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Bramford to Twinstead Reinforcement

Volume 6: Environmental Information

Document 6.1: Environmental Statement: Non-Technical Summary

Final Issue A
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Planning Inspectorate Reference: EN020002

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 Regulation 5(2)(a)

nationalgrid

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Contents

1. Introduction

1.1 Overview

1.1.1 This Non-Technical Summary (NTS) presents a summary of the Environmental Impact Assessment (EIA) undertaken for the Bramford to Twinstead Reinforcement, here on referred to as 'the project'.

1.1.2 EIA is a tool used to assess the significant effects of a project on the environment. The findings of the EIA are reported in an Environment Statement (ES). This NTS provides a description of the EIA process and its findings in a manner that is easily understood and in non-technical language. This NTS has been produced to support the application for development consent and the accompanying ES under the Planning Act 2008.

1.1.3 National Grid Electricity Transmission plc (here on referred to as National Grid) is making an application for development consent to reinforce the transmission network between Bramford Substation in Suffolk, and Twinstead Tee in Essex. The project would be achieved by the construction and operation of a new electricity transmission line over a distance of approximately 29km (18 miles), the majority of which would follow the general alignment of the existing overhead line network. A description of the project is provided in ES Chapter 4: Project Description (**application document 6.2.4**).

1.1.4 The application for development consent defines Order Limits which encompass the land required to build and operate the project, including land which is only required temporarily for construction purposes.

1.1.5 The Order Limits include Limits of Deviation (LoD), which represent the maximum locational flexibility for permanent infrastructure, such as the grid supply point (GSP) substation, overhead line, pylons, cable sealing end (CSE) compounds and underground cables. This allows for adjustment to the final positioning of project features to avoid localised constraints or unknown or unforeseeable issues that may arise.

1.1.6 Within the Order Limits, a 'Proposed Alignment' has been developed for the proposed reinforcement as a result of consultation feedback, engineering design, environmental assessment work and landowner discussions, however, it should be noted that the permanent aspects of the project, including pylon locations, are not currently fixed and could be located anywhere within the LoD, as shown on ES Figure 4.1: The Project (**application document 6.4**). The location and orientation of the CSE compounds, GSP substation and underground cables may also change within the LoD.

1.1.7 The assessment presented within the ES is based on the Proposed Alignment and takes account of the flexibility within the LoD. It also includes reasonable worst-case assumptions about the design and construction methods that may be used to construct the project.

1.1.8 The application for development consent, including the ES, will be examined by the Planning Inspectorate and the final decision will be taken by the Department for Energy Security and Net Zero.

1.2 Purpose of this Non-Technical Summary

1.2.1 The purpose of the NTS is to enable local communities and other stakeholders to understand the likely significant environmental effects arising from the project in a concise manner which is easily understood and accessible by all.

1.2.2 In accordance with the Infrastructure Planning (EIA) Regulations 2017, effects are assessed in terms of how 'significant' they are likely to be. EIA is primarily concerned with 'likely significant effects' and those that are likely to be material to the decision whether to grant development consent for the project. The ES also sets out measures to mitigate (to avoid or reduce) potential significant adverse effects of the project.

1.2.3 Full details of all likely significant effects identified are presented in the ES, along with information on the mitigation proposals, which are secured in the Register of Environmental Actions and Commitments (REAC) (**application document 7.5.2**).

1.3 Structure

1.3.1 This NTS includes a description of the project, a summary of the consultation process and the EIA findings. Table 1.1 sets out a summary of each of the chapters of this NTS.

Table 1.1 – Structure of this NTS

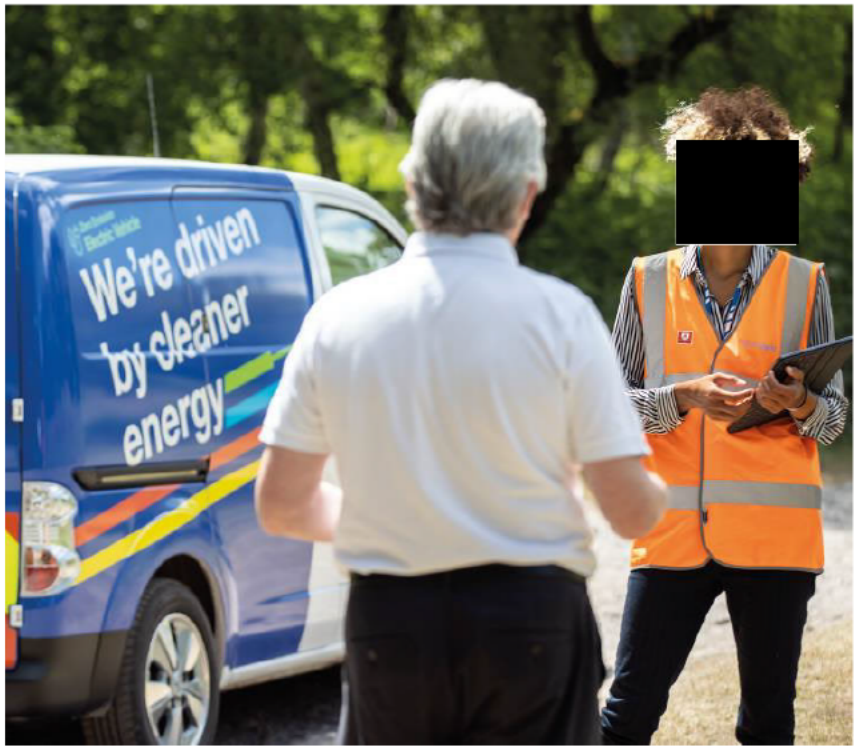
Chapter	Content
1: Introduction	This provides an overview of the NTS including its structure and purpose. An introduction is also given to National Grid, the applicant.
2: Existing Environment	This chapter provides an overview of the project location and features in the project environment.
3: Background to the Project	The chapter describes the need for the project, provides an overview of the alternatives considered
4: Project Description	This chapter provides a general description of the project including features of the project and details of construction and operation and maintenance phases.
5: Environmental Impact Assessment	This chapter provides a summary of the general EIA process, how the EIA has been undertaken, how it has been informed by consultation and stakeholder engagement, and the likely significant environmental effects arising from the project. It also provides an overview of the embedded measures.
6-15: Environmental Topic Chapters - Environmental Impacts and Mitigation	These chapters summarise the residual significant effects associated with the project and whether they are concluded as being significant or not. For each of the environmental topic areas considered in the assessment, the chapter provides an overview of how the environmental effects have been assessed, a description of the existing environment, overview of the environmental measures proposed to avoid or reduce adverse impacts where possible, and the potential environmental effects arising from the project. These effects are categorised into the topic areas as set out in Table 1.2.
16: Conclusion	This summarises the findings of the EIA and next steps in the Development Consent Order (DCO) application.

Table 1.2 – Environmental Topic Chapters

Topic Chapter	Content
6: Landscape and Visual	This chapter considers the effects of the project on landscape designations, landscape character and views.
7: Biodiversity	This chapter considers the effects of the project on ecological designations, habitats and protected species.
8: Historic Environment	This chapter considers the effects on archaeological remains, historic buildings and the historic landscape.
9: Water Environment	This chapter considers the effects of the project on flood risk and surface water quality and quantity.
10: Geology and Hydrogeology	This chapter considers the risk of potential contaminants and the effects on ground water quality and flows.
11: Agriculture and Soils	This chapter considers the effects of the project on agricultural soil quality and best and most versatile land. It also considers effects on land use.
12: Traffic and Transport	This chapter considers the effects of the project on the local road network and also public rights of way (PRoW).
13: Air Quality	This chapter considers the effects of emissions that may be generated by construction vehicles and machinery on people and ecological receptors.
14: Noise and Vibration	This chapter considers the effects of noise that may be generated by the project on people.
15: Cumulative Effects	This chapter considers the cumulative effects that could be generated from more than one impact on a receptor or the effects from the project in combination with other proposed developments.

1.4 Who Is the Applicant?

1.4.1 The application is being made by National Grid. National Grid owns and maintains the high voltage electricity transmission system in England and Wales and operates the high voltage electricity network throughout Great Britain, transporting electricity from generators (such as power stations and wind farms) to local distribution network operators (DNO). The DNOs own and operate the 132kV and local low voltage power lines and infrastructure that delivers electricity to individual properties. The DNO for the region is UK Power Networks (UKPN).



2. Existing Environment

2.1.1 The project is located in the east of England and crosses a county administrative boundary defined by the River Stour, with Suffolk County to the east of the river and Essex County to the west. The project lies within three local planning authority areas: the eastern part of the project lies in Mid Suffolk District (Suffolk); the central parts of the project lie in Babergh District (Suffolk); and the proposed GSP substation and the western part of the project lie in Braintree District (Essex). An overview of the existing environment is provided in Figure 2.1 below. This figure also shows the Order Limits, which include the new overhead lines, the new underground cable and removal of existing overhead lines. A description of the project is provided in Chapter 4: Project Description.

2.1.2 There is an existing 400kV overhead line operated by National Grid between Bramford and Twinstead. There is also an existing 132kV overhead line (proposed for removal) that is operated by UKPN.

