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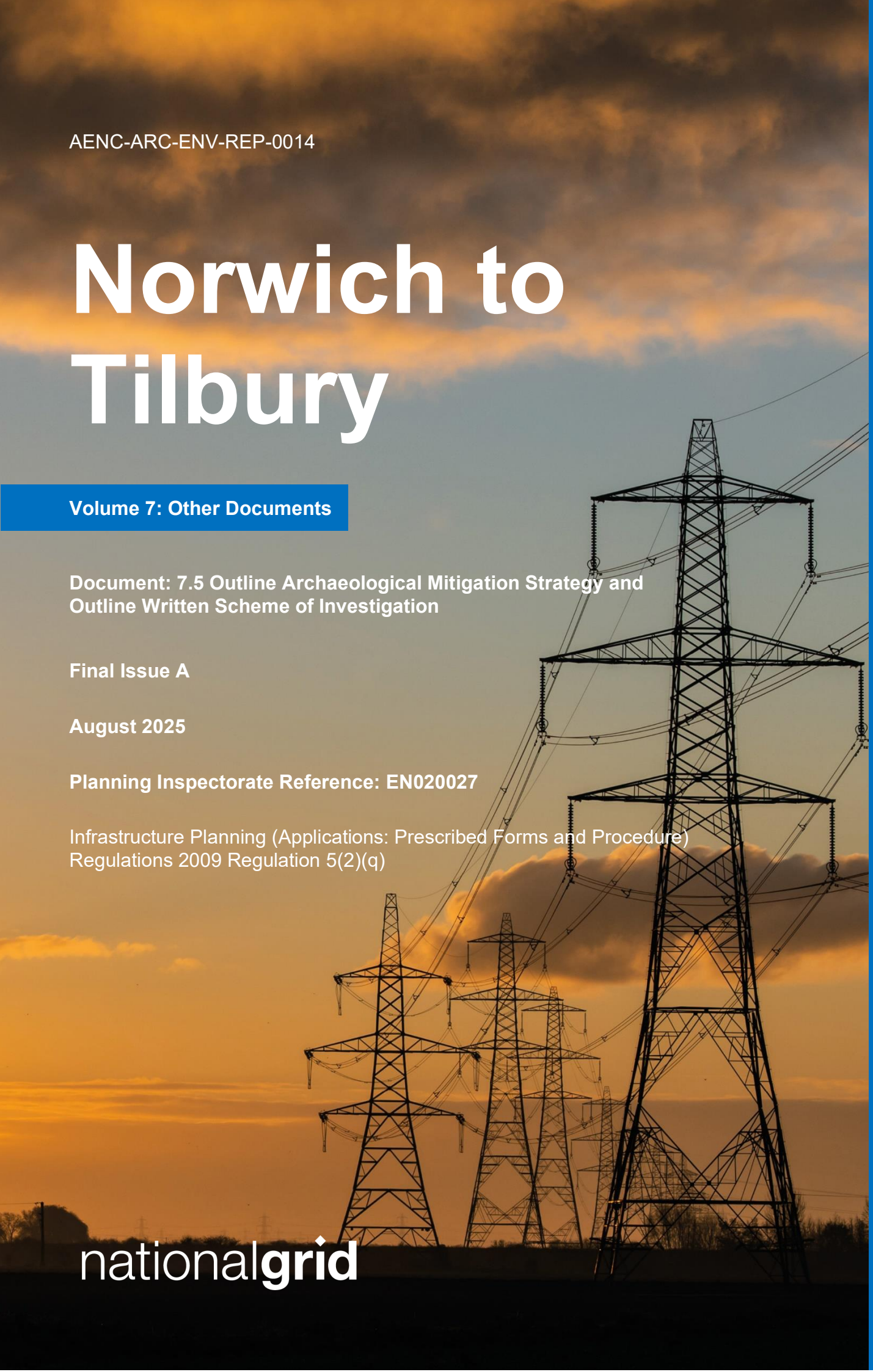

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Executive Summary

This document provides an Outline Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (AMS-OWSI) for Norwich to Tilbury (the 'Project'), to support the Development Consent Order (DCO) application.

The purpose of this document is to set out the process, guiding principles and methods for the planning and implementation of additional archaeological mitigation works proposed to mitigate the adverse effects of the Project. This document details the types of archaeological mitigation proposed to reduce the effect of the Project on archaeological remains. Mitigation for historic buildings and historic landscapes is accounted for in the Outline Code of Construction Practice (CoCP) (document reference 7.2) and the Outline Landscape and Ecological Management Plan (LEMP) (document reference 7.4) and therefore is not discussed in this document.

This document also presents the approach to engagement and approvals, project management, and the post-excavation analysis and publication stages of the post-consent work.

Specific mitigation would be developed in Detailed Written Schemes of Investigation (DWSI) that will be prepared following agreement of this outline document. Mitigation has been developed based on the Historic Environment baseline, mainly derived from the archaeological surveys and trial trenching undertaken for the Project and supplemented, where appropriate, with desk-based information.

Mitigation within this Outline AMS-OWSI is secured by Requirement 5 in the Draft DCO (document reference 3.1) which would require the Main Works Contractor(s) to submit, have approved by the relevant discharging authority, and comply with, Detailed WSIs that are substantially in accordance with this document. All pre-commencement operations listed in the Draft DCO (document reference 3.1) would be carried out in accordance with this Outline AMS-OWSI.

1. Introduction

1.1 Introduction

1.1.1 This document provides an Outline Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (AMS-OWSI) for Norwich to Tilbury (the 'Project'), to support the Development Consent Order (DCO) application.

1.2 Overview of the Project

1.2.1 National Grid Electricity Transmission plc ('National Grid') owns and maintains the national high voltage electricity transmission network throughout England and Wales.

1.2.2 The transmission network connects the power from where it is generated to the regional Distribution Network Operators who then supply businesses and homes.

1.2.3 National Grid holds the Transmission Licence for England and Wales, and its statutory duty is to develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity, as set out in the Electricity Act 1989.

1.2.4 National Grid has developed plans for the Project. The Project would support the UK's net zero target through the connection of new low carbon energy generation in East Anglia and by reinforcing the transmission network.

1.2.5 The Project comprises reinforcement of the transmission network between the existing Norwich Main Substation in Norfolk and Tilbury Substation in Essex, via Bramford Substation, the new East Anglia Connection Node (EACN) Substation and the new Tilbury North Substation.

1.2.6 The reinforcement is needed because the existing transmission network, even with current upgrading, will not have sufficient capacity for the new renewable energy (a substantial proportion of which would be generated by offshore wind) that is expected to connect to the network over the next 10 years and beyond. Completion of the Project, together with other new reinforcements across the country, will meet this future energy transmission demand both in East Anglia and across the UK.

1.2.7 The Project comprises:

- A new 400 kilovolt (kV) electricity transmission connection of approximately 180 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation, a new EACN Substation and a new Tilbury North Substation, including:
  - Approximately 159 km of new overhead line supported on approximately 509 pylons, either standard steel lattice pylons (approximately 50 m in height) or low height steel lattice pylons (approximately 40 m in height) and some of which would be gantries (typically up to 15 m in height) within proposed Cable Sealing End (CSE) compounds or existing or proposed substations

  - Approximately 21 km of 400 kV underground cabling, some of which would be located through the Dedham Vale National Landscape (an Area of Outstanding Natural Beauty (AONB[1])

- Up to seven new CSE compounds (with permanent access) to connect the overhead lines to the underground cables
- Modification works to connect into the existing Norwich Main Substation and a substation extension at the existing Bramford Substation
- A new 400 kV substation on the Tendring Peninsula, referred to as the EACN Substation (with a new permanent access). This is proposed to be an Air Insulated Switchgear (AIS) substation
- A new 400 kV substation to the south of Orsett Golf Course in Essex, referred to as the Tilbury North Substation (with a new permanent access). This is proposed to be a Gas Insulated Switchgear (GIS) substation
- Modifications to the existing National Grid Electricity Transmission overhead lines to facilitate the connection of the existing network into the new Tilbury North Substation to provide connection to the Tilbury Substation
- Ancillary and/or temporary works associated with the construction of the Project.

1.2.8 In addition, third party utilities diversions and/or modifications would be required to facilitate the construction of the Project. There would also be land required for environmental mitigation and Biodiversity Net Gain (BNG).

1.2.9 As well as the permanent infrastructure, land would also be required temporarily for construction activities including, for example, working areas for construction equipment and machinery, site offices, welfare, storage and temporary construction access.

1.2.10 Further details of the Project are included within Environmental Statement (ES) Chapter 4: Project Description (document reference 6.4) and shown on ES Figures 4.1: Proposed Project Design (document reference 6.4.F1) and 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2).

1.3 Purpose of the Outline AMS-OWSI

1.3.1 The purpose of this document is to set out the process, guiding principles and methods for the planning and implementation of additional archaeological mitigation works (and any post-consent archaeological work) proposed to mitigate the adverse effects of the Project. Mitigation for historic buildings and historic landscapes is accounted for in the Outline Code of Construction Practice (CoCP) (document reference 7.2) and the Outline Landscape and Ecological Management Plan (document reference 7.4) and therefore is not discussed in this document.

1.3.2 This document details the types of archaeological mitigation proposed to reduce the effect of the Project on archaeological remains.

1.3.3 The first principle of archaeological mitigation is to preserve or protect archaeological remains wherever possible or, where this is not possible, to implement a structured programme of archaeological investigation and recording.

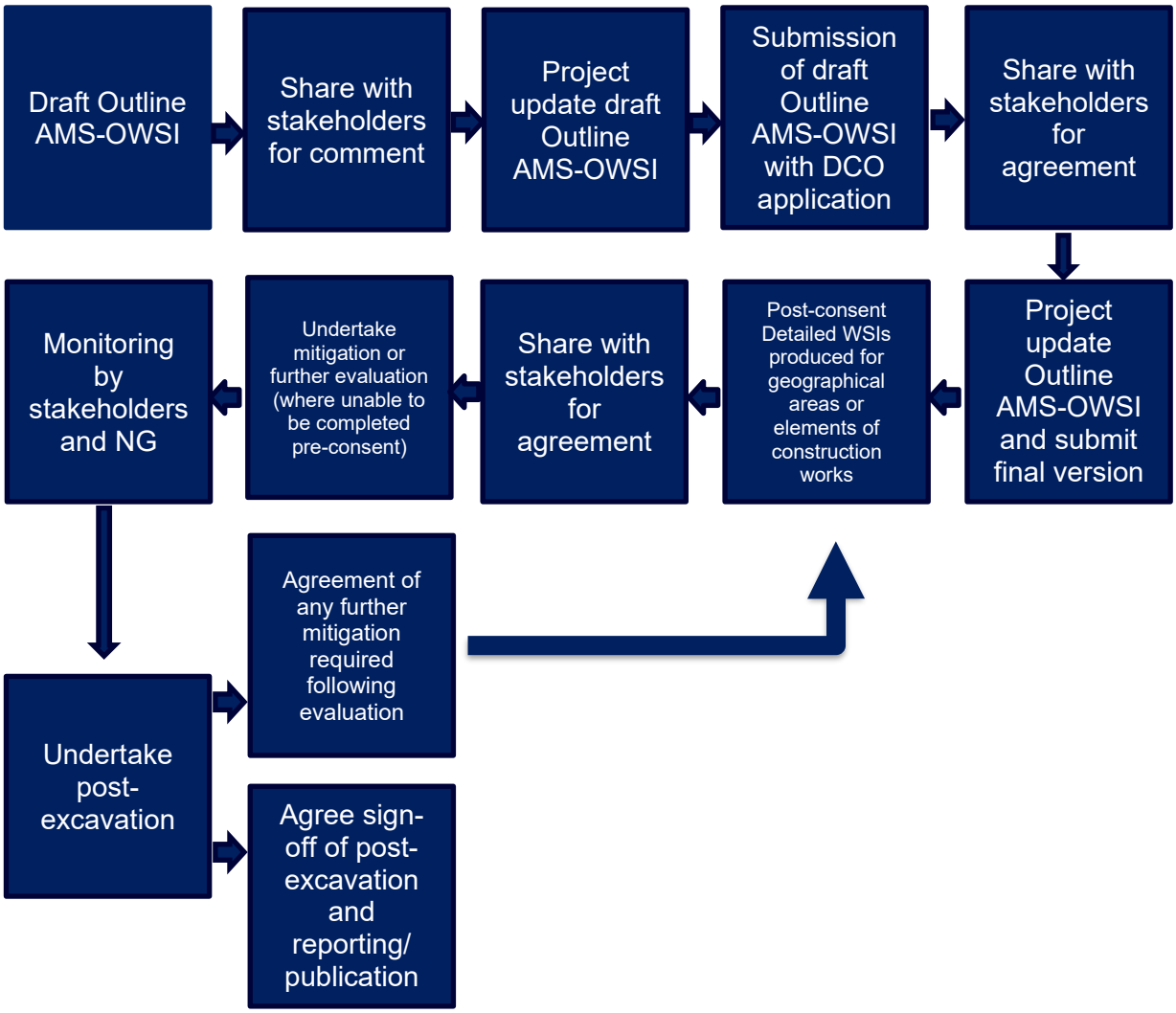
[1] National Landscape is the rebranded name of an AONB from 22 November 2023

1.3.4 Appropriate and proportionate geophysical (magnetometer) survey and archaeological trial trenching has been undertaken to date. This is summarised in Section 1.8. Alongside the detailed desk-based information included in assessment this is considered to provide a reasonable basis for assessment necessary for the purposes of the ES (document reference 6.11). It is expected that limited additional archaeological evaluation would also be carried out post-consent at certain locations along the Project where access was previously not possible or where only a limited amount of work was carried out pre-consent. This assumes that the majority of evaluation would have been undertaken during the pre-consent phase, as set out in Section 1.8. The purpose of this would be to inform the detailed mitigation requirements.

1.3.5 This document also presents the approach to engagement and approvals, project management, and the post-excavation analysis and publication stages; a flow diagram of the process is shown in Image 1.1.

1.3.6 This document describes the types of mitigation that could be undertaken and the process for agreeing appropriate mitigation with relevant stakeholders. The mitigation proposed in the ES (document reference 6.11) assessment would be developed in Detailed Written Schemes of Investigation (DWSI) that will be prepared following agreement of this outline document. Mitigation has been developed based on the Historic Environment baseline, mainly derived from the archaeological surveys and trial trenching undertaken for the Project and supplemented, where appropriate, with desk-based information.

Image 1.1 Flow diagram of mitigation WSI process



1.4 Scope of the Outline AMS-OWSI

1.4.1 This document follows the approach to mitigation set out in ES Chapter 11: Historic Environment (document reference 6.11) of the ES (Volume 6 of the DCO application) and mitigation measures in the Outline CoCP (document reference 7.2). Mitigation in the Outline CoCP is secured by Requirement 4 and mitigation within this Outline AMS-OWSI is secured by Requirement 5 in the Draft DCO (document reference 3.1) which would require the Main Works Contractor(s) to submit, have approved by the relevant discharging authority, and comply with, Detailed WSIs that are substantially in accordance with this document. All pre-commencement operations listed in the Draft DCO (document reference 3.1) would be carried out in accordance with this Outline AMS-OWSI.

1.4.2 The Outline AMS-OWSI sets out the framework for archaeological mitigation of sites affected by the Project. This document conforms with current good practice as defined by national and professional standards, and takes account of relevant guidance including but not limited to:

- The Chartered Institute for Archaeologists' (CIfA) Code of Conduct (updated October 2022) together with the newly restructured Standards and Universal

Guidance (for field evaluation, excavation, monitoring and recording) (CIfA 2023a-f).

- Historic England's guidance, including Managing Significance in Decision-Taking in the Historic Environment (GPA2) (Historic England, 2015a) and The Setting of Heritage Assets (GPA3) (Historic England, 2017)
- Overarching National Policy Statement for Energy (EN-1) (NPS EN-1) (Department for Energy Security and Net Zero (DESNZ), 2024a)
- The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2024) (particularly Section 16) and associated Planning Practice Guidance
- DCO requirements and relevant local planning policies where applicable
- Archaeological fieldwork standards/guidance produced by Norfolk County Council, Suffolk County Council Archaeological Service or Essex County Council.

1.4.3 This framework ensures that the proposed archaeological mitigation strategy is consistent with nationally recognised professional expectations and statutory planning requirements.

1.4.4 The mitigation measures proposed within this Outline AMS-OWSI are informed by established approaches set out in recognised national guidance, such as the *Design Manual for Roads and Bridges* (DMRB) LA 106 (*Cultural Heritage Assessment*, National Highways, 2020). While the Project is not a road scheme, this guidance provides nationally recognised approaches to mitigation strategies for archaeological remains within linear infrastructure contexts. Its principles are broadly applicable to large-scale infrastructure projects, including linear energy developments.

1.4.5 In line with guidance in DMRB LA 106, the proposed mitigation measures include avoidance, preservation, or investigation and recording.

1.4.6 Embedded, standard and additional mitigation measures relevant to the Historic Environment are described in ES Chapter 11: Historic Environment, Section 11.6 (document reference 6.11) and the Outline CoCP (document reference 7.2). Standard and additional mitigation measures specific to the Historic Environment are secured through Requirement 4 in the Draft DCO (document reference 3.1) which would require the Main Works Contractor(s) to prepare the CoCP to discharge the Requirement.

1.4.7 Standard and additional mitigation measures for archaeology set out in the Outline CoCP include:

- H01: Methodology and processes for archaeological mitigation is specified through the Outline AMS-OWSI (document reference 7.5) to be submitted with the DCO application.
- H02: DWSIs shall set out the arrangements and responsibilities for implementing, monitoring and auditing the mitigation measures identified in the DWSIs
- H03: The location of known archaeological remains or areas where archaeological investigations will be undertaken (i.e., excavations) will be signposted/ fenced off to avoid unintentional damage
- H04: Where a previously unknown heritage asset has been discovered, or a known heritage asset has proven to be more significant than foreseen at the time

of application, the Project will inform the Local Planning Authority and agree a solution that protects the significance of the new discovery, through preservation or excavation and recording, whichever is practicable within the Project construction requirements

- H05: Local Planning Authority Archaeological Advisors will have access to the Project to monitor and sign-off relevant work. No construction can commence within areas identified for archaeological mitigation without sign off from the relevant Local Planning Authority Archaeological Advisor.