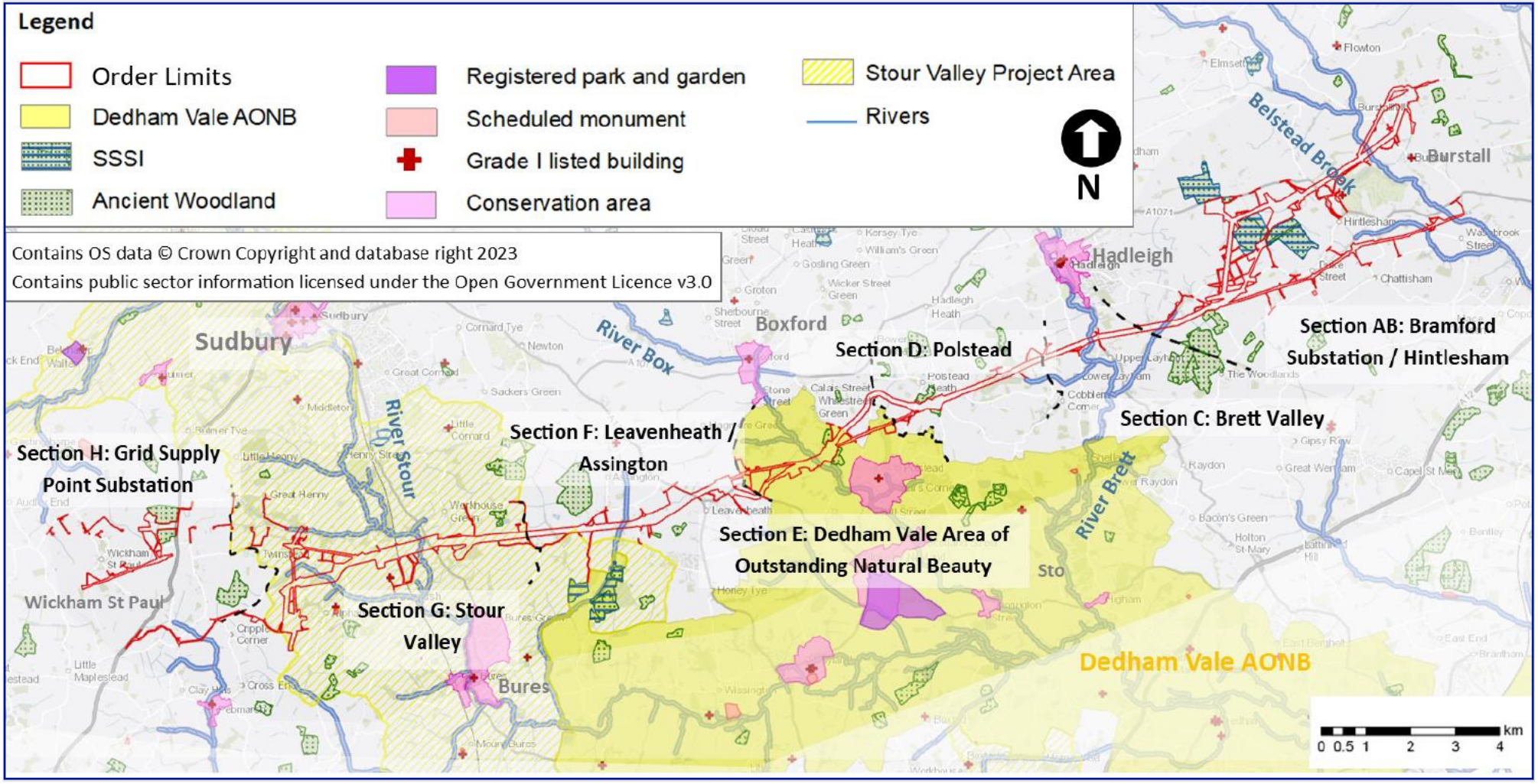
2.1.3 The local area is predominantly rural, with much of the land used for arable crop production. Sudbury and Hadleigh lie to the north of the project and the county town of Ipswich is located to the east. The main roads include the A1071 running roughly east west between Ipswich and Sudbury; the A134 running roughly north south between Sudbury and Colchester; and the A131 between Sudbury and Halstead.

2.1.4 The project would pass through the Dedham Vale Area of Outstanding Natural Beauty (AONB), which is designated as an exceptional example of a lowland river valley. The area has a rich history and has been the inspiration for many writers and painters, notably John Constable.

2.1.5 The surrounding landscape comprises a broadly flat plateau dissected by several river valleys. The river valleys run in a broadly northwest–southeast direction with the River Stour, River Box and River Brett joining together to the south.

2.1.6 The existing 400kV overhead line crosses through parts of Hintlesham Woods Site of Special Scientific Interest (SSSI), which is one of the largest remaining areas of ancient woodland in Suffolk. A variety of birds breed in the woods, including woodcock, nightingale, tawny owl, nuthatch and whitethroat.

Figure 2.1 – Existing Environment



3. Background to the Project

3.1 Need for the Project

3.1.1 The existing electricity transmission network in East Anglia does not have the capability needed to reliably and securely transport all the energy that will be connected in the future, while working to the required standards.

3.1.2 With new offshore wind generation, a new nuclear power station at Sizewell C and greater interconnection with countries across the North Sea being proposed, there will be a large increase in the amount of renewable and low carbon electricity generation connecting along the East coast.

3.1.3 This increased generation will play a key role in delivering the UK Government's net zero ambitions and delivering up to 50GW of offshore wind connected by 2030. To facilitate these ambitions, electricity network infrastructure is needed to ensure that energy can be transported from where it is generated to where it is used.

3.1.4 Whilst the transmission system in East Anglia has been sufficient until today, it will soon exceed its current capability. This includes its thermal boundary capability (the physical capacity of the circuits to carry power) and transient stability (the ability to accommodate faults without damaging generators or the network).

3.1.5 Increased transmission capability is therefore required in the East Anglia region, to allow National Grid to maintain a robust network, remain in accordance with its licence obligations, and to allow new sources of electricity generation to connect. This is vital to facilitate the ambitious targets set by the Government, for secure, clean and affordable energy for the long term.

3.2 Alternatives Considered

3.2.1 National Grid has undertaken a robust and transparent process to assess options and to carefully consider the different beneficial and adverse effects each may have, across a wide range of criteria including environmental, socio-economic, technical and cost factors. The aim was to find a balanced outcome, bearing in mind National Grid's duties. The process was guided by detailed specialist engineering considerations, environmental assessment and engagement with local stakeholders, regulatory stakeholders and non-governmental organisations.

Strategic Options

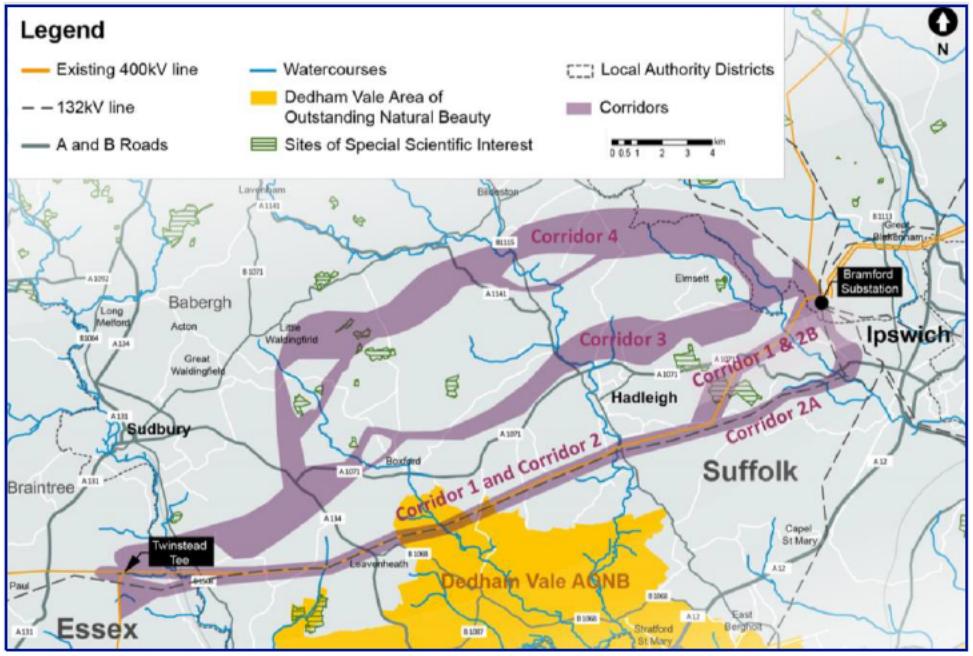
3.2.2 Once the need for reinforcement of the network in this area had been established, National Grid undertook a strategic options appraisal to determine the different ways in which this need could be met and to generate a preferred strategic proposal. The alternatives considered at this stage comprised different technologies, different geographical connection points, or a combination of the two. A long list of strategic options was identified that would meet this need. As the process proceeded, options were either discounted, parked or taken forward for further investigation.

3.2.3 The strategic options appraisal concluded that a predominantly overhead line from Bramford substation to Twinstead Tee, would be the preferred strategic proposal and best fulfils National Grid's various duties and obligations.

Route Corridors

3.2.4 National Grid identified four potential route corridors through which a predominantly overhead line between Bramford Substation and Twinstead Tee could be constructed (Figure 3.1).

Figure 3.1 – Route Corridors



3.2.5 Corridor 2 proposed the removal of the existing 132kV overhead line between Burstall and Twinstead and the adoption of its route for a new 400kV overhead line. This corridor was identified as the preferred route corridor as, even though it passes through parts of the Dedham Vale AONB, it would result in the least scale of change to the existing environment and the opportunity to remove the existing 132kV overhead line was seen as a benefit for the landscape and views.

Alignments Considered

3.2.6 National Grid considered various alignments for the transmission reinforcement within the preferred corridor (Corridor 2). This included considering both overhead line and underground cable solutions. The National Policy Statement against which Nationally Significant Infrastructure Projects (NSIP) are examined acknowledges that overhead lines are appropriate in many instances, however, there may be specific locations where underground cables are appropriate depending on the sensitivity of the existing environment.

3.2.7 Indicative alignments (northern, southern and underground alignment) were appraised for each section. The preferred alignment identified for each section of the project was as follows:

- Section AB: Bramford Substation/Hintlesham: the appraisal concluded that an overhead line on the southern alignment in Corridor 2B (on the southern side of the existing 400kV overhead line) was preferred;
- Section C: Brett Valley; Section D: Polstead and Section F: Assington/Leavenheath: the appraisal concluded that an overhead line on a southern alignment was preferred;
- Section E: Dedham Vale AONB: an underground cable was preferred given its nationally designated status as an AONB; and

- Section G: Stour Valley: an underground cable was preferred, because of the particular qualities of the Stour Valley landscape and its cultural associations.

Refinement of the Alignments

3.2.8 The designs continued to evolve based on the results of environmental surveys, technical assessments and feedback from consultation.

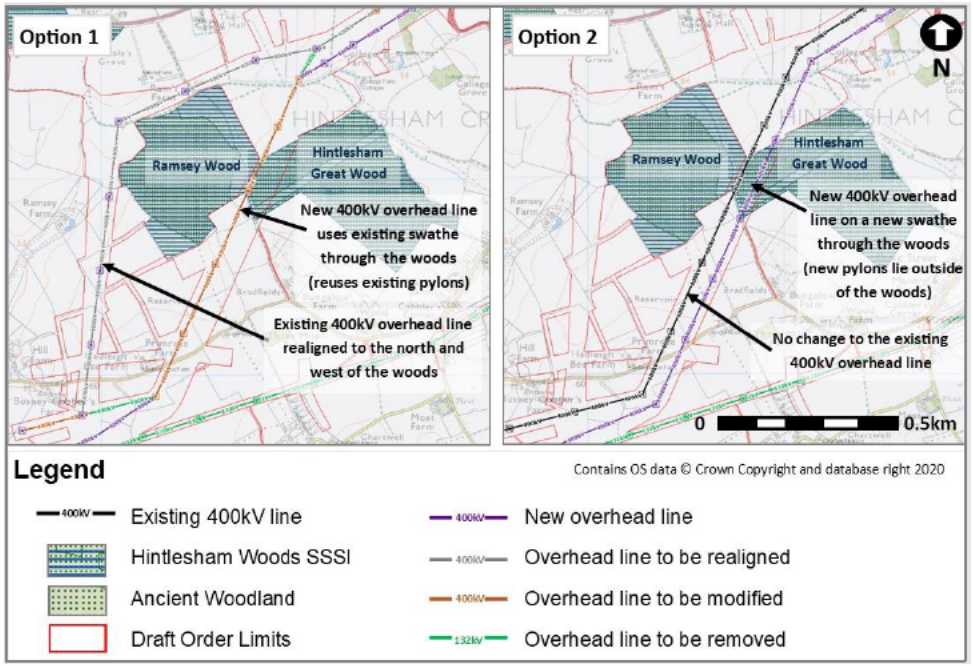
Section AB: Bramford Substation/Hintlesham

3.2.9 National Grid undertook a further review of alternatives at Hintlesham Woods SSSI, in response to landowner feedback and consultation responses received and identified two options as shown in Figure 3.2.