1.5 Structure of the Outline AMS-OWSI

1.5.1 Chapters 1 to 4 of this document comprise the outline archaeological mitigation strategy. They describe the principles to be applied when designing and implementing archaeological mitigation for the Project. They propose strategies and approaches for the protection of archaeological remains to be retained and for the investigation, recording, analysis, and publication of archaeological remains to be removed in advance of construction.

1.5.2 Chapter 5 of this document comprises the Outline Written Scheme of Investigation (OWSI). The application strategy for each of the mitigation approaches is discussed and outline method statements are presented. These would form the basis of the works to be detailed in the DWSIs.

1.5.3 Chapter 6 of this document details the requirement for post-excavation analysis and the eventual publication of the archaeological and other heritage work arising from the mitigation programme.

1.6 Status of this Document

1.6.1 This Outline AMS-OWSI has been prepared for submission alongside ES Chapter 11: Historic Environment (document reference 6.11) and ES Appendices 11.1-11.7 (document references 6.11.A1 – 6.11.A7) as a draft document to support the application for development consent.

1.6.2 This Outline AMS-OWSI has been agreed in principle with the Local Planning Authority Archaeological Advisors. This document will be updated in agreement with the Local Planning Authority Archaeological Advisors and will be provided to them for approval.

1.7 Roles and Responsibilities

1.7.1 This Outline AMS-OWSI has been prepared for submission alongside the ES (Volume 6 of the DCO application).

1.7.2 National Grid (the Applicant for the Project) will establish the appropriate roles and responsibilities for site staff as set out in the Outline CoCP (document reference 7.2).

1.7.3 The Local Planning Authority Archaeological Advisors will be responsible for confirming that the requirements of the DCO are met, in accordance with any conditions relating to archaeology. The Archaeological Advisors will be responsible for final sign off and approval of all mitigation measures.

1.7.4 National Grid will appoint an Archaeological Clerk of Works (ACoW) for the Project. The ACoW, working on behalf of National Grid, will be responsible for liaising with the Archaeological Advisor to ensure that evaluation and mitigation measures are correctly implemented, monitored, and maintained during the construction phase of the works. This will include monitoring the Archaeological Contractor's work to ensure compliance with the DWSIs and this Outline AMS-OWSI and monitoring the specific construction activities to ensure compliance with all archaeological mitigation requirements, including protection measures, set out in the Outline CoCP (document reference 7.2).

1.7.5 National Grid will appoint an Archaeological Contractor to carry out the archaeological evaluation and mitigation fieldwork. The Archaeological Contractor will be responsible for the production of DWSIs for each stage of archaeological investigation.

1.8 Summary of Evaluation Fieldwork Undertaken by the Project

1.8.1 The results of the evaluation fieldwork completed to date are contained in ES Appendix 11.3: EACN Geophysical Survey Report (document reference 6.11.A3), ES Appendix 11.4: Geophysical Survey Results Report (document reference 6.11.A4), ES Appendix 11.5: Trial Trenching Results Reports (document reference 6.11.A5) and ES Appendix 11.6: Geoarchaeological and Archaeological Monitoring of Ground Investigation Works Report (document reference 6.11.A6). The results of this fieldwork are summarised in the ES Chapter 11: Historic Environment (document reference 6.11) and included in assessment in ES Appendix 11.2: Historic Environment Assessment Tables (document reference 6.11.A2).

1.8.2 Table 1.1 below provides a summary of the progress to date and future programme for the archaeological evaluation fieldwork for the Project. The table refers to priority and non-priority areas for fieldwork. Priority areas have been defined based on reduced design flexibility, construction methodology, and the associated extent of archaeological impact likely to result from their construction. The Limits of Deviation (LoD) allows for greater flexibility at the construction stage for some elements of the Project than others, for example the overhead line in comparison to temporary construction compounds. The priority areas have less design flexibility in the LoD than the non-priority areas. Construction programme considerations have also informed the classification of priority areas. Priority areas comprise:

- 400 kV underground cable, including the associated haul road works
- Cable Sealing End compounds
- Temporary construction compounds
- Substations.

1.8.3 Non-priority areas comprise:

- Overhead line sections of the Project, including the associated haul road works
- Third party infrastructure works
- Ecological and landscape mitigation areas/biodiversity net gain areas.

1.8.4 In most cases the classification of priority areas for geophysical survey and archaeological trial trenching are the same. However, for geophysical survey the priority areas also include some sections of proposed overhead line or 3rd party mitigation works where there is assessed to be higher archaeological potential. As there is greater flexibility in final design for these design elements and the working areas, and consequently areas of physical impact, are smaller they have not been included in the priority areas for archaeological trial trenching.

Table 1.1 Summary of evaluation progress and ongoing programme

Fieldwork Type	Phase/ Comment	For DCO submission and included in ES	Post DCO submission / pre-examination	Pre-Determination	Post DCO Consent / pre commencement
Geophysical Survey	Priority areas (Phase 1)	Surveys in 2025 focused on areas where access was not possible in 2024 or where design change altered the location for the survey. Approx. 90% complete and included in the ES (Volume 6 of the DCO application).	The final 10% of results will be included in an addendum of further information to support the ES (Volume 6 of the DCO application), to be ready for start of examination.	n/a	Contingency for any areas where access not possible pre-consent. This document includes provision for this and will be secured through the DCO.
	Non-Priority areas (Phase 2)		Approx. 50% of areas included in addendum of further information to support the ES (Volume 6 of the DCO application) ahead of DCO examination.	Completion of final 50% of survey and reporting (if not completed by end of 2025).	Contingency for any areas where access not possible pre-consent. This document includes provision for this and will be secured through the DCO.
Archaeological Trial Trenching (ATT)	Priority areas (Phase 1) (estimate 3,400 trenches)	Site 1: Complete (283 trenches) Site 8: Three areas complete (330 trenches) Site 9: Five areas complete (280 trenches Site 10: Complete (505 trenches) 1398 trenches complete overall (approx. 40%)	Completion of sites 8 and 9. Remaining Sites (2, 5, 6, 7, 11, 12, 13, 14, 15, 16) These sites comprise temporary construction compounds, substation works and short sections of underground cable near Fairstead and Tilbury (Essex).	n/a	Contingency for any areas where access not possible pre-consent. This document includes provision for this and will be secured through the DCO.

Fieldwork Type	Phase/ Comment	For DCO submission and included in ES	Post DCO submission / pre-examination	Pre-Determination	Post DCO Consent / pre commencement
			Fieldwork to be completed in 2025 An addendum of further information to support the ES (Volume 6 of the DCO application), to include any additional baseline and assessment resulting from trial trenching, would contain a minimum of approx. 85% of results of post-submission fieldwork to be ready for start of examination. Any outstanding results would be shared and agreed with stakeholders early in 2026.		
	Non-Priority areas (Phase 2)	Trial trench evaluation of non-priority areas will be agreed with Local Planning Authority Archaeological Advisors and is expected to follow the same approach to areas of physical impact from construction as for the priority areas.		Expectation that ATT will continue during 2026 (examination and pre-determination) to ensure information available to inform detailed design and enable ongoing agreement of mitigation with stakeholders.	Contingency for any areas where access not possible pre-consent. This document includes provision for this and will be secured through the DCO.

2. Principles and Objectives for Archaeological Mitigation

2.1 Principles

2.1.1 This chapter of the document describes the principles that would apply to archaeological mitigation for the Project.

2.1.2 The principles would be applied to all archaeological work carried out across the entire Project. Those that are relevant to an archaeological mitigation area would be specifically provided in the relevant DWSI.

2.1.3 Additional archaeological mitigation is required where there would be an unavoidable impact on archaeological remains and associated deposits. The sites of archaeological interest which would require mitigation were initially identified in ES Chapter 11: Historic Environment (document reference 6.11) and ES Appendix 11.2: Historic Environment Assessment Tables (document reference 6.11.A2) (and any further environmental information – as detailed within ES Chapter 11: Historic Environment (document reference 6.11) and Table 1.1, regarding providing Historic Environment baseline and assessment following further evaluation).

2.1.4 The principles set out below seek to guide actions to ensure the conservation of heritage assets throughout the Order Limits.

- The consideration of the Historic Environment of the Project as a whole should be inclusive and include archaeological remains from palaeoenvironmental evidence up to and including remains of the last century
- All heritage assets should be considered with appropriate weight, reflecting their value, which could be subject to change in the event of discovery of currently unknown archaeological remains or new information on known archaeological remains
- Archaeological works should be undertaken to a high standard in accordance with the relevant CIfA Codes of Conduct and Standards and Universal Guidance, and should reflect both the value of the heritage assets and the scale and impact of the Project
- The design of mitigation work should take into account applicable Government guidelines on planning and archaeology, including the relevant National Policy Statements, such as Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2024a), National Policy Statement for Electricity Networks Infrastructure (EN-5) (Department for Energy Security and Net Zero, 2024b) the NPPF (Ministry of Housing, Communities and Local Government, 2024), and the National Planning Practice Guidance (NPPG), as well as standards and guidance issued by Local Planning Authorities
- Organisations and individuals undertaking archaeological work along the Project should do so within the ethical and professional standards set out in the CIfA Code of Conduct, Bylaws, standards and universal guidance as well as Policy

Statements (https://www.archaeologists.net/codes/cifa) (as updated from time to time).

2.1.5 The archaeological mitigation approach in this Outline AMS-OWSI would be developed and implemented through the DWSIs in line with the following parameters:

- Adhere to professional codes, guidance, and standards including CIfA
- Ensure that all staff involved in the mitigation programme are aware of the value of the heritage assets along the Project through provision of a Project-specific induction
- Review and assess the information already available from relevant prior investigations before designing any new works
- Consider archaeological and cultural heritage evidence from all periods and its contribution to the understanding of the historic landscape and its use over time, with reference to the East of England Regional Research Framework (Association of Local Government Archaeological Officers East of England and Historic England, 2000; 2011; 2020)
- Only undertake extensive intrusive works in areas within the Order Limits where there would be a direct impact through development to archaeological remains
- Use information provided by other disciplines (for example, geotechnical investigations)
- All works must take account of all statutory designations.

2.2 Objectives

2.2.1 The following objectives set out the practical outcomes that the archaeological mitigation strategy must deliver. They convert the overarching principles in Section 2.1 into clear, measurable actions to guide all stages of work, from evaluation and excavation through to outreach, analysis, publication and archive deposition.

2.2.2 All those undertaking archaeological work associated with the Project would:

- Ensure a detailed programme of archaeological work is in place to appropriately mitigate impacts on any archaeological remains due to the Project
- Promote high quality research using appropriate excavation methodologies and scientific techniques to explore a transect through the landscape and investigate past settlement patterns, develop new research questions to be addressed through the Project's archaeological investigations contributing to relevant regional and national research frameworks
- The results of archaeological investigation would be published within an appropriate period following assessment and analysis (see Chapter 6 for further details). The results of fieldwork interventions should be combined into a single report or several thematic reports
- Ensure that the results of the investigations are:
  - Made publicly available in an appropriate format for assimilation into the relevant Historic Environment Records (HERs)

- Disseminated in a timely manner via the Online Access to the Index of Archaeological Investigations (OASIS) and the Archaeological Data Service
- Disseminated through outreach during and post fieldwork where possible.

2.3 Aims of Mitigation Techniques

2.3.1 Archaeological mitigation for the Project would take various forms, ranging from preservation of a site in situ, excavation, sampling and monitoring and recording. Further details of these techniques are contained within Chapter 5. The mitigation techniques that may be required for the Project, and the aims of each technique, are presented in Table 2.1.

Table 2.1 Aims of mitigation techniques proposed for the Project

Ref	Mitigation Method	Description and Aim
1. Preservation in situ		
1.1	Avoidance	Primarily achieved through design as embedded mitigation but can be recommended when significant archaeological remains are discovered during archaeological work or construction. The aim is to avoid damage to heritage assets by removing any potential impact.
1.2	Burial or sealing of remains with barrier membrane	Burying or sealing remains beneath fill material to ensure that they are not disturbed (including use of a protective barrier membrane between the buried remains and the fill material. The aim is to avoid damage to heritage assets by removing any potential impact.
1.3	Fencing	Measures for preservation in situ would include protective fencing. The aim is to avoid damage to heritage assets by removing the potential for unintended impacts.
1.4	Track matting	Where construction vehicle movements cannot be avoided, temporary track matting will be laid to spread vehicle loads, prevent rutting and minimise compression of the soil profile, thereby reducing the risk of harm to any buried archaeological remains.
1.5	Control of plant movement	Where practicable the aim is for control measures (such as fencing, signage) for plant movement to avoid damage to buried archaeological remains through compression or rutting.
2. Recording of heritage assets		
2.1	Geoarchaeological deposit modelling	May be used in conjunction with 4.4. Using existing information to map the distribution of buried deposits of archaeological interest across a site or landscape.

Ref	Mitigation Method	Description and Aim
		Interpretation of when the deposits accumulated and what they represent allows areas of archaeological potential to be identified. The aim is to enable subsequent fieldwork to be focused and/or the context of archaeological remains to be better understood.
3. Non-intrusive archaeological fieldwork		
3.1	Controlled metal detecting	The systematic metal detecting of a given area of archaeological investigation to allow the plotting and recording of any metalwork. There are two aims, firstly to create a record of the distribution of archaeological artefacts within the ploughzone, to advance understanding of the value of the archaeology of a given area and to inform the development of further mitigation, and secondly to recover any archaeological metalwork from topsoil during intrusive archaeological fieldwork.
3.2	Geophysical survey	A non-intrusive archaeological survey technique used to identify differences between buried archaeological remains and surrounding soil. The purpose of this is to understand likely presence, extent and nature of buried archaeological remains.
4. Intrusive archaeological fieldwork		
4.1	Trial trenching	This comprises the machine excavation of trenches and investigation by hand of identified archaeological remains. The aim is to determine the presence or absence of archaeological deposits, their state of preservation and to inform the development of further mitigation.
4.2	Detailed excavation	A programme of controlled, intrusive fieldwork with defined objectives which maps, examines, records and interprets archaeological remains at a site or within a specified area. The aim is to create a record of any archaeological remains before they are lost, wholly or in part, to advance understanding of the value of the archaeological assets.
4.3	Strip, map and sample excavation	Strip, map and sample comprises the archaeologically controlled strip of a defined area within the Order Limits under the direction of a suitably qualified archaeologist. The aim is to create a record of any archaeological remains before they are lost, wholly or in part, to advance understanding of the value of the archaeological assets.
4.4	Geoarchaeological and	May be used in conjunction with 2.2 (Geoarchaeological deposit modelling). A programme of sample recovery and assessment/analysis carried

Ref	Mitigation Method	Description and Aim
	palaeoenvironmental investigation	out to investigate palaeoenvironmental conditions and soil sediment development that may be relevant to the research of archaeological sites or remains found within the vicinity. Achieved through trial pit excavations or other soil sample retrieval methods (such as auger or boreholes). The aim is to provide additional information and context to any archaeological remains before they are lost, wholly or in part, to advance understanding of the value of the archaeological assets.
5. Monitoring during construction		
5.1	Archaeological monitoring and recording	A programme of observation of soil stripping by machine for construction works and where required the investigation and recording of archaeological remains. To be carried out in specific areas where the presence of, or moderate potential for, archaeological remains has been demonstrated or can be predicted. The aim is to create a record of any archaeological remains before they are lost, wholly or in part, to advance understanding of the value of the archaeological assets.
6. Outreach and public engagement		
6.1	Outreach officer	An archaeologist with specific responsibilities for outreach and engagement with the wider community.
6.2	Outreach activities	This could include presentations, talks, public events and exhibitions.
7. Post-excavation		
7.1	Conservation and assessment	A programme of post-excavation assessment, conservation and reporting would be carried out.
7.2	Analysis and reporting	Archaeological post-excavation analysis (including but not limited to, finds analysis, environmental sample analysis, Carbon 14 and Optically Stimulated Luminescence (OSL) dating and other specialist inputs), and reporting.
7.3	Archiving	The deposition of the archive in an approved local museum or other repository, and the creation of an appropriate digital archive.
8. Publication		
8.1	Publication	Publication of the results in appropriate formats including academic and more popular publications.

3. Research Agenda

3.1.1 The Overarching National Policy Statement for Energy (EN-1) (Department for Energy Security and Net Zero, 2024a) states in paragraph 5.9.17 that, where the loss of the whole or part of a heritage asset's significance is justified, the applicant will be required to *'record and advance understanding of the significance of the heritage asset before it is lost (wholly or in part)'.*

3.1.2 Advancing understanding is achieved through reference to the value of the heritage asset and the potential contribution the asset makes to the Historic Environment research agenda.

3.1.3 The research framework relevant to the Project is the East of England Regional Research Framework (EERRF) (Association of Local Government Archaeological Officers East of England and Historic England, 2000; 2011; 2021).

3.1.4 The EERRF was published in 2021 and built on the previous research framework published in 2000 and updated in 2011. The EERRF outlines the current understanding of the Historic Environment of the East of England region, and identifies gaps in current knowledge/understanding, and relevant research questions. The EERRF comprises period specific resource assessments and research agendas. It has been subject to periods of review and update in response to the development of understanding of the Historic Environment of the region.

3.1.5 The EERRF, desk-based studies, geophysical surveys and the results of the archaeological trial trenching would be used to inform specific research questions for the Project, in consultation with key stakeholders, and would be set out in the DWSIs.

3.1.6 Each DWSI for areas of archaeological interest would be prepared substantially in accordance with this document, which is secured through Draft DCO Requirement 5 (document reference 3.1), and would clearly identify research objectives and approaches which would contribute to meeting those objectives.

4. Construction Activities Requiring Mitigation

4.1 Temporary Construction Compounds

4.1.1 This chapter includes details of construction activities that would require archaeological mitigation. It explains the nature of the different types of construction works in order to explain the types of potential impacts to archaeology, should archaeological remains be present in those locations. This would inform the mitigation that would be required and specified in the Detailed WSIs. Further details of construction activities can be found in ES Chapter 4: Project Description (document reference 6.4).

4.1.2 There would be an element of preparatory works/pre-commencement works/enabling works in anticipation of construction at all temporary construction sites. The working areas would be demarcated and secured by temporary fencing appropriate to the location, for example provision of stockproof fencing in grazing areas. Gated entrances would be installed at the entrance to the working areas, to secure the site. Once secured, the working area, temporary construction compounds and proposed cable sections would generally be stripped of the upper layers of soil which would be stored appropriately within the Order Limits in accordance with the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2). They would be reinstated to their former condition (or as agreed with the relevant landowner) following their use.

4.1.3 The following types of temporary construction compounds are proposed to facilitate construction of the Project:

- Main Works compounds (overhead line) (two proposed): These would act as the key focal points for deliveries, materials storage, fuel storage, office space, meeting facilities, welfare facilities and power generator(s) for the Project delivery teams. Main Works compounds would be approximately 275 m x 200 m. They would be typically surfaced with stone chippings over geogrid
- Satellite compounds (overhead line) (five proposed): These would be positioned at strategic locations along the Project. They would be smaller than the Main Works compounds, approximately 130 m x 110 m, and would serve as specific working areas to provide local welfare facilities for staff and points for delivery of materials to the working areas. They would be typically surfaced with stone chippings over geogrid
- Primary compounds (underground cable) (three proposed): These would provide storage for approximately 54 cable drums, and have approximate dimensions of 155 m x 155 m. These would allow for deliveries, materials storage, fuel storage, office space, meeting facilities, welfare facilities and crane platforms typically for unloading cable drums. They would be typically surfaced with stone chippings over geogrid. An additional six secondary construction compounds are proposed along the cable alignment which would be similar to the primary compounds but smaller to reflect the available space and Project needs at the specific location

- Substation/CSE compounds (10 proposed): These would be appropriately positioned at substation and CSE locations. These would be similar in size and arrangement to those used for the cable works, with the cable drum storage being replaced with additional laydown area
- Concrete batching plant compounds (four proposed): These would provide a location for temporary concrete batching equipment, with approximate dimensions of 62 m x 90 m. These would allow for assembly of the batching equipment, topsoil storage, aggregate storage (for concrete mixing) and Heavy Goods Vehicle (HGV) access around the equipment. Batching equipment would typically be 10 m in height. The batching plants would provide Cement-Bound Sand (CBS) for backfill of the cable trench and concrete for substation and CSE compound works. These compounds would be located at strategic positions, based on anticipated concrete/ CBS demand. They would be typically surfaced with stone chippings over geogrid
- 132 kV overhead line mitigation works compounds (17 proposed): These would be appropriately positioned within the working area for the 132 kV mitigation works and approximately 40 m x 40 m in size, located at each end of the proposed works. They would be typically surfaced with trackway
- Highway mitigation compounds (13 proposed): These are required to facilitate the construction of the highway mitigation works, for example road widening and passing places. They would generally include welfare facilities, traffic management equipment, vehicle parking and material storage. They would be typically surfaced with stone chippings over geogrid.

4.1.4 As the construction of the temporary construction compounds would require removal of soil there is potential for physical impacts to archaeology located within these areas. The construction techniques are expected to affect near-surface archaeology with no impacts expected to deeply buried deposits. On the basis of current construction information it is not expected that the static load or vehicle movements within temporary construction compounds would generate downward compaction pressures of a great enough magnitude to impact deeply buried archaeological deposits, any such impacts are expected to occur within the depth of archaeological deposits that would be investigated as ‘near-surface’ features through mitigation measures set out in the relevant DWSI.

4.1.5 Any soil reinstatement measures, as set out in the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2), would also be expected to only affect near surface archaeological remains as these works would not impact a greater depth than would have been investigated through mitigation.

4.2 Haul Roads

4.2.1 The almost continuous haul roads along the entire length of the alignment are proposed to typically be constructed within the underground cable corridor and adjacent to the overhead line.

4.2.2 The proposed haul roads are only discontinuous at major obstructions along the underground cable and overhead line corridor such as major roads, railways, areas of environmental or historical significance and major watercourses.

4.2.3 For overhead line construction, the haul roads would be typically 6 m wide, with passing places (widening to 8 m) provided at typical intervals of 200 m. The

frequency of passing places would be determined by site-specific conditions at the detailed design stage and the forward visibility along the haul roads.

4.2.4 For the construction of underground cables, CSE compounds and substations, the haul roads would be typically 8 m wide to allow for the delivery and movement of larger equipment using Abnormal Indivisible Load vehicles.

4.2.5 The typical cross section of the haul roads would be 21 m wide, to allow for topsoil and subsoil storage, drainage, and demarcation fencing. A standard detail showing the typical layout of the haul road is shown on the Design and Layout Plans – Traffic and Transport (document reference 2.6.3).

4.2.6 For the assessment of haul road construction, it is assumed that topsoil (and some subsoil) would be stripped and aggregate (e.g. stone) placed on top of the subsoil, delivered to site by HGVs. However, the Main Works Contractor(s) once appointed may adopt different construction methods or transport techniques that would not result in materially new or different effects to those assessed in the ES (Volume 6 of the DCO application).

4.2.7 Within the underground cable sections, the haul roads would normally be positioned central to the alignment, i.e. with cable trenches located either side of the haul roads. Therefore, no additional vegetation clearance would be required, except in some cases where the haul roads deviate from the underground cable alignment to reach a site access point onto the public highway.

4.2.8 In some locations, overhead line construction corridors would need to be accessed from the underground cable corridors. In these locations, a haul road is proposed to be constructed adjacent and parallel to the underground cable corridor to access the overhead lines (this is also referred to as a ‘bypass haul road’). This would be provided to separate the overhead line construction vehicle movements from the works associated with the underground cable construction. Bypass haul roads are shown on ES Figure 4.1: Proposed Project Design (document reference 6.4.F1).

4.2.9 Temporary crossings would be required over watercourses, streams, and field ditches to maintain the haul roads along the alignment; these would likely consist of temporary bridges or culverts. Further detail is included in ES Appendix 4.2: Watercourse Crossing Details (document reference 6.4.A2).

4.2.10 As the construction of the haul roads would require removal of soil there is potential for physical impacts to archaeology located within these areas. The construction techniques are expected to affect near-surface archaeology with no impacts expected to deeply buried deposits. On the basis of current construction information it is not expected that vehicle movements on the haul roads would generate downward compaction pressures of a great enough magnitude to impact deeply buried archaeological deposits, any such impacts are expected to occur within the depth of archaeological deposits that would be investigated as ‘near-surface’ features through mitigation measures set out in the relevant DWSI.

4.2.11 Any soil reinstatement measures, as set out in the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2), would also be expected to only affect near surface archaeological remains as these works would not impact a greater depth than would have been investigated through mitigation.

4.3 Overhead Line

4.3.1 The working areas around each new pylon would be cleared of vegetation and fenced appropriately. Access tracks to each pylon location would then be installed. Temporary appropriate technology / material would be required adjacent to each new pylon location, on which to place cranes, piling rigs and other plant. The stone working areas would typically be 60 m x 60 m (or 70 m x 70 m for angle/terminal/low-height suspension structures and 80 m x 80 m for low-height tension structures). Materials would be brought to site on HGVs and would include the steelwork for the pylons and the conductors (i.e. cabling) wrapped around large drums.

4.3.2 The base of the pylons would involve the excavation of the soil. Piling (which may include percussive) would be required at some pylon locations, subject to the ground conditions. A sample series of ground investigation has been completed (the remaining ground investigation would be undertaken by the Main Works Contractor(s) before detailed design) which would inform the foundation designs. The assessment assumes as a worst-case that percussive piling would be required at each pylon foundation.

4.3.3 Different foundation types can be used for lattice pylons, such as pad and column, vertical tube piles or bored mini-pile foundations, depending on the local ground conditions. The type of foundation to be used is typically identified during the detailed design stage by the Main Works Contractor(s) following intrusive ground investigation surveys.

4.3.4 As the construction of the pylons and surrounding working areas would require removal of soil there is potential for physical impacts to archaeology located within these areas. The construction techniques are expected to affect near-surface archaeology with potential for impacts to deeply buried deposits in the locations of the pylon foundations. On the basis of current construction information it is not expected that the static load or vehicle movements within pylon working areas would generate downward compaction pressures of a great enough magnitude to impact deeply buried archaeological deposits, any such impacts are expected to occur within the depth of archaeological deposits that would be investigated as ‘near-surface’ features through mitigation measures set out in the relevant DWSI.

4.3.5 Any soil reinstatement measures, as set out in the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2), would also be expected to only affect near surface archaeological remains as these works would not impact a greater depth than would have been investigated through mitigation.

4.3.6 Other elements of the works to construct the pylons and install the conductors are not expected to cause any below ground impacts as there would be no requirement to break ground in new areas.

4.4 Substations

4.4.1 The Project requires reinforcement works to the existing National Grid network, including a substation extension at the existing Bramford Substation and modification works to connect into the existing Norwich Main Substation. The Project also requires the construction of the new EACN Substation and the new Tilbury North Substation. Each substation design would be unique, dependent on the proposed equipment and site-specific conditions. However, they would follow a similar typical construction

sequence and programme. The typical construction sequence to construct or extend an electrical substation required for the Project would involve the following:

- Vegetation clearance and stripping of topsoil[2] from the proposed permanent site area and any working areas (topsoil would be stored in bunds on site, for reuse as part of landscaping proposals)
- Set up of temporary access and temporary construction compounds including:
  - Temporary lighting
  - Temporary drainage
  - Temporary fencing
  - Laying and compaction of granular material (and asphalt where required)
- Excavation of drainage attenuation features, installation of pipes, etc.
- Earthworks for construction of permanent site access and platform (including forming temporary soil bunds for storing excavated material). Where practicable, the temporary and permanent access would be combined
- Civil engineering works, to include permanent fencing, access, drainage and foundations of larger structures and/or equipment that is sensitive to ground settlement)
- Percussive piling may be required. This would be confirmed through a programme of ground investigation which would inform the foundation designs to be confirmed at detailed design. Therefore, within the ES (Volume 6 of the DCO application) it is assumed that percussive piling would be required at all new and existing substations
- Installation of structures (e.g. gantries)
- Building works, if the site is to include proposed GIS bays
- Overhead line or underground cabling works, as necessary
- Mechanical and electrical equipment installation
- Testing of equipment
- Commissioning/energisation
- Reinstatement of working areas outside the permanent substation boundary (including environmental mitigation and landscaping as required).

4.4.2 As the construction of the substation would require removal of soil there is potential for physical impacts to archaeology located within these areas. The construction techniques are expected to affect near-surface archaeology with potential for impacts to deeply buried deposits in the locations of any piling works. On the basis of current construction information it is not expected that the static load or vehicle movements within other parts of substation working areas would generate downward compaction pressures of a great enough magnitude to impact deeply buried archaeological

[2] Subsoil would be stripped where required as per the individual site requirements and proposed earthworks strategies. Where suitable, the subsoil would be reused within the earthworks or as part of the landscaping proposal. Where the subsoil cannot be reused it would be removed from site.

deposits, any such impacts are expected to occur within the depth of archaeological deposits that would be investigated as 'near-surface' features through mitigation measures set out in the relevant DWSI.

4.4.3 Any soil reinstatement measures, as set out in the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2), would also be expected to only affect near surface archaeological remains as these works would not impact a greater depth than would have been investigated through mitigation.

4.5 Cable Sealing End Compounds

4.5.1 Although the Project predominantly comprises overhead lines, there are four sections of underground cable. Where overhead lines transition to underground cables (and vice versa), a CSE compound is required. This would comprise high voltage equipment and gantry structures, to enable the transition between underground cables and overhead conductors.

4.5.2 A CSE compound is required at each interface between the new overhead line and the new underground cable. The typical construction sequence to install a CSE compound required for the Project would be similar to that set out for substations, above.

4.5.3 Percussive piling may be required in the CSE compounds. This would be confirmed through a programme of ground investigations which would inform the foundation designs to be confirmed at detailed design. Therefore, within the ES (Volume 6 of the DCO application) it is assumed that piling would be required at all CSE compounds.

4.5.4 Potential archaeological impacts at CSE compounds would mirror those at substations: physical effects on near-surface archaeology across the CSE compound footprints and possible effects on deeper deposits where piling is required.

4.6 Underground Cables

4.6.1 The standard means of installing underground cables is using opencut techniques. Typically, for opencut construction, a construction corridor 120 m wide is required for a double circuit 400 kV underground cable alignment. The 120 m width includes the haul roads, soil storage, pre-construction drainage areas, communications cables and typically six cable trenches for 18 cables (three cables per phase) assumed to be to a typical minimum depth of 1.2 m and suitably spaced apart to allow for the required heat dissipation between cables and circuit phases. This is presented in the Design and Layout Plans (document reference 2.6).

4.6.2 Standard opencut installation typically involves the following processes:

- Appropriately fencing off the working area to secure the site from trespassing and livestock
- Vegetation would be removed where necessary and topsoil would be stripped from the working area and stored for reuse
- A haul road would be installed along the alignment to provide access for construction vehicles to the working areas

- Several open trenches (typically six trenches each accommodating three cables) would be excavated, ducts would be placed within the trenches and then backfilled with a surround of CBS. Telecommunication and ancillary cables are usually placed adjacent to the main cables and within the CBS surround prior to backfilling
- Concrete joint bays would be constructed with the High Voltage Alternating Current (HVAC) cables pulled into the ducts from one joint bay to the next using a winch
- HVAC cables would be jointed (requiring work in a controlled environment)
- The joint bays would be backfilled and link pillars installed above ground to allow monitoring of the cables
- At road crossings, the above works would require traffic management to safely separate the public from the construction activities. Where the road is wide enough, the trenches and ducts would typically be installed across one side of the road, while the other remains operational (using temporary control). The arrangement would then be swapped to the other side to complete the crossing. For narrower roads, a temporary closure and diversion would be required
- Watercourse crossings would typically be undertaken by damming upstream and downstream of the cable alignment to create a dry working area. Water flows would then be pumped from the upstream side to the downstream side of the working area to maintain the flow of the watercourse.

4.6.3 The preferred approach for this Project is to use ducting. A ducted system would result in a more flexible construction programme and enable quicker reinstatement of ground compared to a traditional direct burial method, where the trench would remain open for much longer. There may be locations where ducting is not the best solution, such as where topography limits installation techniques. In such cases, standard opencut methods may be employed (i.e. direct burial).

4.6.4 Once the cables have been installed, the temporary works including any haul roads and temporary construction compounds would be removed. The land would be reinstated to its previous condition and use (or a condition agreed with the landowner), subject to any planting restrictions, for example trees cannot be planted over the top or within 10 m of underground cables.

4.6.5 As the construction of the underground cable and working area would require removal of soil there is potential for physical impacts to archaeology located within these areas. The construction techniques are expected to affect near-surface archaeology with no impacts expected to deeply buried deposits. On the basis of current construction information it is not expected that the static load or vehicle movements within the construction swathe for underground cables would generate downward compaction pressures of a great enough magnitude to impact deeply buried archaeological deposits, any such impacts are expected to occur within the depth of archaeological deposits that would be investigated as ‘near-surface’ features through mitigation measures set out in the relevant DWSI.

4.6.6 Any soil reinstatement measures, as set out in the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2), would also be expected to only affect near surface archaeological remains as these works would not impact a greater depth than would have been investigated through mitigation.

Trenchless Installation

4.6.7 Where open trench is not feasible, for example where the alignment crosses an existing live railway line or other drivers such as for environmental mitigation, trenchless installation may be required. An example of which is Horizontal Directional Drilling (HDD). Typically, for HDD, a construction corridor approximately 200 m wide is required. The underground cable would typically be at a depth of 10 m below ground level; however, the depth would depend on the methodology employed and local constraints.

4.6.8 The underground cable would be installed using a drilling or boring method (or a suitable alternative method) to pass beneath features. There are different trenchless methods that could be used, and each method would have a different construction footprint (all of which could be accommodated within the Order Limits). Depending on the technique, there may be a need to undertake several passes to make the hole wide enough to allow the ducts (pipes) to be pulled through.

4.6.9 Trenchless installation is an expensive option, often one of the noisiest activities during construction, requires a longer programme and can be technically challenging in areas of less suitable geology. Therefore, opencut trench installation is the preferred technique where there are no constraints.

4.6.10 Temporary discharges may be required relating to dewatering and over-pumping in the cable sections, particularly where deeper working is required such as at the trenchless crossing. It is anticipated these would be made to ground, rather than to watercourses. Where this is not practicable in localised areas, any discharge to surface water would be made in compliance with relevant consents.

4.6.11 Some trenchless methods require use of a drilling slurry such as bentonite to support the surrounding ground while the drilling/boring commences. The use of pressurised liquids presents a risk of environmental contamination, either through loss of fluids into permeable strata or breakout of fluids at the surface. Adequate mitigation of these risks requires detailed ground investigation and further design of the trenchless crossings – further assessment of this is presented in ES Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9). Space for access arrangements from the public highway to the proposed trenchless crossing locations is included within the Order Limits in the event of a pollution incident during construction.

4.6.12 There are up to five trenchless crossings proposed to construct the Project. They are shown on ES Figure 4.1: Proposed Project Design (document reference 6.4.F1). The location and number of the trenchless crossings presented are subject to further micro-siting/engineering design which would be informed by ground investigation.

4.6.13 The construction methods for trenchless installation of underground cable are not expected to affect near surface archaeology in normal working, with the exception of the drive and reception locations. In these locations impacts to both near surface and deeply buried archaeological deposits could occur, due to construction passing through the full stratigraphy to reach the required depth. Within the trenchless crossing there is the possibility of a drilling slurry breakout. However, this is considered to be unlikely with the proposed mitigation of these risks and consequently archaeological mitigation in advance is not proposed. The trenchless crossing locations are subject to geophysical survey and archaeological trial trench evaluation to ensure the character and extent of any archaeology in these locations

is understood. This would inform any potential mitigation requirements in the event of a drilling slurry breakout.

4.6.14 The construction techniques have potential to affect deeply buried deposits depending on the potential identified by geoarchaeological monitoring of the ground investigation works in these locations. In most cases it is assessed that the depth is great enough to avoid impacts to even deeply buried deposits.