3.2.10 National Grid concluded that Option 2 should not be taken forward based on several important considerations, including but not limited to:

- Consultation feedback and engagement with stakeholders and landowners;
- The findings of environmental surveys and the presence of rare and protected species in the woodland;
- Policy designations including ancient woodland and SSSI;
- Landscape and visual impact; and
- Further design and engineering studies.

Figure 3.2 – Consultation Options at Hintlesham Woods



Section E: Dedham Vale AONB

3.2.11 Initially, a direct crossing of Dollops Wood using a trenchless crossing was identified as the preferred option in this section. Dollops Wood is a county wildlife site and was identified as an important habitat that should be avoided. Ground investigations subsequently indicated that a trenchless crossing at this location could have high construction and environmental risks due to the topography and the ground conditions. As a result of these risks, National Grid identified an alternative alignment that went to the north around the woodland as it avoided environmental and technical risks

associated with the trenchless crossing and avoided impacts on the woodland.

Section G: Stour Valley

3.2.12 During the statutory consultation in early 2022, a number of responses were received regarding the alignment of the underground cables in Section G: Stour Valley. The responses were concerned about the proximity of the routeing to the residents of Alphamstone and also on the habitats and land use along the cable route to the south of Henny Back Road. As a result, National Grid undertook a further option appraisal on both the former options and also new options proposed in the consultation responses. An alignment was selected on the basis that the trenchless crossing would avoid habitat loss at Alphamstone Meadows local wildlife site and areas identified as technically challenging due to the geology.

Cable Sealing End Compounds

3.2.13 A number of CSE compound locations were considered, and the preferred locations were based on environmental and technical inputs alongside consideration of National Grid's duties under the Electricity Act 1989 and consultation feedback.

Grid Supply Point Substation

3.2.14 An initial study was undertaken by UKPN to identify options to maintain the security of local electricity supplies. The study concluded that developing a GSP substation in the vicinity of Twinstead Tee was the preferred strategic option.

3.2.15 National Grid then built on this study to identify potential sites for the GSP substation between Twinstead Tee (in the east) to Thaxted (in the west). Eight potential sites were identified, and it was concluded that a substation between Butler's Wood and Waldegrave Wood was preferred, as it would have the least impact on the landscape character of the area, visual amenity, ecology and the historic environment. It would also have the shortest access road.

Underground Cable Construction

3.2.16 National Grid has considered different methods for constructing the underground cables, comprising:

- Opencut – where a trench is dug and the cables are buried;
- Ducting – where a trench is dug, then a duct (pipe) is placed into the trench and the cable can then be pulled through the ducts at a later date; and
- Trenchless crossings - where the underground cable would be installed using a drilling or boring method beneath sensitive surface features

3.2.17 The ducted solution would have environmental and construction benefits compared to a standard open cut trench construction method and therefore has been chosen as the main form of cable installation on the project.

3.2.18 Trenchless crossings are proposed at four locations where there are particular sensitive constraints (see Chapter 4: Project Description).

Full Line Tension Gantries

3.2.19 A review of the design identified that there would be benefits in using full line tension gantries (the transition points from overhead line equipment to equipment in a compound) on the project at all four CSE compounds. These would be approximately 15m in height and would have landscape and visual benefits compared to a terminal pylon alternative, which would be approximately 54m in height. This would remove the need for four terminal pylons across the project

Temporary Access Route Off the A131

3.2.20 The project is located in an area of Essex and Suffolk where there are a number of narrow lanes which are unsuitable in certain locations for construction traffic, particularly the very large low loading lorries required for the delivery of cables drums to the Stour Valley West CSE compound.

3.2.21 National Grid therefore proposes to use a temporary access route off the A131, rather than using the existing local road network. This would avoid traffic disruption and significant remedial works that would be required to the local roads.

4. Project Description

4.1 General Description

4.1.1 The project comprises:

- Construction and operation of a new electricity transmission line over a distance of approximately 29km;
  - Approximately 18km of this transmission line is overhead line, consisting of approximately 50 new pylons, and conductors (wires); and
  - Approximately 11km of the line is underground cables.
- Four CSE compounds where underground cables meet overhead lines;
- Removal of approximately 27km of existing overhead line and associated pylons;
- A new GSP substation (and associated works) at Butler's Wood to the east of Wickham St Paul, in Essex, to facilitate the removal of the existing 132kV overhead line;
- Other activities would be required to facilitate construction and operation of the project, including (but not limited to):
  - Modifications to, and realignment of sections of the existing overhead line;
  - Temporary land to facilitate construction activities including temporary amendments to the public highway, public rights of way (PRoW), working areas for construction equipment and machinery, site offices, welfare, storage and access;
  - Temporary infrastructure to facilitate construction activities such as amendments to the highway, pylons and overhead line diversions, scaffolding to safeguard existing crossings and watercourse crossings;
  - Diversion of third-party assets and land drainage from the construction and operational footprint; and
  - Mitigation, compensation and enhancement of the environment.

4.2 Project Section Overview

4.2.1 This section provides an overview of the project and its alignment through each of the seven sections identified in Figure 2.1.

Section AB: Bramford Substation/ Hintlesham

4.2.2 Bramford Substation itself is an electricity substation comprising several buildings and a variety of electricity infrastructure. There is proposed associated development at Bramford Substation to connect the overhead line into the substation. This associated development would take place within the boundaries of National Grid's operational land.

4.2.3 The proposed 400kV overhead line would tie into the existing substation on the western boundary. This would require realignment of the existing 400kV overhead line and a new angle pylon, near Hill Farm to connect into Bramford

Substation. The existing 400kV overhead line to the north-east of Hill Farm would be removed (comprising three pylons and the intervening spans of conductors).

4.2.4 The proposed 400kV overhead line would run south-west from Bramford Substation to an angle (tension) pylon near Church Road. The alignment would then change to a slightly more westerly orientation, to run parallel to the existing 400kV overhead line to the north of Hintlesham Park and Hintlesham Hall.

4.2.5 The proposed 400kV overhead line would use the route and existing pylons through Hintlesham Woods, and the existing 400kV overhead line would be re-aligned to the north and west of the woods on newly constructed pylons.

4.2.6 Once to the south of Hadleigh Bee Farm, the proposed 400kV overhead line would follow the same alignment as the existing 400kV overhead line, in a generally westerly direction to Hadleigh Railway Walk. Hadleigh Railway Walk forms the boundary between Section B and Section C.

4.2.7 The existing 132kV overhead line running to the south of Hintlesham would be removed in its entirety through this section.

Section C: Brett Valley

4.2.8 The proposed 400kV overhead line would run broadly parallel to the existing 400kV overhead line between Hadleigh Railway Walk in the east and Overbury Hall to the west. The proposed 400kV overhead line approximately follows the alignment of the existing 132kV overhead line, which would be removed in its entirety in this section.

Section D: Polstead

4.2.9 The proposed 400kV overhead line would run broadly parallel to the existing 400kV overhead line and generally follows the route of the existing 132kV overhead line, which would be removed in its entirety in this section.

4.2.10 The proposed 400kV overhead line would terminate at the proposed Dedham Vale East CSE compound, which would be located immediately west of Millwood Road, between two areas of woodland. A permanent access road would connect the CSE compound to Millwood Road. The CSE compound would provide the interface point between the 400kV overhead line and the underground cables.

Section E: Dedham Vale AONB

4.2.11 Underground cables are proposed throughout Section E (approximately 2.3km) and the existing 132kV overhead line would be removed entirely leaving only the existing 400kV overhead line, overhead in this section.

4.2.12 The underground cables would run in a south-west direction from Holt Road to Heath Road before diverting to the north of Dollops Wood. From here the cables divert in a south-east direction and would pass back underneath the existing 400kV overhead line to the north of Bushy Park Wood.

4.2.13 The underground cables would then cross below the River Box using a trenchless crossing technique, before passing around the southern edge of Alder Carr. The section ends to the north of the B1068 (Stoke Road), where the cables would cross the road into Dedham Vale West CSE compound. A

permanent access road would be constructed from Stoke Road.

Section F: Leavenheath/Assington

4.2.14 The proposed 400kV overhead line would extend from Dedham Vale West CSE compound in a south-west direction, crossing the A134 and routed to the south of the existing 400kV overhead line. The proposed 400kV overhead line changes to a more westerly direction to the east of High Road and continues on this alignment to the south of Assington and on to Upper Road, which forms the western end of the section.

Section G: Stour Valley

4.2.15 The proposed 400kV overhead line would continue west from Upper Road to the proposed Stour Valley East CSE compound south of Workhouse Green. The CSE compound would have a permanent access road from the B1508 (St Edmund's Hill) near Dunstead Farm.

4.2.16 From the CSE compound, the underground cables would be laid in a westerly alignment towards the B1508 and the River Stour and Sudbury Branch Railway Line which would be crossed using trenchless methods.

4.2.17 After the Sudbury Branch Railway Line, the cables would be routed across Henny Road and continue to the south-west, to the trenchless crossing to the south of Ansell's Grove. The underground cables would then change to a southerly direction after crossing the existing 400kV overhead line (which would be removed) before crossing Henny Back Road to connect to the Stour Valley West CSE compound to the south.

4.2.18 Five pylons and five spans of the existing 400kV overhead line (approximately 2km) would be removed from the section between Twinstead Tee and the Stour Valley West CSE compound. The existing 132kV overhead line would be removed up to the point at which it crosses beneath the existing 400kV overhead line at Twinstead Tee. There would also be some minor works to replace the arcing horns on the existing 400kV overhead line to the east and west of Twinstead Tee.

Section H: GSP Substation

4.2.19 National Grid is proposing to remove the existing 132kV overhead line between Burstall Bridge and Twinstead Tee, a distance of approximately 25km. This requires alternative arrangements to be put in place to secure the supply of the local electricity distribution network. This would be achieved by establishing a new GSP substation, between Butler's Wood and Waldegrave Wood, to the east of Wickham St Paul.

4.2.20 National Grid obtained planning permission for a new GSP substation under the Town and Country Planning Act (TCPA) in October 2022 (planning application reference 22/01147/FUL). This includes two super grid transformers, associated buildings, equipment and switchgear, a single circuit cable sealing end compound, a new permanent vehicular access to the public highway. However, for the purposes of a complete assessment of the effects of the project, the GSP substation is also included in the application for development consent and the likely significant effects are

assessed within the ES to allow a comprehensive assessment of the project in full.

4.3 Construction Timeline

4.3.1 Construction of the GSP substation is anticipated to commence in spring 2023. This would be in advance of DCO consent and would be undertaken pursuant to the existing GSP substation TCPA planning permission (see above). The remaining works would commence in autumn 2024, subject to DCO consent. All works would be completed in 2028. This is shown on the timeline in Figure 4.1.

4.4 Construction Working Hours

4.4.1 The core construction working hours would be as follows:

- 07:00–19:00 Mondays to Fridays; and
- 08:00–17:00 on Saturdays, Sundays and Bank Holidays.

4.4.2 This excludes start up and close down activities, which can take place up to one hour either side of the core working hours. There are operations that may take place outside of the core working hours including operations commenced during the core working hours which cannot safely be stopped, surveys or monitoring and operations requested by a third party, for example highway works to avoid disruption to the local road network at peak times.

Figure 4.1 – Project Timeline

[33] As the GSP substation has planning permission under the Town & Country Planning Act, construction may start sooner

4.5 Enabling Works

4.5.1 The enabling works for construction would comprise the following key activities:

- Set up of construction compounds, such as the main site compound off the A134 at Leavenheath;
- Construction of the temporary access routes;
- Third party utility diversions; and
- Vegetation removal.

4.6 Project Components

4.6.1 This section describes the works associated with the main components of the project. Order Limits have been defined to encompass the land required temporarily to build the project and permanently to operate the project.

Overhead Line Removal

4.6.2 The conductors would be lowered to the ground and cut into small sections or wound onto cable drums and removed from site. Pylons would be dismantled by removing the fittings, then the steelwork taken apart in sections using a crane or 'felling' the whole structure. Foundations would be removed to a specified depth, any excavated land filled in and the ground reinstated.

New 400kV Overhead Line

4.6.3 The proposed new pylons are typically 54m tall and would usually be constructed by installing concrete foundations (the type of foundation would be subject to ground conditions) and then assembling the pylon steelwork by bolting elements together prior to lifting them into place on top of the foundation using a crane.

4.6.4 Once the pylon is installed, the conductors would be lifted up to the arms of the pylons using special equipment which pull the conductors up onto and along the pylons in sections. The installation would then pull the conductors to achieve the correct tension.

Underground Cables

4.6.5 There would be approximately 11km of underground cables, with four CSE compounds required to facilitate the transition between the overhead and underground cable technology, one at the start and end of each underground cable section.

4.6.6 The underground cable route would be fenced off and the working area prepared, for example stripping and stockpiling soil to protect its structure. The cable trenches would be excavated and ducts then buried in the trenches. Cables would then be pulled through the ducts.

4.6.7 Four trenchless crossings are proposed on the project (at the River Box, River Stour, the Sudbury Branch Railway Line and at Ansell's Grove).

Cable Sealing End Compounds

4.6.8 Construction of the CSE compounds would begin with the preparation of the site area including any earthworks required to create a level working platform. Stone surfacing and a concrete pad would be installed which would form the

foundations for the CSE compound equipment and a security fence would also be placed around the CSE compound. The equipment supporting structures within the compound would be installed, including the approximately 15m tall gantries, and constructed on the prepared concrete foundations. The high voltage cables and overhead line conductors would be connected to the CSE before the site is tested prior to operation. Landscape planting would then be included to help filter views of the CSE compounds.

Grid Supply Point Substation

4.6.9 Construction activity would begin with site preparation including installation of the fencing to secure the site and installing the permanent access road onto the A131. The area would be cleared and levelled to create a level platform upon which the GSP substation would be constructed.

4.6.10 The structures and equipment within the substation would be installed and constructed on prepared concrete foundations. Control buildings would be built and connected to electricity and water supplies as well as the drainage system. Finally, equipment to protect and control the electricity network would be installed or modified and the new and modified overhead lines tested before being commissioned.

4.6.11 Excess soil generated from the earthworks to level the site would be used to create landscaped mounds around the GSP substation. These mounds would then be planted to help filter views of the GSP substation.

4.7 Reinstatement Works

4.7.1 Once construction works are complete the temporary access routes, temporary compounds and working areas would be removed and the ground and soils reinstated.

4.7.2 Vegetation that was temporarily managed or removed as part of the enabling works would be replanted or allowed to regrow where operational safety planting restrictions are not in place. Replanting would take place as soon as practicable, taking into account suitable planting seasons. Tree and hedgerow replanting would take place as described in the Landscape and Ecological Management Plan (LEMP) (**application document 7.8**).

4.8 Operation and Maintenance

4.8.1 The typical lifespan of an overhead line, underground cables and the CSE compounds is at least 40 years, depending on use and location. Periodic inspection and maintenance would be required during the operational lifetime, similar to what is already undertaken for the existing 400kV overhead line. Inspections using the fibre-optic cables that would be installed alongside the underground cables during construction, would be undertaken approximately every three years. This would identify whether cable repairs were required.

4.8.2 Maintenance activities are likely to include:

- Visual inspections for damage to the transmission line and to determine if plant/tree growth or development were at risk of affecting safety clearances;
- Repairs to pylon foundations, steelwork and fittings; and

- Servicing of equipment at substations.

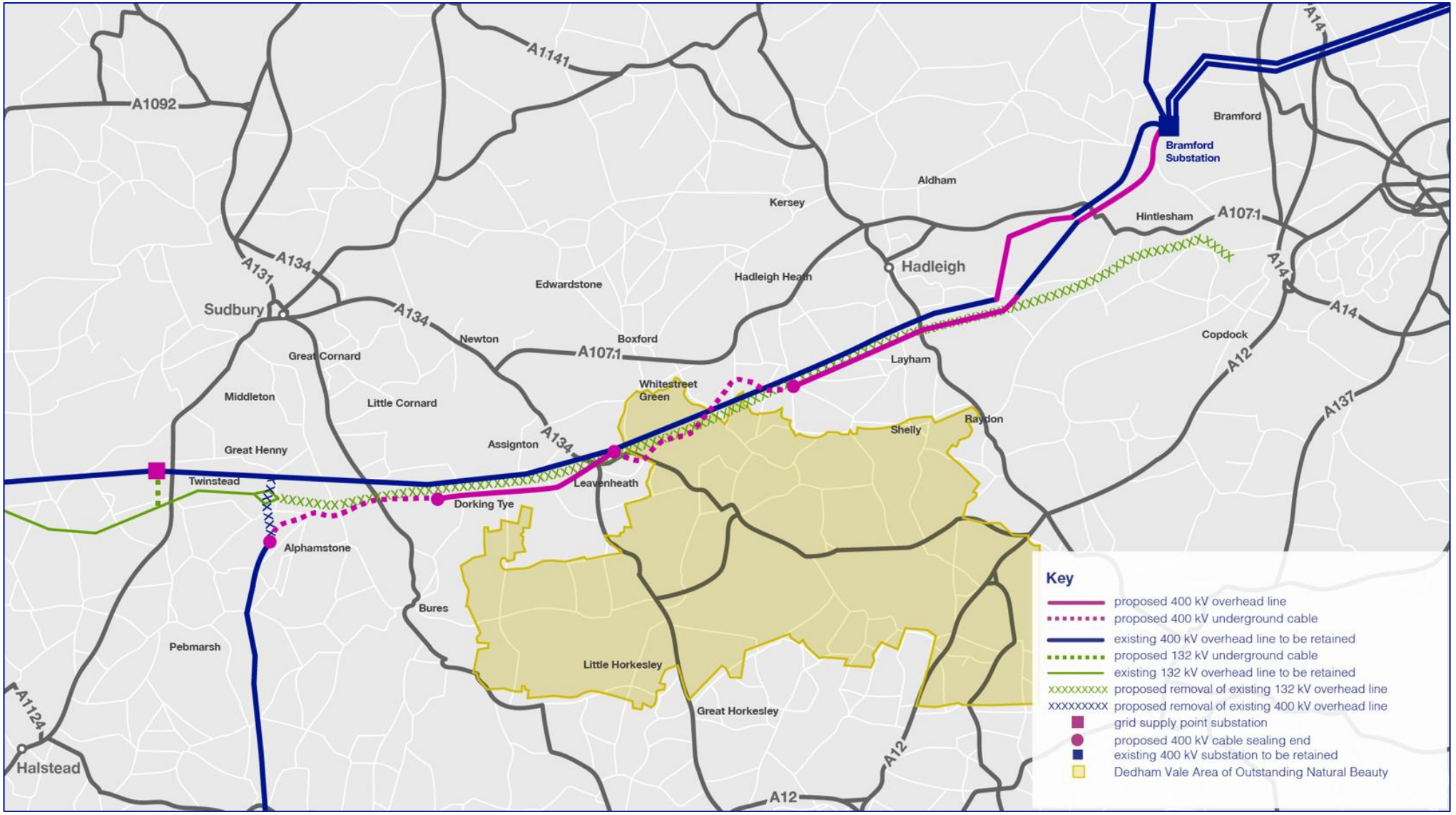
4.8.3 Infrequent refurbishment work is likely to also take place. During such works the overhead lines on one side of the pylons would be kept ‘live’ so electricity could continue to flow. Such works would comprise the replacement of the overhead line equipment such as the conductors and supporting insulators and steel fittings.

4.8.4 The GSP substation would be unmanned during operation. Routine site visits would be required to visually inspect the condition of equipment, structures and buildings for signs of damage or wear.

4.9 Decommissioning

There are no plans to decommission the project. While the design life of the project is currently at least 40 years, this is likely to be significantly extended given the probable increase in electricity demand in the future and the typical life of some components being longer than 40 years (for example a pylon would typically last 80 years before requiring full refurbishment). The design life of the project could, therefore, be extended with regular maintenance and refurbishment of each component.

Figure 4.1 – Proposed Project



5. Environmental Impact Assessment

5.1 Overview of the EIA Process

5.1.1 EIA is the process of compiling, evaluating and presenting information about the likely significant effects, both adverse and beneficial, of a project and identifying appropriate mitigation to reduce residual effects, where practicable, to a non-significant level. The assessment provides decision makers with the environmental information they require to determine whether a proposal should be granted consent. It also allows other parties to make informed representations about the proposed project.

5.1.2 To enable the EIA process to be proportionate and focus on those impacts likely to be significant, a Scoping Report was submitted to the Planning Inspectorate in May 2021. This report set out what should be assessed in the EIA to help define how to approach the assessment and what information may be needed to identify the likely significant effects from the project. A Scoping Opinion was provided by the Planning Inspectorate in June 2021 that provided an opinion on what information should be included within the ES. The Scoping Opinion and the statutory consultee responses have subsequently informed the assessment work and further design evolution undertaken.

5.1.3 A Preliminary Environmental Information (PEI) Report was published by National Grid as part of the pre-application consultation process.