4.7 Modification and Removal of Existing National Grid Pylons

4.7.1 Sections of the existing YYJ and ZB National Grid overhead lines need to be modified to facilitate the connection of the existing transmission network into the new Tilbury North Substation. The works are shown on ES Figure 4.1: Proposed Project Design (document reference 6.4.F1) and ES Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2) and comprise:

- The re-routeing of the existing YYJ overhead line to a more southerly permanent alignment. This would require eight new pylons and the removal of five existing pylons
- Undergrounding a short section (approximately 0.55 km) of the existing ZB overhead line and the construction of two new CSE compounds, each with a permanent access. In addition, three new pylons would be required and four existing pylons removed
- A number of temporary overhead line diversions onto temporary pylons and use of the proposed permanent pylons in a temporary arrangement would be required to facilitate the works to maintain 'live' circuits for the YYJ and ZB overhead lines. Any temporary pylons like the permanent pylons would be approximately 50 m in height and would require similar foundations to permanent pylons, as described earlier
- To facilitate all of the above, the YYJ and ZB overhead line conductors need to be restrung between pylons YYJ116 to YYJ129 and ZB9 to ZB22.

4.7.2 Where pylons are proposed to be removed, it may be necessary to establish a 60 m x 60 m working area. Typically, this area would not be stoned; instead, if ground conditions are poor, trackway may be used. Removal of pylons would involve removing the conductors by lowering cut sections to the ground, then lowering the insulators and fittings to the ground. Where a pylon is in a clear area and it is safe to do so, the pylon would be removed by 'felling' the whole structure. Alternatively, a mobile crane would be used to remove the structure in sections which would then be lowered to the ground. Once dismantled, the pylon steelwork would typically be broken up on site then removed. The reinforced concrete foundation would then be removed typically to a depth of 1.2 m below ground level. The excavation would then be backfilled and the ground reinstated and any waste removed from site to a suitable licensed waste management facility.

4.7.3 The removal of existing pylons is not expected to cause new impacts to archaeology as the works areas would have been affected by construction of the pylons, and if archaeology were present it would have been removed at this time.

4.7.4 Archaeological impacts related to construction of new/temporary pylons and underground cable are as described for those works above.

4.8 Third Party Infrastructure Works

4.8.1 Several existing overhead and underground third-party services would need to be diverted, removed, undergrounded, or protected. This is largely where they interface with the Project, for example with proposed new overhead line crossings, along Primary Access Routes or at site access point locations. The construction methodology would largely follow the same premise as per the 400 kV overhead line and underground cable proposals but on a reduced scale in terms of width of cable trenches, size of working areas, and types and sizes of vehicles required to undertake the works.

4.8.2 The required mitigation methods and duration (i.e. permanent or temporary mitigation) need to be confirmed with the asset owners prior to any works being carried out. However, third-party works are outlined in the paragraphs that follow.

UK Power Networks (UKPN) 132 kV Pylons

4.8.3 Works to remove, underground and divert existing 132 kV lattice pylon overhead line UKPN infrastructure are shown on ES Figure 4.1: Proposed Project Design (document reference 6.4.F1) and ES Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2).

4.8.4 It may be necessary to establish a temporary diversion of the overhead line while the mitigation works are undertaken to ensure security of supply to end users by keeping one of the circuits live. To maintain supply, one live circuit would be routed on temporary poles, masts or pylons around the area of work so that pylon removal can be undertaken in an electrically isolated safe area (the temporary diversion of the overhead lines is required for approximately eight months up to one year). Only the angle structures have been shown on ES Figure 4.1: Proposed Project Design (document reference 6.4.F1) as the type of structures to be used are yet to be confirmed by UKPN; additional structures between those presented would likely be required during the works. A working area with an approximate 50 m radius at pylon locations and 20 m either side of centreline along the spans to be removed/temporarily diverted would be required. Typically, this area would not be stoned; trackway would be used instead.

4.8.5 It is assumed that typically these works would make use of existing access points. For access to temporary construction compounds and the installation of the underground cable diversions associated with these works, a bellmouth junction would be required due to the nature and type of vehicle movements (delivery of underground cable drums) to these locations. The connection from the bellmouth to the construction swathe would typically not be stoned; trackway would be used instead.

4.8.6 Dismantling of pylons would be undertaken in the same way as for National Grid pylons described above.

4.8.7 To facilitate the underground cable, the last remaining pylon would be replaced with a terminal pylon supporting a CSE platform. From here the 132 kV underground cable diversion would be installed as per the 400 kV underground cable alignment but reduced in scope due to the smaller scale of the assets. The installation of underground cable diversions is assumed to be in a single trench typically up to 3 m in width and 1.2 m in depth to the cover (worst-case for deep ploughing). An underground cable Limits of Deviation (LoD) of 35 m has been applied. Sensitive

features would be avoided such as heritage assets, woodland including ancient woodland, and ecologically valuable habitats including Sites of Special Scientific Interest (SSSIs), County Wildlife Sites (CWS) and Local Wildlife Sites (LWS). However, it is assumed that any vegetation within the LoD would be removed to ground level during construction and reinstated where practicable following the works.

4.8.8 In addition to the above, to facilitate the dismantling of the PSC and PAB route (to the west of Lower Dunton Road and subsequent underground cable diversion route), a new 132 kV substation extension would be required to the west of the existing UKPN Basildon Grid Substation at Dunton Hills. This would accommodate new equipment required to facilitate the undergrounding of the PAB overhead line, due to a lack of space in the existing Basildon Grid Substation footprint. The substation extension would be approximately 80 m by 50 m with a maximum height of 15 m.

4.8.9 These works would be expected to cause similar types of impacts to archaeology as for the 400 kV connection, although they would be reduced in area due to the smaller working areas and greater use of trackway required for the 132 kV works. Where practical archaeology would be avoided by these works, but archaeological mitigation would be required in any locations where this is not practicable.

UKPN Low Voltage/11 kV/33 kV and Openreach Wood Pole Infrastructure

4.8.10 Works to remove, underground and divert existing low voltage/11 kV/33 kV and Openreach wood pole UKPN infrastructure along the overhead line alignment are shown on ES Figure 4.1: Proposed Project Design (document reference 6.4.F1) and ES Figure 4.2: Proposed Project Design – Permanent Features (document reference 6.4.F2). Flexibility has also been retained to allow for the undergrounding of this third party infrastructure along the existing alignment, where this would not lead to materially different significant effects assessed within the ES (Volume 6 of the DCO application).

4.8.11 Vehicles and equipment would be similar to that required for the proposed 400 kV overhead line and underground cable works but at a reduced scale relevant to the works. A terminal wood pole structure would be installed at each end of the section to be undergrounded to facilitate the transition from overhead line to underground cable. The installation of underground cable diversions is assumed to be in a single trench typically up to 1 m in width with 1.2 m depth to the cover (worst-case for deep ploughing). These would be routed either within the existing highway, highway verges or across farmland (using existing gaps through hedgerows where practicable). An underground cable LoD of 25 m has been applied. Sensitive features would be avoided such as heritage assets, woodland including ancient woodland, and ecologically valuable habitats including SSSIs, CWS and LWS. Any residential gardens included within the Order Limits reflect existing oversail by existing UKPN low voltage, 11 kV and 33 kV and Openreach infrastructure and access to such areas is required to facilitate removal or, for example, stringing works.

4.8.12 It is assumed works would be completed using suitable vehicles, for example standard 4x4 or agricultural type vehicles and an excavator (size relevant to the works), which would use the public highway or existing agreed access routes (for the wood pole line), field gates and hedgerow gaps (where practicable). It is assumed there would be no requirement to create new physical temporary access tracks.

4.8.13 This work comprises:

- 47 Openreach mitigation designs
- Five UKPN low voltage mitigation designs
- 89 UKPN 11 kV mitigation designs
- 21 UKPN 33 kV mitigation designs (two of which are steel lattice pylon overhead lines).

4.8.14 These works would be expected to cause similar types of impacts to archaeology as for the 400 kV connection, although they would be reduced in area due to the smaller working areas and greater use of trackway required for the low voltage works. Where practical, archaeology would be avoided by these works but archaeological mitigation would be required in any locations where this is not practicable.

4.8.15 Where the proposed 400 kV underground cable alignment interacts with existing low voltage/11 kV/33 kV UKPN and Openreach wood pole infrastructure, it is proposed that, where necessary, the height of the existing wooden poles would be raised to allow for safe vehicle clearance underneath during construction and operation (and maintenance). A lateral LoD of 25 m has been applied. The works would require limited vegetation clearance during construction, and during operation (and maintenance) vegetation would be managed to maintain the required clearance from the overhead line similar to what is currently required for routine maintenance. Construction activities would include the provision of temporary access to the existing and proposed pole locations, the creation of a working area, the installation of new wooden poles, the stringing of new conductors and fibres, and the removal of the existing poles. It is assumed trackway would be used for the access and working areas.

4.8.16 These works are not expected to cause any new impacts to archaeology as the works areas would have been affected by construction of the original poles/pylons, and if archaeology were present it would have been removed at this time.

4.9 Environmental Mitigation

4.9.1 All proposed environmental mitigation, such as landscape planting and ecological habitat creation, is proposed in the areas within the Order Limits surrounding or near to existing or proposed substations and CSE compounds.

4.9.2 The environmental mitigation proposals are set out in the Outline Landscape and Ecological Management Plan (document reference 7.4). These works could require removal or disturbance of soil through creation of earthworks or tree or other planting and therefore have potential to impact near-surface archaeology. Most of the areas proposed for environmental mitigation would have been affected by construction activity for this Project or other developments and so in many cases any archaeology would have already been affected (and mitigated) prior to the implementation of environmental mitigation. In any locations where archaeology had not already been affected and the nature of the environmental mitigation would cause an impact this would be subject to mitigation as set out in a DWSI.

4.9.3 The Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2), sets out approaches to soil management and handling for construction and reinstatement following construction works. Some of the proposed methods could cause impacts to near-surface archaeology. In many cases the

construction works themselves would have already affected (and mitigated) any archaeology in these locations. However, in areas where there has been no previous archaeological impact the Outline Soil Resource Plan includes provision to ensure potential archaeological impacts would be managed and considered in determining appropriate reinstatement measures and would be detailed in the final Soil Resource Plan.

5. Outline Written Scheme of Investigation

5.1 Detailed Written Scheme of Investigation

5.1.1 DWSIs would be prepared setting out in detail specific mitigation measures for the detailed design of the Project, informed by the strategy described in this Outline AMS-OWSI. Existing models and new datasets collected during fieldwork would inform design of mitigation works in the DWSIs during the investigations. These DWSIs would be prepared by the relevant Archaeological Contractor(s) in consultation with National Grid, the relevant Local Planning Authority Archaeological Advisors and Historic England. The DWSIs would be approved by the relevant Local Planning Authority (through the relevant Local Planning Authority Archaeological Advisors) and, if relevant, Historic England, prior to works commencing in the area to which each DWSI applies. A period of 28 days for review and agreement of DWSIs will be included in the programme.

5.1.2 The specification for the archaeological works contained within the DWSIs would be written in accordance with this Outline AMS-OWSI, and the complete suite of CIfA Standards and Guidance (CIfA 2020a-c, 2022b, 2023a–f). These documents cover archaeological evaluation, excavation, archaeological monitoring and recording (watching brief), and other related fieldwork and post-excavation activities. The DWSIs will also adhere to the current CIfA Code of Conduct (CIfA 2022a) and all other relevant best-practice guidance and standards.

5.1.3 DWSIs would be prepared for specific geographic areas of works, such as a section of overhead line construction, or for types of construction works, such as temporary construction compounds. The approach would depend on the requirements of the construction programme and the nature of archaeology to be mitigated.

5.1.4 Each DWSI would set out the timing and order of the investigative works and include details of how the archaeological programme interacts with other construction activities, and the parties undertaking them. Each DWSI would include a programme for the archaeological work that would be referenced against key milestones/events in the overall design and construction programme.

5.1.5 The Archaeological Clerk of Works (ACoW) and/or the Archaeological Contractor(s) would produce archaeological constraints maps and give Tool Box Talks to inform all site personnel of the archaeological and Historic Environment constraints on site, the protection measures that are required and their obligations under the Outline AMS-OWSI, DWSI and generally, to ensure that these are put in place and complied with.

Archaeological Project Team

5.1.6 The archaeological mitigation works would be delivered by an Archaeological Project Team under the leadership of an experienced Project Manager. The Archaeological Project Team would be provided by one or more Archaeological Contractor(s), to be appointed by National Grid. The Archaeological Contractor(s) would have prime responsibility for delivery of the full programme of archaeological mitigation as set out

in the Outline AMS-OWSI including: all on and off-site works; technical and non-technical publication and dissemination; and preparation and deposition of the archaeological Project archive with the recipient museum or other appropriate storage facility.

5.1.7 The Archaeological Project Team would include named key specialists who would either be site-based or have a regular site presence, or who would be on-call at short notice. These would include (but not be limited to) the following roles:

- Project Manager
- Environmental archaeology co-ordinator
- Environmental archaeology supervisor
- Finds co-ordinator/processing specialist
- Lithics specialist with relevant period expertise
- Ceramics specialist with relevant period expertise
- Geoarchaeologist
- Geophysicist
- Archaeological surveyor
- Digital data co-ordinator/manager
- Human remains specialist
- Animal bone specialist
- Scientific dating specialist
- Conservation specialist
- Metal-detectorist
- Outreach officer.

5.1.8 The names and qualifications of the individuals fulfilling these roles would be provided by the Archaeological Contractor(s) to National Grid for information and comment, immediately after their appointment. The postholders would be in place at the start of the mitigation programme. Any changes to the named Archaeological Project Team postholders would be notified to National Grid, for information and comment.

5.1.9 The specialists appointed to the Archaeological Project Team would be fully integrated into the Archaeological Contractor(s)'s Project Team to actively input to the design of strategies for the DWSIs, any public archaeology and community engagement elements, and to advise throughout the fieldwork and post-excavation stages. Regular communication between specialist members of the Archaeological Project Team and the fieldwork Project Manager and field staff would be ensured through off-site planning meetings, site visits and progress meetings.

5.1.10 Archaeological staff (part of the Archaeological Contractor(s)'s site team) supervising the investigative works set out in the Outline AMS-OWSI and relevant DWSIs must:

- Have demonstrable experience of directing machine- and hand-stripping in alluvial, colluvial and gravel deposits and of working with the archaeological character of the Project area
- Be fully familiar with the results of the relevant geophysical surveys, artefact collection, archaeological trial trenching, the Outline AMS-OWSI and the pertinent DWSIs.

Unexpected Finds

5.1.11 If unexpected finds (sites, artefacts, environmental remains or ecofacts, monuments or features) are made during the construction stage, a site consultation meeting(s) would be convened between the Main Works Contractor(s), National Grid, the ACoW, the Archaeological Contractor(s), the relevant Local Planning Authority Archaeological Advisors and (if appropriate) Historic England or other key stakeholders. The site consultation meeting would consider the specific nature of any unexpected archaeological remains and the potential impacts of any construction activity on the unexpected archaeological remains. The outcomes of this meeting will inform any further archaeological work and the extent of any stand-off that may be required.

5.1.12 This document, as secured through Requirement 5 of the Draft DCO (document reference 3.1, requires that any unexpected finds must be retained in situ and reported to the relevant Local Planning Authority as soon as reasonably practicable. No construction can take place in the location of the unexpected finds until a suitable approach is agreed with the Local Planning Authority and executed, as appropriate. If the relevant Local Planning Authority finds that further investigation is needed, no construction would take place within the area of the remains, until further investigation and recording is undertaken including details to be approved by the relevant Local Planning Authority.

5.2 Communication, Monitoring and Sign-Off

Communication

5.2.1 On a project of this size, effective communication between all parties is essential. A communication strategy for external communications about the archaeological mitigation would be developed and implemented in line with the Outline Stakeholder Communications Plan, Appendix E of the Outline CoCP (document reference 7.2).

5.2.2 Regular progress meetings would be held monthly during the programme of archaeological mitigation works between key stakeholders, including the Local Planning Authority Archaeological Advisors and Historic England, the relevant Archaeological Contractor(s), the ACoW, National Grid and Main Works Contractor(s) as required.

5.2.3 The purpose of these meetings would be to update all the stakeholders on progress on archaeological mitigation across the Project, to share best practice and to ensure the overall direction of the archaeological mitigation works are carried out in line with the principles of this document.

5.2.4 Prior to the implementation of archaeological mitigation works as set out in each DWSI, a meeting would be held between the ACoW, National Grid, the relevant

Archaeological Contractor(s), the Local Planning Authority Archaeological Advisors and the Main Works Contractor(s).

5.2.5 The purpose of these meetings would be to discuss the overall strategy for the delivery of the works as set out in the relevant DWSI, the initial monitoring programme by the Local Planning Authority Archaeological Advisor and to share any relevant information not captured within the DWSI.

Monitoring

5.2.6 Site monitoring has two elements, firstly, the day-to-day liaison and monitoring between the ACoW and the Archaeological Contractor(s), National Grid, and the Main Works Contractor(s) (as relevant) to monitor progress and compliance with the requirements of the DWSIs, and secondly the monitoring of the archaeological mitigation works by the Local Planning Authority Archaeological Advisors.

5.2.7 The first element would include (but not be limited to):

- Monitoring of all aspects of archaeological fieldwork by the ACoW
- Monitoring of the installation and removal of protective measures, such as temporary fencing, and at sites where preservation of archaeological remains is required by the ACoW.

5.2.8 The archaeological mitigation works would be subject to ongoing monitoring by the ACoW, who would have unrestricted access to the sites, site records or any other information as may be required. The work would be inspected to ensure that it is being carried out to the required standard and that it would achieve the desired aims and objectives.

5.2.9 The ACoW would report to National Grid on the archaeological mitigation works on a weekly basis.

5.2.10 The second element would ensure that archaeological mitigation works meet the requirements of each approved DWSI.

5.2.11 Local Planning Authority Archaeological Advisors are required to monitor the works and associated records as they are carried out. The frequency of monitoring visits would depend on the complexity of the works and significance of any archaeological deposits.

5.2.12 The Local Planning Authority Archaeological Advisors would be afforded access to the archaeological works and any other information, which would be arranged as necessary and required through the ACoW who would act as coordinator in respect of access and monitoring arrangements.

5.2.13 Where a DWSI needs to be amended for any reason, the Local Planning Authority Archaeological Advisors (and Historic England, if appropriate) and the Main Works Contractor(s) would be consulted on any alterations to the agreed DWSIs prior to them being undertaken.

5.2.14 National Grid would act as coordinator of engagement between the Archaeological Contractor(s) and the relevant heritage stakeholders, to ensure the timely provision of on-site advice to the fieldwork team.

Site Sign-Off

5.2.15 The programme of works would require authentication of completion and the following approach is proposed.

5.2.16 Once the Archaeological Contractor(s) determines the fieldwork to be completed, a sign-off meeting would be held on site (unless alternative communication is agreed) between the ACoW, National Grid, Local Planning Authority Archaeological Advisors (and Historic England, if appropriate), the Archaeological Contractor(s) and the Main Works Contractor(s).

5.2.17 The purpose of this meeting would be to agree that the archaeological mitigation works have been carried out to the satisfaction of all parties prior to the formal sign-off by the Local Planning Authority Archaeological Advisors.

5.2.18 Sites that have been completed would be subject to a formal signing off procedure. The Archaeological Contractor(s) would submit a completion statement to the ACoW. The ACoW would submit the accepted completion statement to National Grid and the appropriate Local Planning Authority Archaeological Advisor for confirmation (in consultation with Historic England, where required) that the relevant works have been completed in compliance with the relevant DWSIs.

5.2.19 In the event of disagreement between the Archaeological Contractor(s), the ACoW, the relevant Local Planning Authority Archaeological Advisor and/or National Grid on the progress, strategy or completion of work, a form of arbitration would be proposed in accordance with Schedule 4 of the Draft DCO (document reference 3.1).

5.2.20 National Grid would act as coordinator of engagement between the Archaeological Contractor(s) and the relevant heritage stakeholders, to ensure the sign-off meeting is held in a timely manner.

Interim Statements, Post-Excavation Reporting and Publication

5.2.21 The Local Planning Authority Archaeological Advisors and, where appropriate, Historic England would review Interim Statements, the Post-Excavation Assessment Report, specialist reports and publications.

5.2.22 The Post-Excavation Assessment Report would be approved by the relevant Local Planning Authority (through the relevant Local Planning Authority Archaeological Advisors) and Historic England.

5.2.23 Details of the Interim Statements, post-excavation reporting and publication are set out in Chapter 6.

5.3 Methodology for Each Mitigation Technique

5.3.1 This section sets out the outline method statements for each mitigation technique. These would form the basis of the works to be detailed in the DWSIs.

Preservation In Situ

Avoidance

5.3.2 Heritage assets and archaeological sites that will be protected by a combination of protection measures that will be put in place at the start of the construction programme to ensure their long-term survival will be identified in the DWSIs.

5.3.3 Avoidance would be undertaken where it would be practicable to amend design/construction works areas to allow for retention of the archaeological remains in situ and where those archaeological remains are found to be of significant value to require this form of mitigation. Relevant protection measures would include temporary protective fencing which will be maintained throughout the pre-commencement works and construction stages (incorporating an additional 10 m buffer area for specific identified designated and non-designated assets where practicable). Some sites may require archaeological photographic recording prior to protection measures to ensure that there is a record of their existing condition, prior to the start of any groundworks.

5.3.4 For each site or heritage asset, protection measures will be described in a DWSI prepared in consultation with the relevant Local Planning Authority Archaeological Advisors and, if appropriate, Historic England. This will also include arrangements for regular site inspections by the ACoW, maintenance requirements, and 'Tool-Box Talks' to inform all site personnel of the archaeological and Historic Environment constraints on site, the protection measures that are required and their obligations under this Outline AMS-OWSI and generally, to ensure that these are put in place and complied with. New sites may be added to the number of sites for preservation of archaeological remains, or existing sites may be adjusted.

5.3.5 Archaeological photographic recording of sites will be undertaken by the Archaeological Contractor(s) before protection measures are deployed and after their removal.

Burial or Sealing of Remains

5.3.6 At some locations along the Project, suitable fill material on top of a protective barrier membrane as identified in the DWSI could be used to bury sensitive archaeological remains, to ensure that they are not disturbed during construction. Sites would be temporarily buried beneath fill to enable specific construction requirements, e.g. soil storage, some temporary construction compounds or some temporary roads.

5.3.7 The Archaeological Contractor(s) will include in the DWSI methods that they intend to use to protect sensitive buried archaeological remains, including measures to prevent damage (such as deep rutting) caused by vehicles or plant. This will include detail on the effects of compression and loading (whether dynamic or static) and site-specific protective measures, including the extent of the area to be protected, the depth of fill required and the type of fill. The DWSIs will set out suitable methodologies for filling areas without disturbing or impacting sensitive archaeological remains, and for removing the fill at the end of construction.

5.3.8 The preservation methodology in the DWSI will be developed in line with the principles of Historic England's 'Preserving Archaeological Remains' guidance (Historic England, 2016a) as set out below and in consultation with the National Grid, the ACoW and the Local Planning Authority Archaeological Advisors. At each site, measures will be put in place to avoid rutting or the compaction of soft ground (topsoil

and fill) until or unless adequate protection is provided (vehicles will be restricted or prohibited from traversing sensitive areas prior to fencing, the laying of a protective membrane and fill deposits/vehicle running surface, and at decommissioning).

5.3.9 The methodology used to allow for the preservation of archaeological evidence is as follows:

- A layer of 10 mm pea shingle is used to fill in any gaps or undulations in the surface of the archaeological remains to a depth of 500 mm above the highest level of the archaeological remains. This ensures that any archaeological features are fully infilled. This is pushed over the remains using a D3 low ground pressure machine
- A layer of geotextile is laid over the shingle by hand
- Above the geotextile layer, normal earthwork construction then proceeds.

5.3.10 This methodology should form the basis of the preservation methodologies prepared by the Archaeological Contractor(s) and set out on in the relevant DWSI.

5.3.11 The ACoW will give Tool-Box Talks to inform all site personnel of the archaeological and Historic Environment constraints on site, the protection measures that are required and their obligations under the DWSI, and generally to ensure that these are put in place and complied with. Following construction, the protective fill material will be removed by the Main Works Contractor(s), under supervision by the Archaeological Contractor(s), leaving the sites in their original condition.

Fencing

5.3.12 To demarcate those sites that require preservation of archaeological remains and to avoid unintentional damage during construction, temporary fencing will be installed during the start of the construction stage. The fencing will be installed by a fencing contractor(s) under the supervision of the relevant Archaeological Contractor(s).

5.3.13 The location and type of fencing for each site for preservation of archaeological remains will be set out in the DWSI (it may be helpful for the Archaeological Contractor(s) to combine various sites into a single DWSI). It will also set out whether any preliminary archaeological investigative work is required (before or during the installation or removal process). Requirements for archaeological investigation will be contained within the DWSIs.

5.3.14 The ACoW will be responsible for regularly monitoring the condition of the fencing and the Main Works Contractor(s) will be responsible for its maintenance until either construction work in that area is complete or at Project opening, at which time the removal of the fencing will be monitored by the ACoW.

Track Matting

5.3.15 To demarcate those sites that require preservation of potential below-ground archaeological remains and to avoid unintentional damage during construction by plant and vehicles, the use of plastic ground cover mats is encouraged (and preferred to metal mats and wooden ‘bog’ mats) as per Norfolk County Council standards and guidelines (2018).

5.3.16 Plastic ground cover mats will be installed during the start of the construction stage. The mats will be installed by an appropriately qualified contractor under the supervision of the relevant Archaeological Contractor(s).

5.3.17 The location and type of ground cover mats for each site for preservation of archaeological remains will be set out in a DWSI (it may be helpful for the Archaeological Contractor(s) to combine various sites into a single DWSI). It will also set out whether any preliminary archaeological investigative work is required (before or during the installation or removal process). Requirements for archaeological investigation will be contained within the DWSIs.

5.3.18 The ACoW will be responsible for regularly monitoring the condition of the ground cover matting and the Main Works Contractor(s) will be responsible for its maintenance until either construction work in that area is complete or at first operation, at which time the removal of the ground cover matting will be monitored by the ACoW.

Control of Plant Movement

5.3.19 Where archaeological investigation is required, the Archaeological Contractor(s) will retain overall control of all machine excavation within the work area. Stripped zones will be clearly demarcated, and no plant or vehicle movements may enter these zones until the works described in paragraphs 5.3.19–5.3.20 have been completed and formally signed-off..

5.3.20 Where any archaeological investigative work is required, all machine excavation is to be under the direct control and supervision of an experienced archaeologist provided by the Archaeological Contractor(s). The topsoil, subsoil and/or overburden should also be examined for archaeological material.

5.3.21 All machinery is to be kept off archaeologically stripped areas until areas under the control of the Archaeological Contractor(s) have been completed and the area has been signed off by the appropriate Local Planning Authority Archaeological Advisors.

Recording of Heritage Assets

Geoarchaeological Deposit Modelling

5.3.22 Geoarchaeology studies should follow the guidance provided by Historic England (2015b), Norfolk County Council (2018), Suffolk County Council Archaeology Service (SCCAS) (2018) and Essex County Council (2020). Buried soils and sediment sequences may be inspected and recorded on site at all intrusive stages of the Project by a geoarchaeologist where practicable in order to produce a geoarchaeological deposit model. Historic records of previous ground investigation, where available, may also be consulted to inform the deposit model. This model can then provide further understanding of site formation processes and subsequently reduce or avoid the collection and processing of redundant samples during further intrusive works or provide an outcome as mitigation.

5.3.23 Samples will be collected for analysis of chemistry, magnetic susceptibility, particle size, micromorphology and/or other techniques as appropriate, following the outline strategy presented in a DWSI, and in consultation with the Archaeological Contractor(s)'s geoarchaeologist, ACoW, National Grid, and Local Planning Authority archaeological advisors.

5.3.24 As per the guidelines provided by Historic England (2015b), Norfolk County Council (2018), and SCCAS (2018), the following will need to be considered:

- The characterisation of the sequence and patterns of the accumulation of palaeoenvironmental/ geoarchaeological deposits across the relevant sections of the Project, including the depth and extent of stratigraphy
- The character of potential land surfaces/buried soils within or pre-dating such sediments
- Significant variations in the deposition sequences indicative of localised features such as palaeochannels, particularly in relation to topographic variation and features should be identified
- The location and extent of any waterlogged organic deposits should be identified, and where practicable, samples should be retrieved to assess the preservation potential of environmental remains and the suitability of material for scientific dating.
- The relationship between sediment sequences and other deposit types such as soil, peat, and archaeological features and deposits should be made clear
- To provide for the absolute dating of critical contexts
- The potential for palaeoenvironmental evidence with the potential to inform understanding of past environments, palaeo-climates, sea-level changes and human interaction
- Suitable reporting must be provided documenting the results of the investigation.

5.3.25 Any identified evidence for recent changes in preservation conditions that may have been caused by alterations in the site environment will be given special consideration.

5.3.26 Geoarchaeological and palaeoenvironmental investigation is also discussed below.

Non-Intrusive Archaeological Fieldwork

Controlled Metal Detecting

5.3.27 Use of metal detectors will be required during all types of intrusive archaeological investigations. The requirements for metal detector use during archaeological investigations will be contained within the DWSIs.

5.3.28 The metal detectors used must have separate discrimination and sensitivity controls which should not be set to discriminate against iron objects.

5.3.29 Topsoil, subsoil or other overburden on intrusive archaeological investigation sites must be scanned with a metal detector before and during its excavation, including when it is excavated by machine, but only when the site-specific health and safety requirements deem it is safe to do so.

5.3.30 Exposed features and layers should be scanned by metal detector prior to, and periodically during, their excavation where it is appropriate to do so.

5.3.31 All spoil heaps, whether of topsoil/overburden or from excavated archaeological deposits are to be scanned with a metal detector when the site-specific health and safety requirements deem it is safe to do so. Spoil heaps on intrusive archaeological investigation sites should be kept as low in height and as spread-out as practicable to

allow for metal detecting, where the site-specific requirements deem it is appropriate and safe to do so.

5.3.32 Where spoil is removed from a site its final destination should, where practicable, be ascertained and described in the relevant grey literature report.

Geophysical Survey

5.3.33 The aims of geophysical surveys are set out in Table 2.1. The following general approach will apply for geophysical surveys.

5.3.34 Sites that require this type of investigation will be those that are identified in DWSIs and may include new areas that arise as a result of emerging results, detailed design and unexpected discoveries.

5.3.35 Geophysical surveys must be carried out in accordance with relevant CIfA and Historic England, and county specific standards and guidance (CIfA, 2020b; Historic England, 2008 and 2015b; Norfolk County Council, 2018; Essex County Council, 2020; and SCCAS, 2023b).

5.3.36 Sites designated for detailed geophysical survey will be set out in a DWSI. The programme of works, equipment types, calibrations and configurations, details of the aims and methodology for this type of survey, together with other relevant logistical considerations, will be set out in a DWSI.

5.3.37 Project archives must be prepared in line with Schmidt (2013) and submitted to the relevant county archive.

5.3.38 The results of the geophysical survey will need to be placed fully within the context of known nearby archaeological findings of all kinds.

5.3.39 The results of calibration checks and surveys of the test traverses must be presented as an appendix to the grey literature reports as raw data.

Intrusive Archaeological Fieldwork

Trial Trenching

5.3.40 At the pre-commencement stage additional trial trenching will be carried out in areas along the Project where, although all evaluation necessary for the purposes of the ES (Volume 6 of the DCO application) was completed, detailed evaluation was not completed due to access issues. The purpose of the trenching will be to determine the presence/absence, extent, character, condition and significance of the remains in order to inform the detailed mitigation requirements at these locations should it be required.

5.3.41 The approach to be employed during this stage of additional trial trenching will be identical to that used during the archaeological evaluation stage (used to inform and confirm the ES findings), and as set out in the Overarching Written Scheme of Investigation for Pre-Commencement Trial Trenching (Headland Archaeology 2025). However, the approach shall consider specific provisions of the AMS-OWSI in respect of archaeological excavation, environmental sampling and scientific dating, where relevant.

5.3.42 The scope and location of additional trial trenching will be described in a DWSI that will be prepared by the Archaeological Contractor(s) in consultation with National

Grid, the relevant Local Planning Authority Archaeological Advisors and Historic England. The DWSIs will be approved by the relevant Local Planning Authority (through the relevant Local Planning Authority Archaeological Advisors) and Historic England, prior to works commencing in the area to which each DWSI applies.

Detailed Excavation

General Approach

5.3.43 The aims of detailed archaeological excavation are set out in Table 2.1. The following general approach will apply for detailed archaeological excavation.

5.3.44 Sites that require investigation will be those that are identified in DWSIs and may include new areas that arise as a result of emerging results, detailed design and unexpected discoveries.

5.3.45 Sites designated for detailed archaeological excavation will be stripped with mechanical plant as set out in the DWSI except in areas where further ploughzone sampling is taking place. The sequencing of stripping, location of soil storage areas and arrangements for backfilling, together with other relevant logistical considerations, will be set out in the DWSI.

5.3.46 For sites where machine stripping is required (following completion of any ploughzone sampling), topsoil, subsoil and other overburden will be removed under the supervision of the relevant Archaeological Contractor(s) to the correct archaeological horizon. The relevant horizon will be informed by the evaluation results, the Research Framework, and the aims and objectives described in the DWSIs.

5.3.47 In accordance with the research aims and objectives outlined in the Research Framework, which will be further developed through the identification of site specific aims and objectives within the DWSIs in consultation with relevant archaeological Project team specialists, the archaeological site will then be subject to hand excavation of key features designed to recover artefactual and scientific dating evidence. All specialist samples will be accurately located in three dimensions. At the same time selected feature complexes would be subject to further hand excavation designed to resolve stratigraphic relationships.

5.3.48 The works will also include sampling of archaeological remains for palaeoenvironmental and palaeo-economic indicators (for example, charred plant remains, molluscs, pollen, etc.) (see Environmental Sampling Strategy), in accordance with the DWSI and the Research Framework. Artefact and palaeoenvironmental assessments will be carried out during the course of the fieldwork; selected key features/structures will be subject to more detailed excavation and sample recovery to address the evolving research objectives of the archaeological programme.

5.3.49 The proportion of features excavated will be determined by the significance of the remains and the requirements of the research objectives set out in the DWSI. This iterative process is intended to allow the approach to excavation sampling to be both flexible and closely targeted to address specific questions, rather than being tied to a pre-determined excavation strategy. The proportion will be determined in consultation with National Grid.

5.3.50 The research objectives and excavation strategy will be kept under review during the investigation at each site. In order to facilitate this approach, relevant data, artefact and environmental sample processing will be undertaken whilst the investigation proceeds on site (including artefact spot-dating and preliminary assessment of environmental samples, see section – *Environmental Sampling Strategy*). The preliminary assessment of materials, including faunal remains, ecofacts and palaeoenvironmental proxies recovered from samples, undertaken whilst the investigation is underway will support the outlined iterative approach to sampling. Decisions on further investigation at a given site will be made once sufficient information becomes available.

5.3.51 Palaeoenvironmental sampling and environmental sequences of Pleistocene date have the potential to recover information about past human environmental interactions, human activities and evidence of environmental change. Waterlogged deposits or sequences where waterlogged deposits are present will receive particular attention. Such deposits may also preserve organic artefacts and textiles which are not ordinarily preserved in dry conditions. If waterlogged deposits are identified, the Conservation specialist and the Environmental Archaeology Coordinator or Environmental Archaeology Supervisor will be contacted for advice in the first instance, and National Grid, the ACoW, the Main Works Contractor(s), the Historic England Regional Science Advisor and the relevant Local Planning Authority Archaeological Advisors will be notified. Special consideration will need to be given to other construction activities in the vicinity when considering the impact of works on waterlogged deposits. The process applies to all waterlogged deposits.

5.3.52 Geoarchaeological investigations (see Geoarchaeological and Palaeoenvironmental Investigation) will focus on areas of particular interest as identified through previous and current archaeological evaluations, and in the Research Framework, and will be specifically designed to address particular research questions. National Grid, the ACoW, the Local Planning Authority Archaeological Advisors and, if appropriate, Historic England will be contacted by the Archaeological Contractor(s) and consulted about an appropriate sampling strategy and to comment on site retrieval methods. The sampling methodologies and specific research questions for Geoarchaeological Investigations will be clearly outlined in the DWSI for each relevant area.

5.3.53 The Archaeological Contractor(s) shall not excavate any area beyond those identified within the relevant DWSI. Should archaeological features revealed within the excavation area continue outside of the area and are likely to be subject to construction impact, the excavation area may need to be extended to fulfil the requirements of the DCO and National Policy Statement (NPS) (EN-1) (DESNZ, 2024). This will only be undertaken with the agreement of National Grid, the ACoW and the Main Works Contractor(s), in consultation with the relevant Local Planning Authority Archaeological Advisors and where appropriate Historic England.