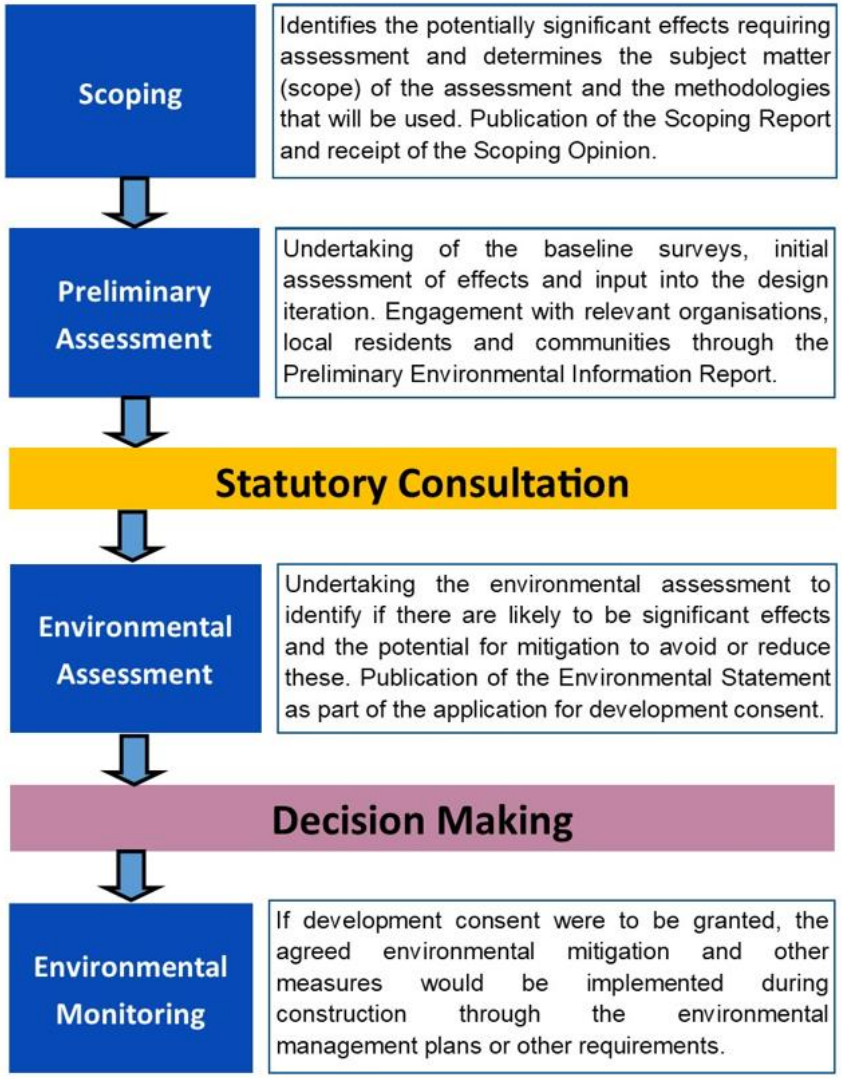
5.1.4 The ES presents the results of the EIA process undertaken and covers the construction, operation and decommissioning phases of the project. The ES is based on desk studies and site surveys which have informed an understanding of the existing environment and how this may change in the future with the project.

5.1.5 Extensive engagement and consultation has been undertaken with the local planning authorities, regulatory authorities, people with an interest in the land and affected communities. Engagement and consultation have helped to identify issues and concerns regarding the project, its design and the EIA process. The EIA process is summarised in Figure 5.1.

5.1.6 National Grid has made a commitment to deliver net gain by at least 10% or greater in environmental value (including biodiversity) on all construction projects (including those delivered by third parties building on our land) and has been working with appointed technical specialists, environmental organisations and landowners to identify potential opportunities for delivering areas of biodiversity net gain, and where practicable link to wider environmental gains. The enhancement proposals are outlined within the Environmental Gain Report (**application document 7.4**).

5.1.7 In the interests of clarity, the enhancements are not assessed as part of the ES, as they are not considered to be mitigating any impacts and are an enhancement on the existing environmental conditions.

Figure 5.1 – Environmental Assessment Timeline



5.2 Measures Incorporated into the Project to Reduce Environmental Effects

Embedded Measures

5.2.1 National Grid has committed to the following as part of the project to reduce environmental effects (referred to as 'embedded measures'):

- Removal of the existing 132kV overhead line between Burstall Bridge and Twinstead Tee, and a section of 400kV overhead line between Twinstead Tee and Stour Valley West CSE compound;
- Underground cables proposed through Dedham Vale AONB and the Stour Valley to avoid new overhead lines in these sensitive landscapes;
- Trenchless crossings of the River Box, River Stour and Sudbury Branch Railway Line and to the south of Ansell's Grove;
- Embedded planting to filter views of the GSP substation and CSE compounds; and
- Site specific embedded measures at Hintlesham Woods SSSI, areas of ancient woodland and other important habitats within the Order Limits.

Good Practice Measures

5.2.2 National Grid has also produced a Code of Construction Practice (CoCP) which includes good practice measures

used during construction and legislative requirements that National Grid undertakes on its projects. Examples include:

- Production of a Construction Environmental Management Plan (CEMP), the CoCP forms an Appendix of this management plan, a Landscape and Ecological Management Plan (LEMP) and a Construction Traffic Management Plan (CTMP). The CEMP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake inspections to check measures set out in the Management Plans are being undertaken;
- Land used temporarily would be reinstated where practicable (bearing in mind any restrictions on planting and land use) to its pre-construction condition and use. Hedgerows, fences and walls (including associated earthworks and boundary features) would be reinstated to a similar style and quality to those that were removed, in consultation with the landowner; and
- All works within main rivers or ordinary watercourses would be in accordance with a method approved under environmental permits issued under the Environmental Permitting Regulations (2016) and the Land Drainage Act (1991), or the protective provisions of the DCO for the benefit of the Environment Agency and the Lead Local Flood Authorities or (where relevant) and protective provisions.

Additional Mitigation

5.2.3 Some ES topic chapter have identified the potential for likely significant effects. In these cases, consideration has been given to how those significant effects could be avoided, reduced or offset. This is referred to as additional mitigation within the ES.

5.3 Structure of the Topic Chapters

5.3.1 The following chapters (Chapters 6 to 15) summarise the existing environmental conditions and provide a summary of the results of the EIA. These summarise the likely significant effects prior to the consideration of mitigation, where required the additional mitigation proposed and then a conclusion of the residual effects following the application of the additional mitigation measures.

6. Landscape and Visual

6.1 Approach to the Assessment

6.1.1 The EIA considers likely significant effects of the project on landscape and visual receptors. Landscape receptors include landscape designations and the landscape character of the area. Visual receptors include people who could experience different views, through the removal and/or introduction of man-made and natural features.

6.1.2 Landscape and visual receptors considered within the EIA comprise the following:

- Dedham Vale AONB (including its setting);
- Special Landscape Areas (SLA) including Gipping Valley SLA, Brett Valley SLA, Box Valley SLA and Stour Valley SLA;
- County level landscape character areas (LCA);
- People living and moving around the area (communities); and
- Recreational receptors (for example PRoW).

6.1.3 Existing conditions were established through a desk study, which incorporated a 5km buffer zone around the Order Limits. Particular focus was put on receptors found within a 3km buffer zone of the Order Limits, where the significant landscape and visual effects are most likely to occur. The desk study was supplemented by site surveys undertaken in 2021 and 2022.

6.1.4 Computer modelling has generated a Zone of Theoretical Visibility (ZTV) which illustrates theoretical visibility of the project during the operational phase. This was used as part of the process to select potential viewpoints for the assessment which were then checked and refined with a field survey to inform the assessment.

6.1.5 The assessment was undertaken for three phases:

- During construction;
- For the first year of operation (year 1) after all construction and reinstatement works have been completed; and
- At year 15 (15 years from completion of building the project), to determine the effects following maturation of the replacement planting.

6.2 Existing Environment

6.2.1 The project crosses a landscape which comprises a low-lying topography of flat to gently undulating landform, and wide, flat river valleys. Topography becomes more rolling to the west of the River Stour, around Twinstead. Major watercourses within the study area typically flow north to south, including the River Brett, River Box, and River Stour, with topography gently rising between these river corridors

6.2.2 The project is located near to and crosses the following landscape designations, including Dedham Vale AONB (national designation) and SLA (local designation) including Gipping Valley SLA, Brett Valley SLA, Box Valley SLA and Stour Valley SLA. Although not a designation, the Stour Valley Project Area (SVPA) has similar picturesque

landscape qualities to Dedham Vale AONB, being valued for its similar gently undulating river valley topography, medieval settlement pattern and rural characteristics, it is also covered within the same management plan.

6.2.3 The county level landscape character assessments were used for the purposes of the assessment. The community assessment was based on parish boundaries.

6.3 Likely Significant Effects Pre-Mitigation

Construction

6.3.1 Construction activities would take place in a predominantly farmed landscape where mechanical operations are frequently associated with agricultural activities. Construction operations are generally considered to be temporary effects, but they may introduce activities which are not typical of the farmed landscape, including the creation of temporary access routes, the need for working areas, soil stripping and materials storage. Additional activities which may give rise to temporary effects include the erection of scaffolding and the use of a temporary pylons to divert existing lines whilst construction work is undertaken. Vegetation would also need to be removed, which could open up views.

6.3.2 Construction effects would generally be temporary and short term, and the effects localised. Some short term landscape and visual effects of significance are likely during construction due to the working areas required to construct underground cables, such as within Dedham Vale AONB and its setting; however, these are anticipated to reduce in the medium to long term (year 15) once construction is complete and replacement planting matures. Significant adverse effects on views of the overhead line construction are less likely due to the temporary nature of the construction works; together with the fact that not all of the work would take place at the same time.

6.3.3 For community areas, a number of short term significant effects have been identified within Alphamstone, Lamarsh, Leavenheath and Polstead associated with the construction of the 400kV underground cable and the CSE compounds

Operation

6.3.4 Whilst the removal of the existing 132kV overhead line and introduction of the larger-scale proposed 400kV overhead line broadly in its place would be likely to intensify the landscape and visual effects in relation to the existing environment, effects are unlikely to be significant unless close to the project, since overhead lines are already components in existing views. The exception to this would be in Section AB Bramford Substation/Hintlesham, where the proposed 400kV overhead line moves away from the existing 132kV overhead line alignment.

6.3.5 The proposed CSE compounds, GSP substation, elements relating to the underground cable and other above ground elements of the project are unlikely to result in long term significant visual effects during operation (year 15). This is because embedded and good practice measures would limit their wider visibility. Although vegetation would be reinstated, there would be an ongoing need for the management of trees and vegetation around the permanent features (beyond year

15), for example to maintain safety clearance underneath the overhead lines.

6.3.6 Overall, landscape effects are likely to be not significant in the long-term. Significant beneficial landscape effects are likely to occur where the existing 132kV overhead line and a section of the 400kV overhead line are removed, for example within Dedham Vale AONB and the Stour Valley.

6.3.7 Significant visual effects occur where community and recreational receptors are moving within and around areas close to the overhead line elements of the project and the project is visible from a wider geographic area. This occurs within the community areas of Burstall and Hintlesham. Changes to views as a result of the project are likely to diminish (and become not significant) with increased distance from the project, and where there is filtering of views from intervening vegetation and/or landform.

6.3.8 Significant beneficial visual effects are likely to occur where the existing 132kV and 400kV overhead lines are removed, for example within the community areas of Chattisham, Lamarsh and Polstead.

6.4 Proposed (Additional) Mitigation

Construction

6.4.1 No additional mitigation is proposed for landscape and visual receptors during construction. Although significant effects have been identified, it is not possible to mitigate these through landscape mitigation measures, predominantly due to the scale of the construction works.