Machine Excavation

5.3.54 Detailed archaeological excavation will be carried out at the locations identified in the DWSIs. Each detailed archaeological excavation area will be positioned using electronic survey-grade equipment. The initial stage of excavation will be undertaken using a 360° mechanical excavator or other similar back-acting plant fitted with a toothless bucket, used in such a manner as to expose cleanly the archaeological surface. The Archaeological Contractor(s) shall ensure that hired-in plant and operators have the capability to achieve a consistently high standard of work. All operatives will receive an induction outlining the nature of any archaeological remains

likely to be encountered and the expectations of the Archaeological Contractor(s), Main Works Contractor(s), the wider Project Team, and National Grid. The DWSIs for each site will include proposals for the stockpiling, handling and replacement of topsoil with reference to the Outline Soil Resource Plan, Appendix C of the Outline CoCP (document reference 7.2).

5.3.55 Machine excavation will proceed under the direct supervision of the Archaeological Contractor(s) in level spits, until either the top of the first archaeological horizon or undisturbed natural deposits are encountered (the methodology will be set out in each DWSI). Particular attention will be paid to achieving a clean and well-defined horizon with the machine. Under no circumstances will the machine be used to cut arbitrary trenches down to natural deposits. Should sondages be required these would be agreed with National Grid, the ACoW, and the Local Planning Authority Archaeological Advisors. The mechanical excavator will not be permitted to traverse any stripped areas.

5.3.56 The surface achieved through machine excavation will be inspected for archaeological remains. The resulting surface will be cleaned by hand in order to identify or define the extent of archaeological remains present. Areas where hand cleaning is likely to be required will be identified in the DWSI; decisions regarding where additional hand cleaning is required will be made on site.

5.3.57 The extent of the area of detailed archaeological excavation will be clearly demarcated to ensure that persons or vehicles cannot inadvertently traverse the area of investigation whilst archaeological works are in progress; the method of demarcation will be set out in the DWSI for the archaeological work. Dump trucks and other plant will not be permitted to track over stripped areas until archaeological investigations at that location are complete and the archaeological site is signed-off for construction. All fencing/bunds associated with the archaeological works area will be regularly inspected by the ACoW and maintained by the Main Works Contractor(s) until the archaeological works in that area have been completed, inspected and approved.

5.3.58 Topsoil within detailed excavation areas will be subject to a rapid metal detector scan prior to stripping, to identify and recover metal objects within the topsoil. All archaeological metal artefacts (except those that cannot be X-rayed, such as lead artefacts) will be subject to X-ray, which will be used to rapidly scan material for retention or disposal (with reference to the CIfA selection toolkit 2019 (rev. 2022)). The finds co-ordinator/processing specialist and the Conservation specialist will be consulted. Stripped surfaces and archaeological features will also be subject to a rapid metal detector scan to identify loose artefacts from uncleaned surfaces, and on cleaned surfaces to help identify areas for careful excavation. Hand-excavated spoil will also be scanned. This will be undertaken by an appropriately qualified or experienced metal detectorist. The DWSIs will set out how metal detecting will be used as part of the artefact recovery strategy for individual sites. Provision will also be made for 3D location recording of artefacts within features, but also within unstratified deposits where significant quantities are identified. The Archaeological Contractor(s) will consider the use of metal detecting at the end of each day in order to assist in site security.

Hand Excavated Trenches and Hand Excavated Test Pits

5.3.59 Hand excavated trenches and test pits will be opened using hand tools instead of mechanical plant in circumstances where sensitive/fragile archaeological remains are predicted to survive based on the results of ploughzone artefact sampling and/or trial trenching. These circumstances may include, for example, in situ lithic assemblages whose fabric could be damaged by the use of mechanical equipment, or distortion of spatial distributions, or where the scale of the investigations is significantly smaller, or where greater control is required (for example where deposits of buried colluvium have been exposed).

5.3.60 Hand excavation will be used to establish the presence/absence of remains/artefact distributions, the extent and condition of the remains or concentrations of artefacts, and to inform additional mitigation requirements. It may be necessary to limit the depth of the investigation so as not to compromise the integrity of a high value potential resource, such as a buried ground surface. Hand excavation will be conducted with due regard to the potential survival of cultural material at the interface with the topsoil and the potential survival of microtopographic features, as identified in the DWSIs. It may also be necessary to excavate deposits using spits of pre-determined thickness to allow cross-site comparisons with work undertaken at the evaluation stage. The proposed use of spits will be set out in the DWSIs.

Artefact Recovery Strategy

5.3.61 As well as the routine collection of artefacts that will be carried out during normal site works, other techniques may be deployed as identified in the DWSI, to recover datasets relevant to the investigation and site specific or Project-wide research objectives.

5.3.62 The Archaeological Contractor(s) will consult the specialists during the preparation of the DWSIs, regarding the artefact recovery strategy. If changes are required during the course of the investigation at a site, then these will be developed as an iterative process at site consultation meeting(s) between the Archaeological Contractor(s), National Grid, and the relevant Local Planning Authority Archaeological Advisors and where appropriate Historic England.

Excavation Sampling Strategy

5.3.63 Archaeological features, layers or deposits identified for excavation will be hand excavated in an archaeologically controlled and stratigraphic manner, to meet the aims and objectives of the investigation as set out in the DWSIs. Machine assisted excavation of large deposits will only be permitted at the discretion of National Grid, in consultation with the relevant Local Planning Authority Archaeological Advisors. Sufficient deposits/features will be investigated through hand excavation in each archaeological excavation area to record the horizontal and vertical complexity of the stratigraphic sequence to the level of underlying sterile geological strata. Excavation will also target the inter-relationships between features and major feature intersections to understand and record their relationships.

5.3.64 The excavation sampling strategy will be dictated by the significance of the remains, their stratigraphic complexity and their artefactual and palaeoenvironmental content (including absence of artefactual content). The Archaeological Contractor(s), in consultation with National Grid, the relevant Local Planning Authority Archaeological Advisors and, if appropriate, Historic England will describe in their DWSIs an appropriate sampling strategy as determined by the results of the archaeological

evaluation and key research questions, prior to works commencing in the area to which the DWSI applies.

5.3.65 The strategy will be kept under review during the investigation. Site data, artefact and environmental sample processing will be undertaken whilst the investigation proceeds on site (including artefact spot-dating and preliminary assessment of environmental samples). Initially, the minimum sample sizes will be implemented on site by the Archaeological Contractor(s) in accordance with the approved DWSI. The reflexive process will allow the recovery of finds and samples for dating and assessment for their palaeoenvironmental and geoarchaeological potential. Changes to the strategy will be developed as an iterative process at site consultation meeting(s) between the Archaeological Contractor(s), National Grid, and the relevant Local Planning Authority Archaeological Advisors.

5.3.66 The following minimum sampling requirements will be used as a standard, within the iterative excavation sampling strategy; these may be varied to suit the research value of the remains, subject to agreement with National Grid, the relevant Local Planning Authority Archaeological Advisors and, if appropriate, Historic England at a site consultation meeting. The DWSI will identify the initial minimum sample for excavation.

Linear Features

5.3.67 Sufficient sections though linear features will be targeted in key locations to address research questions. It may be necessary to increase percentage excavation to address research questions where a higher volume sample would achieve this. Segments will be hand excavated along the length of the feature to understand its depositional sequence and character. Each segment will be not less than 1 m long and will be regularly spaced along its length. Segments will be located away from intersections with other features, although key intersections will also be targeted to provide an understanding of the deposit sequence and the relationship between different feature types/classes. All ditch ends will be investigated. A minimum of 10% of each linear feature will be excavated (increasing to 40% for enclosure ditches and 100% for smaller curvilinear features).

Discrete Features

5.3.68 Pits, post-holes and other isolated features (including natural features that have been shown to contain significant archaeological remains) will normally be completely (100%) excavated (unless otherwise agreed in consultation with National Grid, and the Local Planning Authority Archaeological Advisors. Half-sectioning (50%) of general features may be excavated and sampled for environmental evidence as a minimum, in consultation with National Grid and the Local Planning Authority Archaeological Advisors, subject to the significance of the remains and the research questions identified in the DWSIs.

Buried Ground Surfaces, Floor Surfaces and Hearths

5.3.69 Buried ground surfaces, floor surfaces and hearths have the potential to contain important remains, including finds distributions, ecofacts and palaeoenvironmental remains. It may be possible to recognise individual turves or deposits representing dumped material; if laminated sequences are identified e.g. turves, the Geoarchaeologist will attend site with the Environmental Specialist to devise a sampling strategy, which may include recovery of monoliths. Grid sampling and bulk

sampling may be adopted depending upon the significance of the remains and the research questions identified in the DWSIs. Hearths and areas of in situ burning will be completely excavated (in plan or by quadrant) and sampled for palaeoenvironmental remains and to recover material suitable for scientific dating, such as archaeo-magnetic dating, to address key research aims.

Animal Bone Groups

5.3.70 Where structured deposits or animal bone groups are identified during excavation, the Archaeological Contractor(s) will follow Historic England guidance Animal Bones and Archaeology: Recovery to archive (Baker and Worley, 2019) and will consult with National Grid and the Local Planning Authority Archaeological Advisors and where appropriate Historic England.

Structures

5.3.71 Each structure, including stone structures, will be investigated/sampled to define the extent, form, stratigraphic complexity and depth of the component features and its associated deposits. Intersections between components will be investigated to determine their relationship(s). Particular care will be taken to ensure that areas of in situ burning are not investigated prior to the consideration of scientific dating.

5.3.72 If dwelling structures are found or suspected after topsoil stripping, careful hand cleaning will be undertaken at the level of initial definition to establish the full extent of the structure and any associated or related contemporary features, to understand its complexity, state of preservation, significance and to contribute to answering research questions set out in the DWSIs. It may be necessary to re-clean areas to achieve an acceptable level of feature definition. Features/contexts that are part of the structure or which may have contributed to its construction (such as drip gullies, post holes, internal or external surfaces, hearths, etc.) will be 100% excavated. Contexts will be routinely sampled for ecofacts, palaeoenvironmental remains and dating material.

5.3.73 The hand excavation of wells, or similar deep structures, will only proceed following a safe working practice, as required by national health and safety guidance, and as recorded in the DWSI to be prepared by the Archaeological Contractor(s) and approved by National Grid, the ACoW and the relevant Main Works Contractor(s). Preliminary hand augering of potential deep deposits may be able to identify depth and would inform an excavation strategy which may include machine excavation or stepping-out to ensure that there is no depth restriction in areas subject to archaeological mitigation. The excavation sampling strategy will be developed at site consultation meeting(s) between the Archaeological Contractor(s), National Grid, and the relevant Local Planning Authority Archaeological Advisors and where appropriate Historic England.

Burials

5.3.74 Burials (including features suspected of being burials) will be investigated in accordance with the strategy for the recovery of human remains (detailed below - Strategy for the Recovery of Human Remains).

Tree Hollows

5.3.75 Tree hollows, where encountered, may relate to historic ploughing, topography and drainage, or possibly to specific prehistoric land use. The distribution of tree hollows has potential to contribute to studies of landscape evolution and change across the landscape. The comprehensive mapping and investigation of a representative sample of tree hollows for artefactual, ecofactual and palaeoenvironmental evidence is therefore proposed, comprising:

- Mapping of all possible tree hollows encountered in mitigation areas (i.e. interpretation)
- Archaeological excavation of a sample of confirmed tree hollows
- Recovery of a sample of the fill of excavated tree hollows to be sieved for small artefact recovery. If sieving produces significant quantities of settlement debris, particularly hazelnut shell, then flotation samples will also be processed.

Recording

5.3.76 Once open, the extent of the excavation area(s) will be accurately recorded using metric survey grade equipment (or its equivalent) and fixed in relation to any existing survey markers. The data will be overlaid onto the Ordnance Survey national grid (using digital map data).

5.3.77 Following cleaning, the archaeological remains will be mapped (electronic survey grade equipment) and planned to enable the selection of areas and features for investigation and to compare the position of the identified archaeological remains with any available previous geophysical, aerial photographic, trial trench data, as applicable.

5.3.78 A full written, drawn and photographic record will be made of the archaeological remains, in accordance with the Archaeological Contractor(s)'s recording system and standard archaeological methodologies.

5.3.79 The Archaeological Contractor(s) will be expected to use digital recording methods to ensure the smoothest transfer of information between the on-site work and the Local Planning Authority Archaeological Advisors.

5.3.80 Hand-drawn or digital plans and sections of features will be produced. The minimum acceptable scale will be 1:50 or 1:20 for plans and 1:10 for sections. Human burials and other special deposits, such as animal bone groups will normally be drawn at a scale of 1:10. All plans and sections will be accurately located against the site grid using electronic survey equipment and will include spot heights relative to Ordnance Datum in metres and will be expressed to a minimum of two decimal places. The Archaeological Contractor(s) will include in their DWSI a statement that describes their recording system and the accuracy of their site mapping.

5.3.81 Site photography will be used to record all archaeological remains that are under investigation. In addition, photographs will be taken to assist in interpretation and publication, and to give an overview of the site, the progress of the investigations and site activities. Overhead (drone) photography will also be used to record progress, relationships between structures and to put the investigations within a wider landscape context. Particular attention will be paid to obtaining photographs suitable for displays, exhibitions and other publicity material, dependent on Health and Safety considerations.

Environmental Sampling Strategy

5.3.82 An Environmental Archaeology Coordinator will develop the detailed environmental sampling strategy in consultation with all relevant specialists and will oversee the work at the fieldwork stage. The Environmental Archaeology Coordinator will liaise with the variety of specialists who may be involved, to develop fully the strategy and tactics for environmental research and to ensure the smooth running of this aspect of the investigations. The nominated Coordinator may be a member of the Archaeological Contractor(s)'s specialist team responsible for a particular aspect of the proposed work (such as geoarchaeologist), with suitable experience and training and the ability to convey accurate information about a site and the deposits to specialists. The Environmental Archaeology Coordinator will be present at site visits and meetings with National Grid, and Local Planning Authority Archaeological Advisors as necessary.

5.3.83 The Environmental Archaeology Coordinator will take charge of the routine processing of samples and the supervision of routine sampling in connection with the investigations.

5.3.84 The detailed environmental sampling strategy for each DWSI will be based upon the results of previous assessment work and the potential of the materials to address key research questions. Specialists (such as a zooarchaeologist for animal bones, archaeobotanist for charred plant remains, archaeomalacologist for molluscs), National Grid, the relevant Historic England Regional Science Advisor and Local Planning Authority Archaeological Advisors will be consulted regarding site specific requirements.

5.3.85 Environmental sampling will be carried out in accordance with current national guidelines including Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-Excavation (English Heritage, 2011), Geoarchaeology, Using earth sciences to understand the archaeological record (Historic England, 2015b), and the current CIfA Standard and guidance for the collection, documentation, conservation and research of archaeological materials (CIfA, 2020a).

5.3.86 The processing of samples and their assessment will feed back into the sampling strategy that is employed in the field. The processing and initial assessment of all samples (except for specialist samples) would be undertaken at a site compound to facilitate the rapid feedback to the field team. Processing will be supervised by the Archaeological Contractor(s)'s finds coordinator/processing specialist.

5.3.87 All flotation samples and coarse sieved samples should be processed and assessed to inform the sampling strategy within a timescale agreed between the Archaeological Contractor(s) and National Grid, but not greater than two weeks, except for specialist samples which will need a specific approach. Finds, ecofacts and biological artefacts from sample residues should be recorded to sample fraction.

5.3.88 The aims of the environmental strategy will be to address the Research Framework. Site based studies that could aid the investigations will include the following (this list is not exhaustive, and other studies may be relevant):

- Pedological (including micromorphology) study of soils (or other suitable deposits) deeply buried beneath or within colluvium would provide information relating to the status of the soil at the time of burial and should be able to detect and characterise aspects of previous land use and will provide information on erosion and on the contribution of colluvium and wind-borne material to the soil

- Pollen and diatom/phytolith analysis
- Detailed wet sieving/flotation of buried ground surfaces and other selected contexts and features for the recovery of charcoal/wood, plant macrofossils, small animal bones, molluscs, coleoptera, small artefacts, etc. The retrieval of a reliable sample will be achieved by the routine sampling of a set proportion of each selected context/deposit excavated. Sampling will also be systematic and extensive.

5.3.89 All samples taken will come from suitably cleaned surfaces and will be collected with clean tools and placed in clean containers, in consultation with relevant specialists. They will be recorded and labelled in accordance with national guidance such as English Heritage 2011 and CifA 2014a, and a register of all samples will be kept. Once the samples have been obtained, the Environmental Archaeology Coordinator and the Finds Coordinator will ensure that they are placed in safe storage under suitable conditions to prevent deterioration prior to them being sent to the appropriate specialist.

5.3.90 If organic rich archaeological remains are encountered during the investigations, the Environmental Archaeology Coordinator will be contacted for advice and to devise an appropriate strategy for excavation and sampling. In addition, the Archaeological Contractor(s) will inform the ACoW immediately, who will then notify the Main Works Contractor(s) and National Grid.

5.3.91 Environmental assessment at the reporting stage will include consideration of scientific methodologies alongside traditional recording. For example, zooarchaeological assessment will include the potential of biomolecular methodologies where there is a clear research question which could be addressed through biomolecular analysis, determined through the assessment of animal bones. The Archaeological Contractor(s) will consult with National Grid, the relevant Local Planning Authority Archaeological Advisors and the Historic England Regional Science Advisor. National Grid will approve the proposals for scientific study at the assessment and analysis stages, in consultation with the relevant Local Planning Authority Archaeological Advisors and the Historic England Regional Science Advisor. Samples for radiocarbon dating will be identified from material sampled for environmental analyses.

Strategy for Scientific Dating

5.3.92 Statistical modelling will be combined with a comprehensive scientific dating programme and the archaeological evidence to address the aims and objectives identified in the DWSIs. Each Scientific Dating Specialist will develop the detailed strategy for scientific dating in consultation with all relevant specialists, the Historic England Regional Science Advisor, the relevant Local Planning Authority Archaeological Advisors and National Grid. The Scientific Dating Specialist will devise a strategy (prior to the commencement of the works to which the dating strategy will apply) so that it can be incorporated into the DWSIs to ensure that the right contexts are excavated and to ensure a comprehensive programme of scientific dating is possible, with specific research objectives. Although scientific dating will be undertaken at post-excavation it will also be prioritised at the fieldwork stage to inform decision making and develop the strategies used on site.

5.3.93 Samples for radiocarbon dating will be identified from materials sampled for environmental analysis: see Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation (English

Heritage, 2011); Geoarchaeology. Using earth sciences to understand the archaeological record (Historic England, 2015b); and Animal Bones and Archaeology – Recovery to archive (Baker and Worley, 2019) or from recovered artefacts. The requirements for the recovery, processing, and retention of these materials may be affected by the proposed dating programme (e.g. packaging typologically diagnostic refitting groups of ceramic sherds so that their potential for absorbed lipid analysis and dating is not compromised).

5.3.94 Scientific dating will also be utilised to provide spot dates to inform the excavation strategy, contribute to understanding of stratigraphic sequences, or to provide precision/resolution for statistical modelling. The Scientific Dating Specialist will provide advice and guidance throughout the life-cycle of the Project (preparation of the DWSIs, site investigations, and at the post-excavation assessment and analysis stages). The Historic England Regional Science Advisor, the relevant Local Planning Authority Archaeological Advisors and National Grid will be consulted during preparation of the DWSI and during the Project.

5.3.95 Scientific dating techniques will include the following:

- Radiocarbon (^{14}C) dating which can be used to date any carbon-based organic materials, such as wood, bone, or plant remains. If remnant peat is found, reliable and high-resolution dating will be essential and multiple methods will be employed unless otherwise justified
- Luminescence dating for suitable features
- Archaeomagnetic dating for highly fired structures such as kilns or ovens and burnt soil
- A range of other absolute techniques, such as amino acid racemization, or tephrachronology (dating volcanic ash from deposits)
- If preserved wood is present, for example, in waterlogged deposits then dendrochronology may be able to provide precise and accurate dates.

5.3.96 Scientific dating will be undertaken on the recovered samples in accordance with an explicit sampling strategy designed, in consultation with a chronological modelling specialist, to address the research questions set out in the Research Framework and the DWSI, using simulation of the results that could be obtained from the available samples and Bayesian chronological modelling to combine these with the other available information. A sequential sampling strategy will be adopted (Bayliss, 2009). Multiple laboratories/techniques will be employed to ensure that robust chronologies are produced. Different strands of evidence will be combined using formal statistical modelling to produce quantitative estimates for chronologies that address the Project objectives. Reporting will follow Historic England guidelines such as Historic England 2015c. The strategy will be devised in consultation with the Historic England Regional Science Advisor, the relevant Local Planning Authority Archaeological Advisors and National Grid and will be approved by National Grid.

Strategy for the Recovery of Human Remains

5.3.97 The DWSIs will describe a detailed strategy for the investigation, treatment, recovery and assessment/analysis of human remains (neonate/young infants, inhumations, cremations, disarticulated/charnel remains) which will be developed by the human remains specialist. Any investigation of human remains must comply with Article 23 of the Draft DCO (document reference 3.1). The investigation of human remains will

be undertaken in accordance with national and local guidelines (Historic England, 2018; Advisory Panel on the Archaeology of Burials in England, 2017; Historic England, 2023; McKinley and Roberts, 1993; and McKinley and Brickley, 2004; SCCAS 2023a), under the guidance of the human remains specialist. If scattered cremated remains are present, for example in subsoil or colluvium, it may be necessary to use a combination of methodologies and techniques (including sample sieving) to identify the source of the deposit. At the post-fieldwork stage (assessment and analysis) the Archaeological Contractor(s) will consider the application of modern scientific studies, such as DNA work and isotope analysis.

5.3.98 In the event of the discovery of human remains the Archaeological Contractor(s) will notify National Grid and the ACoW immediately. The ACoW will immediately notify the relevant Local Planning Authority Archaeological Advisors. Remains will be covered and protected and left in situ in the first instance, in accordance with current good practice.

5.3.99 In general, excavation of human remains will not extend beyond the limits of the investigation work area; however, it may be followed under the baulk so that it may be lifted in its entirety, provided this will not result in disturbance of further burials, or extend beyond the Order Limits.

5.3.100 The human remains specialist will be available to visit a site where human remains have been found to provide specialist advice and to ensure that the work is being carried out in accordance with procedures set out in the DWSIs.

5.3.101 Where inhumation burials are encountered, it is good practice to take samples from the entire lens of soil remaining at the bottom of the grave and divide it into three sections, head, torso and feet.

5.3.102 If grave goods are identified and are not subject to block lifting, additional specialist samples should be taken from the areas around the grave goods.

5.3.103 Cremation deposits should be subject to sampling and assessment for charcoal, charred plant remains, artefacts and the recovery of human bone.

5.3.104 Where un-urned cremations are suspected or identified, these will be subject to 100% sampling. Where large deposits of pyre debris are identified the human remains specialist will be contacted to devise an appropriate strategy for excavation and sampling. The strategy will be developed at site consultation meeting(s) between the Archaeological Contractor(s), National Grid, the relevant Historic England Regional Science Advisor and the relevant

5.3.105 Local Planning Authority Archaeological Advisors. It may be beneficial to consider half sectioning the excavation of un-urned cremations to aid an understanding of the vertical distribution of the deposit; the deposit may then be excavated in spits.

5.3.106 Larger fragments of charcoal (>2 cm diameter) will be individually sampled (hand recovered) as specialist samples and the location of these samples recorded on the resulting plan and section drawing; the location of specialist samples will be surveyed in.

5.3.107 It is good practice to block lift cremation urns to allow for X-radiography and excavation under laboratory conditions. The conservator or field staff experienced in lifting cremation urns will be present when lifting takes place. In the first instance, the conservator will be contacted for advice.

5.3.108 In addition to traditional osteological recording, post-excavation osteological assessment will include consideration of recently developed microscopic, biomolecular, imaging and other methods for the study of human remains and the potential of these techniques to meet the research questions relevant to the Project. Where research questions of the Project and the aims and objectives identified in the DWSIs can be addressed through recently developed microscopic, biomolecular, imaging and other methods for the study of human remains, the Archaeological Contractor(s) will consult with National Grid, the Historic England Regional Science Advisor and the relevant Local Planning Authority Archaeological Advisors for further advice prior to analysis being undertaken. National Grid will approve the proposals for scientific study at the assessment and analysis stages.

Treasure

5.3.109 Any artefacts which are recovered that fall within the scope of the Treasure Act 1996 and The Treasure (Designation) (Amendment) Order 2023 will be reported to National Grid and the ACoW. The ACoW will contact His Majesty's Coroner for the relevant area and will ensure that the Treasure regulations are enforced and that all the relevant parties are kept informed. The relevant Finds Liaison Officer for the Portable Antiquities Scheme, relevant Local Planning Authority Archaeological Advisors and Historic England will also be notified immediately. A list of finds that have been collected that fall under the Treasure Act and related legislation will be included in the fieldwork report.

Strip, Map and Sample Excavation

5.3.110 Strip, Map and Sample Excavation (SMS) is defined in Table 2.1. The following general approach will apply for SMS. Sites that require investigation by SMS are identified in DWSIs.

5.3.111 Sites designated for SMS will be stripped with mechanical plant as set out in the DWSIs. Topsoil, subsoil or other overburden that does not contain material relevant to the research objectives will be removed to the correct archaeological horizon under archaeological supervision. The relevant horizon will be informed by the evaluation results, the research framework, and the research aims and objectives identified in the DWSIs. The sequencing of stripping, location of soil storage areas and arrangements for backfilling, together with other relevant logistical considerations, will be set out in a DWSI.

5.3.112 Following stripping, the exposed archaeological remains will be surveyed using electronic survey-grade equipment to create a detailed digital pre-excavation plan. In accordance with the research framework and the research objectives identified in the DWSIs, a strategy based on this plan will be implemented for hand excavation of key features to recover artefactual and scientific dating evidence. At the same time selected feature complexes would be subject to further hand excavation designed to resolve stratigraphic relationships.

5.3.113 The proportion of features excavated will be determined by the significance of the remains, the research framework, and the site-specific research objectives developed in the DWSIs and in consultation with relevant specialists.

5.3.114 The following minimum sampling requirements will be used as a standard, but these may be varied to suit the research value of the remains, subject to agreement

between National Grid, the Archaeological Contractor(s), the ACoW and the relevant Local Planning Authority Archaeological Advisors and Historic England if required.

- Linear features: A minimum sample in length not less than 1 m long, where the depositional sequence is consistent along the length. Linear features with complex variations of fill type will be sampled sufficiently to understand the sequence of deposition – a minimum of 10% along the length. If appropriate all intersections will be investigated to determine the relationships between features. All termini will be investigated
- Discrete features: Pits, post-holes and other isolated features will normally be half-sectioned. If large pits or deposits (over 1.5 m diameter) are encountered, then the sample excavated should be sufficient to define the extent and maximum depth of the feature and to achieve the objectives of the sampling but should not be less than 25%
- Structures: Each structure will be sampled sufficiently to define the extent form, stratigraphic complexity and depth of the component features and its associated deposits to achieve the objectives of the evaluation. All intersections will be investigated to determine the relationship(s) between the component features. The remains of all upstanding walls will be hand cleaned sufficient to understand their dimensions, extent, composition, sequence and relationships
- Special or burnt features: These features should be the subject of 100% excavation. Such features will be identified during pre-excavation planning to enable the input and advice of appropriate archaeological specialists. Where in situ burning is identified no excavation shall take place until the possible recovery of samples for scientific dating has been considered
- Flint scatters: These should be the subject of 100% excavation. Where associated with buried land surfaces, in situ flint scatters will require hand cleaning and will need to be spatially defined in three-dimension to determine the limits of the scatter within the area of investigation. All lithic artefacts with a Maximum Linear Dimension (MLD) of 10 mm will require three-dimensional plotting prior to recovery and individually bagged and recorded as registered finds. Non-tool fragments of less than the MLD should be bagged according to an appropriate spatial recording system consistent with context
- Human remains: refer to paragraphs 5.3.98 – 5.3.108
- Tree hollows: refer to paragraph 5.3.76 above
- Ridge and furrow: Ridge and furrow will only be recorded to note its alignment. No excavation of furrows is proposed.

Geoarchaeological and Palaeoenvironmental Investigation

5.3.115 Each area requiring geoarchaeological or palaeoenvironmental assessment should have an array of boreholes or cores, designed in a grid or transects as appropriate to ensure full evaluation across the area. This design should be undertaken by the Archaeological Contractor(s), who must have a geoarchaeologist and environmental specialists as part of the Project team. The borehole design must take into account the results of the evaluation excavations in ES Appendix 11.5: Trial Trenching Results Report (document reference 6.11.A5) and any geotechnical boreholes in the vicinity to maximise data recovery. The methodology, design and any revised or site-

specific aims must be detailed in a DWSI to be prepared by the Archaeological Contractor(s).

5.3.116 Each borehole column will be recovered using a windowless sampling rig (for example a Terrier Drilling Rig, Dando Rig or for shallower deposits a power auger) that will be provided by the Main Works Contractor(s) and under the supervision of the Archaeological Contractor(s). The diameter of the borehole shall be approximately 100 mm and the core shall be recovered in plastic tubes (or an appropriate substitute).

5.3.117 The location of the borehole will be set out by the Archaeological Contractor(s)'s surveyors and shall be surveyed and levelled in three dimensions to Ordnance Survey Grid and Ordnance Datum

5.3.118 A suitably experienced geoarchaeologist shall be present during the preparatory ground disturbance and during rig drilling. This is to ensure that a proper record is made of the depth of deposits and to ensure that samples are collected and labelled appropriately.

5.3.119 The Archaeological Contractor(s) should make allowance for the excavation of a starter pit prior to drilling to confirm that no buried services, land drains or other subsurface obstructions are present.

5.3.120 Made ground deposits need not be described in detail unless it is relevant to the understanding of site formation processes. The surface of each deposit/the contact with the core will be exposed and the sequence of sediments from the borehole shall be described/ logged on site (character and depths of deposits). If practicable, a record shall be made of the depth of any water table at the borehole location.

5.3.121 Upon completion of the borehole and the recovery of the core, the void left by the sampling rig shall be backfilled by the operator with a suitable material.

5.3.122 The core sample shall be sealed, labelled, transported as soon as practicable, and stored securely and in appropriate controlled conditions either on site (temporary) or off-site at the assessment stage. It may be necessary to store the core long-term if it is likely to contribute to any future analyses.

5.3.123 Where warranted, areas identified for geoarchaeological assessment may be stripped to reveal archaeological features sealed by the colluvium. The requirement will be dependent upon the results of the boreholes and further focus of stripping can be achieved by controlled broad transect samples (2 m+). The results of this approach will guide the requirement for removal of overlying deposits by machine, which may need to be undertaken in stages for the exposure of contemporary surfaces and features over a wide area. The hand-excavated transects should be orientated perpendicular to the course of the streams in question, so that they capture in section sedimentary processes such as colluviation and headland formation. In all cases, the requirement for work should be guided by the Archaeological Contractor(s)'s geoarchaeologist.

5.3.124 All work must be taken in line with guidance on Geoarchaeology (Historic England, 2015b) and Environmental Archaeology (English Heritage, 2011).

5.3.125 A preliminary interpretation of the soil and sediment characteristics of the core will be made, including a summary of the stratigraphy that will characterise the deposit sequence and identify soil/ sediment formation processes. The description of each deposit will include sediment type, inclusions, colour, bedding and nature of contacts

to overlying and underlying units. The report will also include appropriate lithological diagrams.

5.3.126 If suitable organic sediment is recovered from the core, samples will be taken for radiocarbon dating, to provide a dating framework for the stratigraphic sequence. The Archaeological Contractor(s) shall make provision for submitting a justified proposal and number of samples for radiocarbon dating.

5.3.127 If suitable deposits exist, samples will be submitted for specialist assessment (pollen, diatom/ foraminifera) to identify the potential for past environmental reconstruction.

5.3.128 An interim summary assessment report will be produced shortly after completion of the fieldwork to inform the design of any subsequent archaeological mitigation.

5.3.129 The final geoarchaeological assessment report will illustrate the sub-surface topography and shall characterise the sediments present on the site and indicate the potential of the core sample taken for environmental reconstruction. If appropriate, it will include a fully justified and costed proposal for analysis and publication.

5.3.130 The geoarchaeological assessment will be placed within the context of any previous investigations and assessment work undertaken in the vicinity of each site to aid the interpretation of the deposit sequence.

Monitoring During Construction

Archaeological Monitoring and Recording

5.3.131 The following general approach will apply for Archaeological Monitoring and Recording during pre-commencement and main works stages.

5.3.132 Sites that require monitoring during construction activities and investigation will be those that are identified in DWSIs but may also include new areas that arise as a result of emerging results, detailed design and unexpected discoveries.

5.3.133 Sites designated for Archaeological Monitoring and Recording will be stripped with mechanical plant as set out in the DWSIs. The Main Works Contractor(s)' preferred method of working will be subject to archaeological supervision and control. Topsoil, subsoil or other overburden that does not contain datasets relevant to the research objectives will be stripped by a mechanical excavator fitted with a toothless bucket to the correct archaeological horizon, under the supervision of the Archaeological Contractor(s). The relevant horizon will be informed by the evaluation results, the Research Framework and the research aims and objectives identified in the DWSIs. The sequencing of stripping, together with other relevant logistical considerations will be set out in the DWSI.

5.3.134 Following stripping, if archaeological remains are identified they will be surveyed using electronic survey-grade equipment to create a detailed digital pre-excavation plan. In accordance with the aims and objectives that will be identified in each DWSI, a strategy based on this plan will be implemented for hand excavation of key features to recover artefactual and scientific dating evidence. At the same time selected feature complexes would be subject to further hand excavation designed to resolve stratigraphic relationships.

5.3.135 The Main Works Contractor(s) will allow opportunity for the investigation of the archaeological remains. National Grid and the ACoW in consultation with the relevant Local Planning Authority Archaeological Advisors and if appropriate, Historic

England, will determine the scope of work and timetable for the completion of the investigation at each site. Vehicles and other plant will not be permitted to track over areas that contain remains until archaeological investigations are complete, or until the ACoW has given permission.

5.3.136 National Grid and the ACoW in consultation with the relevant Local Planning Authority Archaeological Advisors and if appropriate, Historic England will determine access parameters for plant. However, once the parameters have been established, access for plant will be controlled pro-actively by the Archaeological Contractor(s). In the event of genuinely different circumstances further consultation (as part of normal or additional site meetings) would be anticipated.

5.3.137 Modification of the works specification may be required during the investigations to enable detailed recording to take place, and to allow adequate time within the construction programme in the event of important discoveries. In this situation a revised DWSI will be prepared by the Archaeological Contractor(s) in consultation with National Grid, the ACoW , the relevant Local Planning Authority Archaeological Advisors and if appropriate, Historic England, prior to works commencing in the area to which the DWSI applies. Written notice will be provided by the Archaeological Contractor(s) to the Main Works Contractor(s) to give clearance for construction works to (re)commence in the area.

5.3.138 In the event of an unexpected discovery requiring further investigation (that is, a significant find that was not predicted as a result of the evaluation), the provisions set out above will apply. A site consultation meeting will be held which will consider the specific nature of any unexpected archaeological remains and the potential impacts of any construction activity on the unexpected archaeological remains. The outcomes of this meeting will inform any further archaeological work and the extent of any stand-off that may be required. The area will be fenced off, cleaned archaeologically and recording works completed, in line with a revised DWSI prepared by National Grid and the ACoW in consultation with the relevant Local Planning Authority Archaeological Advisors and if appropriate, Historic England. This document, as secured through Requirement 5 of the Draft DCO (document reference 3.1), requires that any unexpected finds must be retained in situ and reported to the relevant Local Planning Authority as soon as reasonably practicable. No construction can take place in the location of the unexpected finds until a suitable approach is agreed with the Local Planning Authority and executed, as appropriate.

6. Reporting and Publication

6.1.1 Following the completion of the fieldwork, all finds and samples would be processed (cleaned and marked). Each category of find or environmental/industrial material would be examined by a suitably qualified specialist so that the results can be included in the Post-Excavation Assessment Report produced at the end of the investigations.