Operation

6.4.2 The community areas of Burstall and Hintlesham have been identified as having likely significant adverse effects. These effects are from the proposed 400kV overhead line and cannot be mitigated due to the pylon heights.

6.5 Residual Effects Post-Mitigation

6.5.1 There would be residual effects on the landscape and views resulting from the project. In the main these would not be significant, although there are a small number of locations where effects would be significant. A project of this scale and nature can be reasonably predicted to have some residual landscape and visual effects, as is acknowledged in National Policy Statement EN-1 (2011).

Construction

6.5.2 For landscape designations, significant effects have been identified for Dedham Vale AONB and Stour Valley SLA. These effects are from the large-scale construction works associated with the 400kV underground cable. These effects would be short term and localised within 1km.

6.5.3 For landscape character, significant effects have been identified within eight LCA from the large scale construction works associated with the 400kV underground cable, effects of construction of the CSE compounds and construction of the GSP Substation. However, these are anticipated to reduce to neutral once construction is complete and vegetation is reinstated and established.

6.5.4 For community areas, short-term significant effects have been identified within Alphamstone, Lamarsh, Leavenheath and Polstead associated with the construction of the 400kV underground cable and the CSE compounds.

Operation

6.5.5 Residual significant visual effects occur during operation where community and recreational receptors are moving within and around areas very close to the overhead line elements of the project. Changes to views as a result of the project are likely to diminish (and become not significant) with increased distance from the project, and where there is filtering of the project from intervening vegetation and/or landform.

6.5.6 There would be residual significant beneficial effects on Dedham Vale AONB and the Stour Valley from the removal of the 132kV overhead line and removal of a section of 400kV overhead line. These effects would be more pronounced in close proximity to the project, within 1km and are likely to diminish (and become not significant) with increased distance from the project.

6.5.7 There would also be significant beneficial effects on three LCA from the removal of the 132kV overhead line and or removal of a section of the 400kV overhead line within the Box and Stour Valley. These effects would be more pronounced in close proximity to the project, within 1km.

6.5.8 Chattisham, Lamarsh, and Polstead would have long term significant beneficial effects from the removal of pylons within views from these communities.

6.5.9 The only residual long term significant adverse effect for landscape character has been identified in Hintlesham.

6.5.10 For community areas, the only residual long term significant adverse effects would be within Burstall and Hintlesham. These are areas where the proposed 400kV overhead line does not follow the existing 132kV overhead line and therefore there would be an increase in the number of pylons in views.

7. Biodiversity

7.1 Approach to the Assessment

7.1.1 The EIA considers statutory designated sites, non-statutory designated sites, ancient woodland, habitats of principal importance (HPI), and terrestrial and aquatic biodiversity (including protected species such as bats, hazel dormouse and birds).

7.1.2 Existing environmental conditions were established through a desk study, which was based on different buffers zones around the Order Limits based on the potential impact pathways to an effect on biodiversity receptors.

7.1.3 The desk study was supported by a suite of ecological field surveys undertaken by qualified ecologists and using methodology defined in good practice guidelines. The site surveys included:

- Habitat and botanical surveys;
- Aquatic habitat surveys;
- Hedgerow surveys;
- Breeding bird surveys; and
- protected species surveys of badger, bats, dormouse, fish, otter, water vole, and reptiles.

7.1.4 The EIA process has been undertaken with reference to guidance provided in the Guidelines for Ecological Impact Assessment (Chartered Institute of Ecology and Environmental Management, 2022).

7.1.5 The application for development consent includes draft species licences for the project, namely for bats, dormouse and badger. The draft licences have been submitted to Natural England for review and have been updated as part of the application for development consent.

7.1.6 National Grid has also produced a Habitat Regulation Assessment (HRA) Report (**application document 5.3**) which presents the assessment undertaken in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) to determine if a plan or project may affect the protected features of a European designated site before deciding whether to undertake, permit or authorise it.

7.1.7 This presents the HRA undertaken for the project, which comprises Stage 1: Screening and Stage 2: Appropriate Assessment. The report concludes no adverse effect on the integrity of the SPA and Ramsar once good practice measures are employed.

7.2 Existing Environment

7.2.1 The existing environmental conditions for biodiversity identified and documented ecological features that could potentially be impacted, including statutory designated sites, non-statutory designated sites, habitats, arable plant assemblage, watercourses and aquatic habitats, aquatic ecology, bats, breeding birds, hazel dormouse, riparian mammals, and wintering birds.

7.2.2 The Order Limits pass through and adjacent to Hintlesham Woods, which is designated as a SSSI for its ancient

woodland habitat and breeding woodland bird assemblage. The citation lists the site as being one of the largest areas of ancient coppice-with-standards woodlands in Suffolk dating from at least the 12th century. The SSSI is managed by the Royal Society for the Protection of Birds (RSPB) and the Order Limits pass through and adjacent to Ramsey Wood and Hintlesham Great Wood.

7.2.3 Areas of potential ancient woodland sites have also been identified through a combination of desk study and site survey. These are sites suggesting ancient woodland origin that have not been included in the Ancient Woodland Inventory.

7.2.4 Ten statutory designated sites with potential pathways to effects were identified, including the following within or adjacent to the Order Limits:

- Hadleigh Railway Walk Local Nature Reserve;
- Hintlesham Woods SSSI;
- Arger Fen SSSI; and
- Tiger Hill Local Nature Reserve.

7.2.5 Twenty-one non-statutory designated sites with potential pathways to effects were identified, comprising County Wildlife Sites, Local Wildlife Sites and a Suffolk Wildlife Trust reserve.

7.2.6 HPI have been identified within the Order Limits, including lowland fen, lowland mixed deciduous woodland, wet woodland, lowland dry acidic grassland, arable field margins, coastal and floodplain grazing marsh, open mosaic on previously developed land, purple moor grass and rush pastures, hedgerows, rivers, mesotrophic lakes, eutrophic standing waters and ponds.

7.3 Likely Significant Effects Pre-Mitigation

Construction

7.3.1 The construction phase of the project has potential to impact upon ecological receptors through habitat loss, fragmentation and modification, disturbance, injury and mortality.

7.3.2 There would be construction works in and around Hintlesham Woods SSSI. These works require a move (transposition) of the existing overhead line onto new pylons to the north and west of the woods. The proposed 400kV overhead line would then use the existing pylons on either side of the woods. A proportion of the transposition works need to be undertaken during planned electrical outages, which typically take place over the summer in bird nesting season. The project includes a number of commitments to working practices that reduce the amount of works undertaken in the bird nesting season adjacent to the woods where an electrical outage is essential to the safe working.

7.3.3 National Grid has committed to maintaining a 15m buffer away from the edge of the SSSI (and ancient woodland interest feature) in addition to exclusion of heavy vehicles or material storage within the boundary area. As such, there is expected to be no change upon the SSSI and ancient woodland habitat in this area.

7.3.4 In addition, there would need to be works within Hintlesham Woods SSSI to the existing overhead line. National Grid has narrowed the working area at this location and made additional commitments to protect the soil and rootzone. With these measures in place, the assessment has shown that there are unlikely to be significant effects on the SSSI and its interest features (ancient woodland and breeding birds).

7.3.5 Embedded and good practice measures avoid or reduce the magnitude of these impacts so that there would only be one significant effect, pre-mitigation, from the project on biodiversity during construction. This is habitat loss and modification/degradation of lowland mixed deciduous woodland HPI in the following primary locations:

- Section AB: Bramford Substation/Hintlesham: along the proposed 400kV overhead line route north of Mill Farm, south of Park Farm, and through Hintlesham Woods;
- Section D: Polstead: along the proposed 400kV overhead line west of Stable Cottage and south of Valley Farm,
- Section F: Leavenheath/Assington: along the proposed 400kV overhead line north of Mill Farm; and
- Section G: Stour Valley: east of Stour Valley East CSE compound and along a section of underground cable north-west of Stour Valley West CSE compound.

Operation

7.3.6 There would need to be management of vegetation beneath the overhead line in order to maintain operational safety clearances between the new overhead lines and the vegetation below. In addition, trees are not permitted to be planted on top of the underground cables, as they can affect the operational performance of the cables, however scrub planting is permitted, and trees would be reinstated in areas away from the cables to reduce the potential for effects on the operation of the cables. The effects of these planting constraints to designated sites, habitats and species would be not significant.

7.3.7 The proposed 400kV overhead line would create a potential collision feature for bats and birds in the landscape. However, the impact of this is limited given the presence of the existing 132kV overhead line and (in most cases parallel) 400kV overhead line so that the effect would be not significant. There would also be beneficial effects from the removal of the 132kV and section of 400kV overhead lines, such as in Section E: Dedham Vale AONB and parts of Section G: Stour Valley where underground cables are proposed, which would remove these potential collision features from the landscape. These effects would be not significant.

7.4 Proposed (Additional) Mitigation

Construction

7.4.1 Habitat loss and modification/degradation of lowland mixed deciduous woodland HPI is assessed as having a potential likely significant effect during construction. Additional mitigation in the form of new areas of woodland planting have been included in the Order Limits, to compensate for this woodland lost. These areas would be adjacent to retained woodland to enhance connectivity.

7.4.2 In addition to the planted woodland areas to mitigate for the habitat loss and modification/degradation of lowland mixed deciduous woodland HPI, natural regeneration of woodland is proposed. Further details can be found in the LEMP (**application document 7.8**).

Operation

7.4.3 The assessment has concluded that there are no likely significant effects in relation to biodiversity receptors during operation. Therefore, no additional mitigation measures have been identified.

7.4.4 As noted in Chapter 5, environmental net gain (including biodiversity net gain) is reported separately in the Environmental Gain Report (**application document 7.4**) as part of the application for development consent.

7.5 Residual Effects Post-Mitigation

Construction and Operation

7.5.1 The assessment concluded that there are no likely significant residual effects from during construction or operation of the project, once the compensatory woodland has established.

8. Historic Environment

8.1 Approach to the Assessment

8.1.1 The historic environment assessment considers archaeological remains, built heritage assets and historic landscape assets (collectively termed heritage assets). Some of these are designated such as scheduled monuments and listed buildings. Many are undesignated but are still important to the understanding of the historic environment and may be protected within local planning policy.

8.1.2 The EIA considers the physical effects on heritage assets, for example due to damage or removal during construction. Physical effects also include changes to groundwater or from construction vibration which could damage a heritage asset. The EIA also considers the effects on the setting of the heritage asset, which is defined as the surroundings in which a heritage asset is experienced. Projects have the ability to change how heritage assets are perceived through impacts to their setting during both construction and operation.

8.1.3 Existing environmental conditions were established through a desk study, which incorporated a 250m and 3km buffer zone outside of the Order Limits for non-designated and designated assets respectively. Existing information was obtained from the public realm to establish the recorded historic environment conditions and identify heritage assets and place them within their wider geographical and chronological context. The desk study has also included an aerial survey and an assessment of geoenvironmental and palaeoenvironmental potential.