6.2 Interim Statements

6.2.1 Interim statements would be prepared and submitted to National Grid within six weeks of completing fieldwork at each site. The purpose of each interim statement is to provide a basic account of the results of the investigations at each site to inform the progress meetings. The interim statement would include:

- A summary of the results
- A draft or sketch plan of each archaeological area or site
- A quantification of the primary archive including finds and samples
- Identification of any issues that have arisen to ensure that there is integration across the Project between sites and phases
- A programme of work and schedule for the completion of the Post-Excavation Assessment Report.

6.3 Post-Excavation Assessment Report

6.3.1 The Archaeological Contractor(s) would meet the set time frames in order that the post- excavation assessment, analysis, and publication phases can be programmed and resourced properly, and so that the completion date for all construction and post-excavation works can be met.

6.3.2 The results from several fieldwork interventions may be combined as one site for the purposes of the post-excavation assessment and analysis stages or the results for the entire Project assessed in a single Post Excavation Assessment Report. The results from earlier investigations (evaluation surveys and excavations) would also be assessed/reviewed by the Archaeological Contractor(s) where they contribute to an understanding of the site and address the research framework and aims and objectives of the DWSI(s). Following the completion of the post-excavation assessment, the original Project objectives would be reviewed to determine the scope of any analysis and publication that may be appropriate.

6.3.3 The preparation of the Project archive, post-excavation assessment and subsequent analysis and publication phases would be undertaken in accordance with the DWSI(s), Historic England guidelines (Historic England, 2016a), and CIfA guidelines (CIfA 2014b; 2020; 2023a-f) and other relevant archaeological standards and national guidelines. The different phases would be completed within a set time frame following completion of fieldwork, as agreed between the Archaeological

Contractor(s) and the National Grid in consultation with relevant Local Planning Authority Archaeological Advisors and, if relevant, Historic England.

6.3.4 The precise format of the reports is dependent upon the findings of the investigations, but the Post-Excavation Assessment Report would contain the following:

- A non-technical summary
- Site location
- Brief archaeological, historical and Project background
- Original research aims and objectives
- Interim statement of the results of fieldwork – factual data statements (stratigraphic, artefactual, environmental, initial scientific dating results)
- Statements of potential (stratigraphic, artefactual, environmental)
- Statements regarding immediate and long-term storage and curation
- Review of original aims and objectives
- Statement of the significance of the results in their local, regional, national and international context
- Research design that sets out how the research framework and research aims and objectives of the DWSI(s) can be addressed at the analysis stage
- Post-excavation analysis method statements
- Recommendations for analysis, reporting and publication (including a synopsis of the proposed contents)
- General and detailed plans showing the location of the investigation areas accurately positioned on an Ordnance Survey base with grid co-ordinates and a plan of the identified archaeological remains (to a known scale)
- Detailed plans and sections/profiles, deposit models, etc., to support the narrative
- Detailed stratigraphic matrix for each area excavated and how the areas interlink
- Photographs and illustrations, including 3D models
- Bibliography
- A cross-referenced index to the Project archive and summary of contexts
- Appendices containing specialist reports.

6.3.5 The Post-Excavation Assessment Report would be submitted to National Grid for review and comment. National Grid would issue the revised draft report to relevant Local Planning Authority Archaeological Advisors and Historic England for comment. In finalising the report, the Archaeological Contractor(s) would take account of these comments.

6.3.6 The scope of the analysis and publication report would be dependent upon the assessment and future discussions to be held with National Grid, relevant Local Planning Authority Archaeological Advisors and Historic England. The analysis stage would be undertaken in accordance with the Post-Excavation Assessment report and

would lead to the compilation of a research archive and the production of integrated report texts and illustrations for publication.

6.3.7 In accordance with the principles of Management of Research Projects in the Historic Environment) (Historic England, 2006) and the Management of Archaeological Projects, 2nd Ed (Historic England, 1991), a staged programme of post-excavation assessment and reporting would be carried out, to commence on completion of archaeological mitigation fieldwork. The terminology used in relation to this is 'Project design' (PD) and 'updated Project design' (UPD). The PD and UPD would be developed in consultation with key stakeholders and agreed by the relevant Local Planning Authority Archaeological Advisors.

6.4 Conservation and Assessment

6.4.1 Following (or, where suitable, during) fieldwork, the findings would be assessed against the original PD to determine the extent to which the original research aims have been met, and to identify any new research questions to be incorporated in a post-excavation UPD.

6.4.2 A Post-Excavation Assessment Report would be produced, and this report would form part of the Project archive. It would include a statement of the quantity and perceived quality of the data in the site archive, a statement of the archaeological potential of the data to answer the Project research aims, and recommendations on the analysis and data storage and curation requirements.

6.4.3 After processing, including conservation, recording and marking, the finds assemblage from the mitigation must be assessed to give an overview of its potential to meet the research aims of the Project. The recommendations for the extent or depth of further analysis of all, or selected components of, the finds assemblage will be given and justified at this stage and would contribute to the UPD. The assessment would also determine the resource requirements for analysis and identify conservation needs both for analysis and long-term storage and curation. Further analysis should not proceed without the assessment.

6.4.4 Specialist assessment and site narratives would be prepared for inclusion in an UPD. This would be prepared on completion of the specialist assessment, providing a scope for the analysis, reporting and publication of the findings.

6.5 Analysis and Reporting

6.5.1 The Project-specific research aims would be addressed in determining the scope for further specialist analysis. This would be carried out in line with the agreed UPD and against measurable programme milestones, to ensure a reasonable and timely programme for the final publication of the results.

6.5.2 As a minimum, reports would be produced and deposited with the relevant HER within a reasonable and agreed timescale from completion of fieldwork.

6.6 Archiving

6.6.1 All reasonable steps would be taken to obtain the agreement of the landowner to the deposition of the full Project archive, and transfer of title to the relevant repository or repositories before mitigation commences.

6.6.2 An archiving strategy, including digital archiving would be developed prior to the preparation of any DWSI(s). Each DWSI will outline the specific requirement for use of accession/event number or parish code per site, which will be used as a reference on all material to be archived. Generally the following will apply:

- Norfolk - Archives will be deposited with The Norfolk Museums Service. An Event number will be obtained prior to commencement of site works. An accession number will be obtained during reporting phases of works
- Suffolk - Archives will be deposited with Suffolk County Council Archaeological Archive, and in line with SCCAS (2024) guidelines for deposition within Suffolk. A HER Parish Code will be obtained prior to commencement of site works for each parish within which a site falls. An archive deposition form will be completed and submitted to the SCCAS Archive Team
- Essex and Colchester – Archives will be deposited with Essex Museums Service or Colchester and Ipswich Museum Service (as appropriate). A unique site code will be agreed with the Local Planning Authority Archaeological Advisor prior to commencement of site works for each site. An accession number will be obtained in conjunction with the site code for deposition. It will need to be determined whether a single combined deposition location for the archives is practicable. This will be ascertained on a site-specific basis as required. If an agreement cannot be reached between the districts within Essex, individual deposition requirements will be determined per district.

6.6.3 The relevant repository or repositories would be consulted before the archive is prepared regarding the specific requirements for the archive deposition and curation, and regarding any specific cost implications of deposition, including the long-term storage of material requiring special conditions, such as relative humidity and temperature.

6.6.4 If no relevant repository or repositories are identified, the Project would ensure the storage of the archive until an appropriate repository is available.

6.6.5 In addition to the deposition of Project reports and archive with the relevant Local Planning Authority Archaeological Advisors, an electronic record of the Project details would be created through OASIS. The Project record would include technical details for each technique used in the Project. Subject to any contractual requirements on confidentiality, copies of the OASIS record would be integrated into the relevant local and national records and published through the Archaeology Data Service.

6.7 Digital Data

6.7.1 A strategy for digital data would be developed setting out the requirements for the management and preservation of digital data created during the course of the Project. Digital data and digital finds information will be archived to national standards and would be transferred at the end of the Project to a suitable facility or collections repository where it can be properly accessed, curated and maintained (such as Archaeology Data Service (University of York), or other cloud based service).

6.8 Publication and Outreach

6.8.1 The Project is likely to provide scope for additional and more complex reporting, through for example a periodical or regional journal, stand-alone ‘monograph’

publication and/or popular publication. In addition, popular publications that include, for example, reconstruction drawings and non-technical summaries could be provided to make the results of the on-site mitigation recording more publicly accessible. A programme and strategy for the publication, and public dissemination of the results of the archaeological programme of works would be provided in the UPD.

6.8.2 Opportunities should be considered and undertaken as appropriate to disseminate the results in the community, for example a public talk about the results of the excavations to take place locally. Other ideas for public benefit should also be explored.

Abbreviations

Abbreviation	Full Reference
ACoW	Archaeological Clerk of Works
AIS	Air Insulated Switchgear
AONB	Area of Outstanding Natural Beauty
ATT	Archaeological Trial Trenching
BNG	Biodiversity Net Gain
CBS	Cement-Bound Sand
CIfA	Chartered Institute for Archaeologists
CoCP	Code of Construction Practice
CSE	Cable Sealing End
CWS	County Wildlife Sites
AMS-OWSI	Archaeological Mitigation Strategy and Outline Written Scheme of Investigation
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DMRB	Design Manual for Roads and Bridges
DWSI	Detailed Written Scheme of Investigation
EACN	East Anglia Connection Node
EERRF	East of England Regional Research Framework
ES	Environmental Statement
GIS	Gas Insulated Switchgear
HDD	Horizontal Directional Drilling
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HVAC	High Voltage Alternating Current
kV	kilovolts
LoD	Limits of Deviation
LWS	Local Wildlife Sites

Abbreviation	Full Reference
MLD	Maximum Linear Dimension
NPS	National Policy Statement
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
OASIS	Online Access to the Index of Archaeological Investigations
OSL	Optically Stimulated Luminescence
OWSI	Outline Written Scheme of Investigation
PD	Project Design
SCCAS	Suffolk County Council Archaeology Service
SMS	Strip, Map and Sample Excavation
SSSI	Sites of Special Scientific Interest
UKPN	UK Power Networks
UPD	Updated Project Design

Glossary

Term	Definition
Additional mitigation	Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within the ES has identified a requirement to further reduce significant environmental effects.
Alignment	The proposed overhead line and underground cable route.
Ancient woodland	Land that has been continually wooded since at least 1600 in England. Regarded as 'irreplaceable habitat' in national planning policy and guidance. Ancient woodland greater than 2 ha is recorded on the Natural England Ancient Woodland Inventory.
Angle/tension pylon	Pylon where a horizontal insulator string attaches the conductors. Tension or 'angle' pylons are used at points where the overhead line alignment changes direction.
Archaeological remains	The material remains of human activity from the earliest periods of human evolution to the present. These may be buried traces of human activities, sites visible above ground, or moveable artefacts.
Archaeological Mitigation Strategy and Outline Written Scheme of Investigation	Sets out the scope, guiding principles and methods for the planning and implementation of additional archaeological mitigation works associated with the construction of the Project.
Embedded mitigation	Embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation (and maintenance) of the Project.
Baseline	Reference to the report which identifies, describes, and collates the historic environment resource identified from desk-based sources, walkover, and setting survey within the Order Limits and defined Study Areas for the Project.
Bellmouth	A flared vehicular access point connecting a construction site to the public highway, designed to accommodate turning movements by large vehicles.
Biodiversity	The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.
Biodiversity Net Gain	An approach for developments to ensure habitats for wildlife are left in a measurably better state than they were before the development.
Cable	An insulated conductor designed for underground installation.

Term	Definition
Cable Sealing End	Structures used to transfer transmission circuits between underground cables and overhead lines.
Cable Sealing End compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Circuit	A set of wires along which current flows and returns. It is necessary to have a complete circuit for current to flow. The National Grid standard for overhead lines operating at 400 kV is for pylons to carry two circuits, each consisting of three phases, i.e. a double circuit configuration.
Code of Construction Practice	A code of construction practice sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential effects of construction works.
Conductor	The overhead wire that carries electricity from one place to another, for example the line between two pylons.
Consultation(s)	Meeting(s) with stakeholders, councils, the client, and the public that are required to be conducted at different stages of the Project prior to decision making, to discuss the potential impacts made by the Project on designated and non-designated heritage assets within the Order Limits and Study Areas.
Contaminated Land	Land where a substance or contaminant is in or under the land which has the potential to cause significant harm or the significant possibility of significant harm to human health, property or protected species, or significant pollution or the significant possibility of significant pollution to controlled waters.
Environmental Statement (ES)	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (EIA) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
Designated Heritage Asset	Assets which have been attributed certain degrees of importance, that include listed buildings, World Heritage Sites, registered parks and gardens, scheduled monuments, and conservation areas.
Gantry	An overhead bridge-like structure supporting electrical equipment. A transition point from overhead line equipment to equipment in a compound.
Geophysical Survey	A non-destructive survey method in which specialist equipment is used to map subsurface features and conditions by measuring the physical properties of the earth. The imagery produced through this survey provides valuable information in the form of charted data and images that are then analysed and interpreted by a specialist.

Term	Definition
Haul road	A route used by construction traffic within the Order Limits to access a working area from a site access point.
Horizontal directional drilling	Trenchless method for the installation of pipes, in a shallow arc using a surface-launched drilling rig. In particular, it applies to large-scale crossings in which a fluid filled pilot bore is drilled without rotating the drill string, and this is then enlarged by a washover pipe and back reamer to the size required for the product pipe.
High voltage	275,000 volts and over. National Grid's transmission lines generally operate at 275,000 and 400,000 volts. Lower voltage lines, such as 132,000 volts and 33,000 volts, are generally owned by local distribution companies.
High voltage alternating current	The transmission and distribution of electrical energy using alternating current (AC) at high voltage levels.
Historic buildings	Architectural, designed, or other structures with a significant historical value. These may include structures that have no aesthetic appeal or structures not usually thought of as buildings, such as milestones or bridges.
Historic Environment	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, and landscaped and planted or managed flora.
Historic Landscape	The current landscape, whose character is the result of the action and interaction of natural and/or human factors
Impact(s)	The degree of change to the asset and its setting caused by the Project and which is graded through the magnitude of impact criteria.
Insulator	Used to attach the conductors to the pylons, preventing electrical discharge to the steelwork.
Kilovolt	1,000 volts
Lattice pylon	Pylon type widely used on the national electricity transmission networks. Both standard lattice pylons (approximately 50 m in height) and low hight lattice pylons (approximately 40 m in height) are proposed on the Project.
Limits of Deviation (LoD)	LoD allow for adjustment to the final positioning of the permanent features, for example to avoid localised constraints or unknown or unforeseeable issues that may arise. This could include previously unidentified poor ground conditions which require a pylon to be moved slightly for geotechnical reasons, such as ground stability. The horizontal LoD define the parameters within which the position on the ground of proposed permanent features may deviate from the position shown on the plans. This applies to both linear (for example overhead lines and underground cables) and non-linear (for example the new EACN Substation and CSE compounds) proposed infrastructure.

Term	Definition
	Vertical LoD limit the maximum vertical height, or the depth below ground, of any new infrastructure.
Local Planning Authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Main Works Contractor(s)	Contractor(s) appointed by National Grid to construct the Project
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
National Landscape (an Area of Outstanding Natural Beauty)	Formally designated under the National Parks and Access to the Countryside Act of 1949 to protect areas of the countryside of high scenic quality that cannot be selected for National Park status due to their lack of opportunities for outdoor recreation (an essential objective of National Parks). As of November 2023, all AONBs became 'National Landscapes'. This reflects ambitions for the areas to play a key part in the international '30 by 30' commitment (to protect and conserve a minimum of 30% of land and sea for biodiversity by 2030).
Non-Designated Heritage Asset	Assets such as buildings, objects, monuments, sites, places, areas, and landscapes, and information from the Historic Environment Record that are recognised by local authorities as having heritage significance but that are not protected formally by law like a designated heritage asset it. Non-designated heritage assets are values for their contribution to the character and identity of the locality, and their historical, architectural, artistic, and/or archaeological interest.
Order Limits	The maximum extent of land within which the authorised development may take place.
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Permanent access	Access required to infrastructure during the operational phase of the Project, for operational and maintenance purposes.
Piling	Engineering process of installing elongated structural elements, known as piles, into the subsoil. This technique is employed to transfer structural loads to deeper, more competent strata, thereby providing stable foundations for construction projects. Essentially, it addresses situations where surface soils lack sufficient bearing capacity to support intended structures.
Primary Access Routes (PAR)	These are the roads on the local road network that would be used by construction vehicles between the strategic road network and the access points within the Order Limits.
Pylon	Structures that support the overhead line (conductors).

Term	Definition
Setting	The surroundings in which a heritage asset or landscape designation is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.
Site access points	A location connecting a construction site to the public highway.
Standard mitigation	Standard mitigation measures, comprising management activities and techniques, would be implemented during construction of the Project to limit effects through adherence to good site practices and achieving legal compliance.
Significance	The collective term for the sum of all the heritage values that are attached to a place (e.g. a building, archaeological site, larger historic area, etc.) which is then assessed.
Subsoil	Weathered soil layer extending between the natural topsoil and the unweathered basal layer (geological parent material, either solid or drift) below.
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Suspension pylon	Pylon where conductors are suspended by a vertical insulator string. Suspension pylons support the conductors on straight stretches of overhead line.
Temporary construction compounds	Temporary compounds installed during the construction phase of the Project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
Temporary overhead line diversions and pylons	Temporary diversions of existing overhead line may be required to ensure electricity flows are maintained at all times during construction of the Project to limit the disruption to the electricity network. These typically comprise a short section of overhead line with temporary structures or pylons which electricity flows are diverted along.
Terminal pylon	Pylons erected at the end of the overhead line to terminate the line at substations or where overhead lines are connected to underground cables. Because of the uneven load on one side of the pylons, much deeper and heavier foundations are required on the unloaded side.
Trenchless crossing	A crossing installation method that has limited above-ground disturbance which is used to avoid a sensitive feature such as an environmental feature.
Topsoil	Material which developed originally at the top of the soil profile and is characteristically darker in colour and has a higher organic matter content than subsoil material.

Term	Definition
UK Power Networks	UK Power Networks (Operations) Limited (registered company number 03870728) and/or its affiliate Eastern Power Networks plc (registered company number 02366906) as applicable.
Underground cable	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two Cable Sealing End compounds.
Value	A descriptor of the importance of a heritage asset which derives from the asset's ability to illustrate one of more of the Conservation Principles (Historic England, 2008).
Voltage	The electrical potential difference between two points.
Working area	Working area required to construct elements of the Project, such as pylons, underground cables, CSE compounds.

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