8.1.4 The desk study is supported by site inspections, walkover surveys, geophysical survey and archaeological trial trenching to obtain further evidence to inform the assessment. The geophysical surveys and trial trenching focused on the sections of underground cables, where there is a greater risk to archaeology due to the amount of ground disturbance compared with the overhead line sections.

8.1.5 The setting assessment was informed by site inspections to listed buildings where their setting might be changed by the project. The ZTV, aerial images, photomontages and viewpoint assessment were also used to inform the conclusions on setting.

8.1.6 National Grid has prepared an Archaeological Framework Strategy (AFS) (**application document 7.9**), which sets out how archaeological remains would be identified and assessed on the project. This is supported by the Outline Written Scheme of Investigation (OWSI) (**application document 7.10**), which identifies the level of archaeological mitigation that would be applied to all archaeological remains where removal or damage is unavoidable, whether significant or not.

8.2 Existing Environment

8.2.1 Scheduled monuments are nationally important sites designated for their archaeological interest. There are 11 scheduled monuments within the 3km study area, but none within the Order Limits. The closest is a medieval ‘Moated Site at Moat Farm, 450m south of Cobbler’s Corner’ (NHLE 1019889), situated approximately 15m south of the Order Limits. There are also a number of non-designated archaeological remains within the study area.

8.2.2 There are 1,235 designated built heritage assets identified within the 3km study area. There is only one listed building within the Order Limits – this is Grade II listed Hintlesham Hall Gate Piers. Grade I (highest grade) listed buildings in close proximity to the Order Limits and within the ZTV include churches at Burstall, Lamarsh and Alphamstone.

8.2.3 Hintlesham Hall is a Grade I listed building and includes a number of associated buildings which are Grade II* and Grade II listed. It is a country house (now hotel) dating originally to the late 16th century. Hintlesham Park is shown on the Ordnance Survey maps throughout the 20th century, and still appears on the modern OS mapping. This has been degraded by the conversion of the park to arable fields and the felling and removal of almost all the parkland trees to the west and north-west of the Hall.

8.2.4 There are no conservation areas within the 250m study area and nine within the 3km study area, the closest being Polstead to the south of the Order Limits and Hadleigh to the north of the Order Limits.

8.2.5 There are no registered parks and gardens within the Order Limits or 250m study area, however Chantry Park and Tendring Hall Park lie within the 3km study area.

8.2.6 The historic landscape character of the study area predominantly consists of rural fieldscapes formed from an undulating landscape dotted with isolated farmsteads and smaller built-up areas. In particular, there are a large number of areas of pre-18th century enclosure, fields with later boundary loss, and woodland (much of which is ancient). There are also more modern types, such as post-1950s agricultural landscape, 20th century enclosure, modern plantations, and current industrial landscapes.

8.2.7 Other elements of the historic landscape include important hedgerows, historic lanes (Suffolk) and Protected Lanes (Essex). These are sometimes characterised by earthwork features and old trees.

8.3 Likely Significant Effects Pre-Mitigation

Construction

8.3.1 The construction of the project, particularly soil stripping and trench excavation associated with the underground cable sections and the foundations of the CSE compound and GSP substation, have the potential to affect archaeological remains. This can include both known remains, for example those identified in the data searches. There can also be unknown archaeological remains in areas that have not been previously disturbed or surveyed. Archaeological remains can be destroyed or damaged through excavation. The assessment has identified the potential of a significant effect on buried archaeology in the absence of mitigation.

8.3.2 There are no built heritage assets directly affected by the project during construction. There would be temporary impacts on the setting of listed buildings or structures during construction due to a construction site being located within the visual envelope of such structures. However, as construction works would be temporary and, in many cases, existing vegetation and landform would help screen and filter views of the site, there are no significant effects on the setting of historic buildings during construction.

8.3.3 Similarly, construction activities would result in the temporary loss of elements of the historic landscape, for example the creation of gaps in important hedgerows and potential earthworks at access points on protected and historic lanes. In general, these features would be reinstated following construction therefore the effect would be short term and temporary and not significant. The permanent accesses for Dedham Vale East CSE compound, Stour Valley West CSE compound and the GSP substation, however, would result in the permanent loss of important hedgerow, though this effect would not be significant.

Operation

8.3.4 The assessment has not identified any significant effects to archaeological remains or the historic landscape during operation once reinstatement planting has matured.

8.3.5 There is the potential for impacts from the overhead lines, CSE compounds and GSP substation during operation on the setting (primarily visual) of listed buildings. The effect has been reduced by the sensitive positioning of the CSE compounds and GSP substation in the landscape, taking account of landform and existing vegetation screening.

8.3.6 Where the proposed 400kV overhead line replaces the 132kV overhead line and lies parallel to the existing 400kV overhead line, the magnitude of change would be limited, and the effects would be not significant.

8.3.7 The proposed 400kV overhead line to the north-west of Hintlesham Hall would result in a new line of pylons located closer to the Hall than the existing 400kV overhead line. This would not affect the Hall or ancillary buildings in terms of their form but would introduce modern infrastructure into part of the setting as this lies within the historic boundaries of Hintlesham Park. The new overhead line would increase visual intrusion into the setting of the Hall and its ancillary buildings. This would occur within a zone which has changed in character, with the loss of formal parkland to arable fields. In visual terms, and solely within the northern edges of the historic parkland, this would not be significant.

8.3.8 The portion of the former parkland through which the project would pass (parallel to the existing 400kV overhead line) makes only a limited contribution to the Hall's asset value. As such, the proposed 400kV overhead line would affect the ability to appreciate a part of the setting that makes only a minor positive contribution to the Hall's overall significance. Therefore, given the distance between the proposed 400kV overhead line and the Hall, and the limited extent to which the visual setting of the buildings would change, the level of impact would be limited and not significant.

8.3.9 The EIA concludes that the addition of visual impact from the proposed 400kV overhead line on listed buildings would amount to a small adverse impact, which would be not significant and amount to less than substantial harm on the assets.

8.3.10 In accordance with paragraph 5.8.14 of National Policy Statement EN-1, the assessment of built heritage assets has not identified any significant effects on listed buildings during construction or operation and therefore it is concluded that there would be no substantial harm, including in relation to setting in terms of policy.

8.4 Proposed (Additional) Mitigation

Construction

8.4.1 With regards to archaeological remains, mitigation would take the form of watching brief, strip, map and record and archaeological excavation, where warranted. The preliminary locations of such approaches have been made in the OWSI. Where archaeological investigation locates significant remains worthy of preservation in situ, the option of preserving them as such would be considered and applied where warranted. However, most cases would result in preservation by record. With these measures in place there would be no significant effects to known or unknown archaeological remains.

8.4.2 The assessment has concluded that there are no likely significant effects in relation to built heritage assets and historic landscapes during construction. Therefore, no additional mitigation measures have been identified.

Operation

8.4.3 The EIA has concluded that there are no likely significant effects in relation to archaeological remains, built heritage assets or the historic landscape during operation once the vegetation has been reinstated and matured. Therefore, no additional mitigation measures have been identified.

8.5 Residual Effects Post-Mitigation

Construction and Operation

8.5.1 The EIA concluded that with the proposed mitigation in place (as outlined in the AFS and the OWSI), there are no residual significant adverse effects for the historic environment.

9. Water Environment

9.1 Approach to the Assessment

9.1.1 The EIA has considered the likely significant effects of the project on surface water features including rivers and minor watercourses, surface water resources (abstractions and discharges) and flood risk.

9.1.2 A desk study has been undertaken to inform the assessment. This has been supported by information gathered during ecology site walkovers, in particular habitat surveys undertaken during 2021 and 2022.

9.2 Existing Environment

9.2.1 The study area for the water environment includes land and water features within the Order Limits and within a 500m buffer from these. The main rivers in the study area include Belstead Brook, River Brett (including Spring Brook), River Box and River Stour (including an unnamed tributary). There are also numerous tributaries of these rivers, classified as ordinary watercourses.

9.2.2 Most of the study area is in a Drinking Water Safeguard Zone (surface water) as defined by the Environment Agency. The Rivers Box, River Brett and River Stour support abstraction of water for a range of uses, including agricultural spray irrigation, and industrial processes. Abstractions and discharges influence the quantity and quality of water in the rivers.

9.2.3 There are multiple consented discharges from single and groups of domestic dwellings, involving small volumes (typically less than 5Ml/d) and several consents for larger volumes of discharges from wastewater pumping stations and treatment works.

9.2.4 Most of the rivers and minor watercourses have a relatively narrow floodplain within the Order Limits. The exception is the River Stour, which is approximately 560m wide and there are also flood defences along the western side of the river.

9.2.5 Flood risk from surface water runoff varies across the study area, with most areas at low risk from this source. Areas mapped as at higher risk closely align with watercourse corridors. Environment Agency data indicates that, in higher risk areas, the depths of surface water flooding are expected to be relatively shallow (less than 300mm).

9.2.6 With regard to flood risk and drainage, future conditions have been forecast, drawing on current best practice guidelines, taking into account the likely impacts of climate change on rainfall intensities. These future conditions are considered to factor in climate change resilience into the project drainage design.

9.3 Likely Significant Effects Pre-Mitigation

Construction

9.3.1 National Grid has committed to trenchless crossings at the River Box and River Stour. These rivers along with the River Brett would also have temporary bridge crossings of the proposed temporary access route to reduce impacts on the channel. There would be limited impacts to the Belstead

Brook, which is only crossed by the proposed overhead lines which span the watercourses (i.e. no temporary access route crossing is currently anticipated).

9.3.2 The installation of the temporary access routes and the open cut crossings of the underground cables at watercourse crossings, carry risks of opening pollution pathways to water environment receptors, and for temporary effects on their flow regimes and flood risk. However, these works would be undertaken in accordance with good practice measures outlined in the CEMP and CoCP (**application documents 7.5** and **7.5.1** respectively) and therefore are assessed as having not having a significant effect. All watercourses impacted during construction would be reinstated following the works as set out within the LEMP (**application document 7.8**).

9.3.3 Construction also has the potential to temporarily affect the land drainage regime. Construction phase drainage would be managed in accordance with the good practice measures outlined in the CoCP (**application documents 7.5.1**) and therefore are assessed as having no significant effects.

9.3.4 There are no likely significant effects expected in relation to the water environment, flood risk and land drainage during construction.

Operation

9.3.5 Flood risk and land drainage effects during operation have been avoided through design, locating vulnerable components, such as the GSP substation and the CSE compounds, in Flood Zone 1 (the lowest risk of the three categories of flood risk, as defined by the Environment Agency). There is only one permanent crossing of a watercourse, this is where the permanent access road at the GSP substation crosses a minor watercourse. There are no likely significant effects expected in relation to flood risk during operation.

9.3.6 Surface water runoff from the GSP substation and CSE compounds would be managed in accordance with good practice commitments in the CoCP (**application document 7.5.1**) including where new or additional surfacing is required, these would be permeable surfaces (where ground conditions allow) or would be designed to achieve green field rates. There are no likely significant effects expected in relation to surface water run off during operation.

9.4 Proposed (Additional) Mitigation

Construction and Operation

9.4.1 The assessment has concluded that there are no likely significant effects in relation to water receptors during construction or operation. Therefore, no additional mitigation measures have been identified.

9.5 Residual Effects Post-Mitigation

Construction and Operation

9.5.1 The assessment concluded that there are no likely significant residual effects in relation to water receptors during construction or operation.

9.5.2 A Flood Risk Assessment (FRA) was undertaken to determine whether the project would change the risk of

flooding along its length. A draft FRA was issued to the Environment Agency for comment, as part of the pre-submission engagement. This has been updated based on the response received and is included within the application for development consent (**application document 5.5**). The FRA documents the embedded and good practice measures included to make the project resilient to climate change and concludes that the project would be safe from flooding over its lifetime, and would not cause any detrimental effects on flood risk to lands outside the Order Limits.

9.5.3 A Water Framework Directive (WFD) Assessment has also been undertaken to assess whether the projects would have an impact on ecological status of waterbodies or on the objectives of the River Basin Management Plan (RBMP). A draft WFD Report was issued to the Environment Agency for comment, as part of the pre-submission engagement. This has been updated based on the response received and is included within the application for development consent (**application document 5.6**). This concludes that the project is unlikely to affect waterbody status or compromise the objectives and planned measures within Anglian RBMP.

10. Geology and Hydrogeology

10.1 Approach to the Assessment

10.1.1 The Geology and Hydrogeology assessment considers geological receptors such as mineral resources and hydrogeological receptors such as aquifers and groundwater abstractions (including private water supplies). It considers the potential changes to groundwater quality and quantity, for example changes to groundwater pathways and flow during construction and operation.

10.1.2 National Grid has also undertaken a risk assessment for land within the Order Limits that may have potential contaminants that could be mobilised by construction activities and in turn could harm people, soil and water.

10.1.3 A desk study has been undertaken to establish the existing environment. This has been supported by a programme of ground investigation to obtain further information in relation to geological strata and groundwater levels.

10.1.4 The study area is limited to the Order Limits for receptors that could be directly affected by the project such as designated geological sites and mineral resource receptors. A 250m buffer zone has been applied for identifying land contamination risks and a 1km buffer has been applied around groundwater receptors.

10.2 Existing Environment

10.2.1 There are no statutory designated sites for geological importance, potential Local Geological Sites or notified Local

Geological Sites within the study area. Therefore, there are no geological designated receptors that could be affected by the project.

10.2.2 The superficial geology of the study area comprises mainly gravels and sands of fluvial and glacial origin, particularly where river valleys cross the Order Limits. Beneath the superficial deposits, the bedrock comprises either Red Crag deposits or the underlying London Clay Formation, dependent on the local topography. Where large river valleys are present, these are generally incised through the near-surface bedrock deposits into the underlying Woolwich and Reading Formations and, into the underlying chalk at the River Brett and Stour valleys.

10.2.3 Parts of the Order Limits fall within a Source Protection Zones (SPZ) defined by the Environment Agency. The hydrogeology is classified by the Environment Agency as:

- Principal aquifers (Red Crag and underlying White Chalk subgroup);
- Secondary A aquifers; and
- Unproductive strata.

10.2.4 There are a small number of licensed groundwater abstractions, deregulated abstractions and private water supplies within the study area.

10.2.5 Large parts of the Order Limits in Suffolk lie within a Minerals Consultation Area (MCA). The project also crosses Layham Quarry which is allocated for sand and gravel extraction. Large parts of the Order Limits in Essex lie within a Minerals Safeguarding Area (MSA) for sand and gravel. No allocated sites have been identified in close proximity or within the Order Limits within Essex.

10.2.6 Six sites were identified as having a moderate or higher potential for significant contamination based on the historical and/or current land use. The risk evaluation in the individual qualitative risk assessments for the sites identified a 'low risk' from potential contamination for all of the sites.

10.3 Likely Significant Effects Pre-Mitigation

Construction

10.3.1 Geology and hydrogeology effects during construction have been avoided through design, by avoiding, where practicable known potential sources of contamination (e.g. landfills), and sensitive hydrogeological features (such as SPZ).

10.3.2 Construction activities have the potential to impact on groundwater quality through risk of pollution and also change groundwater quantity, flows and activities through localised dewatering of foundations and cable trenches. However, these works would be undertaken in accordance with good practice measures outlined in the CEMP and CoCP (**application documents 7.5** and **7.5.1** respectively).

10.3.3 The trenchless crossing beneath the River Stour may intercept the Chalk bedrock which could result in a potential significant effect on water quality, depending on the specific construction methods. Further work is needed, once specific construction details are available, in the form of a hydrogeological risk assessment to determine any potential risks and appropriate measures required so that significant effects are unlikely.

10.3.4 The potential for encountering contamination would be managed in accordance with the good practice measures described in the CoCP (**application document 7.5.1**) so there are no likely significant effects expected from contamination during construction.

Operation

10.3.5 The minerals areas (MSA and MCA) both extend beyond the Order Limits, across substantial areas of Essex and Suffolk. The actual areas within the Order Limits located within a MSA/MCA where the project would effectively sterilise any potentially valuable mineral are significantly smaller still (i.e. <0.2% of the total MSA/MCA). Therefore, the quantity of mineral sterilised by the project is considered to be insignificant in the context of the extensive occurrence of sand and gravel within both counties.

10.3.6 Other operational geology and hydrogeology effects have been avoided through design, such that there are no likely significant effects expected in relation to geology and hydrogeology during operation.

10.4 Proposed (Additional) Mitigation

Construction

10.4.1 The assessment has concluded that there are no likely significant effects in relation to geology and hydrogeology receptors during construction when the good practice measures outlined in the CEMP and CoCP are taken into consideration. Therefore, no additional mitigation measures have been identified.

Operation

10.4.2 The assessment has concluded that there are no likely significant effects in relation to geology and hydrogeology receptors during operation. Therefore, no additional mitigation measures have been identified.

10.5 Residual Effects Post-Mitigation

Construction and Operation

10.5.1 The assessment concluded that there are no likely significant effects in relation to geology and hydrogeology receptors during construction or operation.

11. Agriculture and Soils

11.1 Approach to the Assessment

11.1.1 The agriculture and soils assessment considers the likely significant effects during construction and operation of the project on agricultural land in terms of land quality including best and most versatile (BMV) land, loss of land for agricultural use and operation of land holdings. It also considers the effects on soil and soil resources in terms of damage and loss and how construction and operation may impact on soil quality and associated ecosystem services.

11.1.2 Existing conditions were established through a desk study of the area covered within the Order Limits. This was supplemented by detailed agricultural land classification site surveys undertaken at the four CSE compounds, the GSP substation and parts of the underground cable sections where land access was provided. Information was also gathered though discussions with landowners and land managers.

11.2 Existing Environment

11.2.1 Soil types within the study area are mainly slightly acidic loamy over clayey soils with calcareous subsoils, sandy soils and locally flinty in places.

11.2.2 There is approximately 720ha of agricultural land within the Order Limits. Of this approximately 40 percent is mapped (Provisional mapping) as Grade 2 and approximately 53 percent is mapped as Grade 3. At least a proportion of the Grade 3 land will be Grade 3a which, along with the Grade 2 land, is considered to be BMV land.

11.2.3 The majority of agricultural land has been identified to be in arable production. There are areas of land within entry level plus higher level agri-environment schemes within the study area, in particular south of Hadleigh, south of Boxford and west of the River Stour. There are also extensive areas of land under Middle Tier Countryside Stewardship.

11.3 Likely Significant Effects Pre-Mitigation

Construction

11.3.1 Construction activities can impact soil through excavation and storage, and through risks of compaction and pollution These activities can impact the quality of the soils and therefore impact soil functions and the ecosystem services these drive. National Grid has identified a number of good practice measures in the CEMP and the CoCP (**application documents 7.5** and **7.5.1** respectively). These measures would protect soil quality and structure during construction and as the majority of land required would be reinstated at the end of the construction phase, this would reduce detrimental effects on soil function and BMV land.

11.3.2 There are also potential impacts on agricultural operations and viability due to disruption and the loss of land from agricultural production. However, these would also be reduced through the good practice measures in the CEMP and the CoCP (**application documents 7.5** and **7.5.1** respectively). National Grid is also working with potentially

affected landowners to seek further ways to avoid impacting on their landholdings and operations.

11.3.3 The permanent loss of BMV land (approximately 3.1ha), associated with the permanent footprint of the CSE compound and GSP substation, has been assessed as not significant. It should be noted that this region has a higher proportion of BMV land compared to England as a whole. Avoiding all BMV is therefore difficult when other constraints, such as poorer quality agricultural land which supports valuable habitats, is also taken into consideration.

11.3.4 The effect of construction of the project on all other aspects of agriculture and soils has been assessed as not significant.

Operation

11.3.5 No likely significant effects have been identified to agriculture and soil during operation.

11.4 Proposed (Additional) Mitigation

Construction

11.4.1 In relation to the likely significant effects associated with the permanent loss of BMV land at the CSE compounds and GSP substation, no additional mitigation is available. The Material and Waste Management Plan (**application document 7.7**) identifies the need to consider the effective re-use of the soils on the project, which may enable the re-used soils to continue to provide functions in new locations, for example in supporting landscape planting or biodiversity.

Operation

11.4.2 The EIA has concluded that there are no likely significant effects in relation to agriculture and soils during operation. Therefore, no additional mitigation measures have been identified.

11.5 Residual Effects Post-Mitigation

Construction and Operation

11.5.1 The assessment concluded that there are no likely significant effects in relation to agriculture and soils during construction or operation.

12. Traffic and Transport

12.1 Approach to the Assessment

12.1.1 The traffic and transport assessment considers the impact of the project on the road, walking and cycling networks, its users including walkers, cyclists and horse riders (collectively referred to as 'WCH') using both the local road network and PRoW.

12.1.2 The assessment focuses on construction impacts, where the project would require staff (commuting journeys) and delivery and removal of materials to and from the site. The project would include abnormal indivisible loads for the delivery of the cable drums and the GSP substation transformers.

12.1.3 The project could cause disruption to local roads and PRoW through closures/severance and management during construction.

12.1.4 There would be very limited traffic movements during operation, as the GSP substation and CSE compounds would be unmanned. The inspections and maintenance visits would be similar to those already undertaken for the existing 400kV overhead line. Therefore, operational effects have been scoped out of the traffic and transport assessment.

12.1.5 National Grid has submitted a Transport Assessment (**application document 5.7**) as part of the application for development consent. This has been developed in accordance with and consideration of relevant national, regional, and local transport and planning policy. It establishes the existing transport conditions, identifies the future transport conditions and transport impacts of the project, and illustrates whether mitigation is required for transport issues generated by the project.

12.2 Existing Environment

12.2.1 The study area includes all roads that have been identified as construction routes for the project, or likely to be used by construction workers travelling to and from construction sites. It also includes the network of PRoW that cross the Order Limits.

12.2.2 The study has included the collection of existing data and reports about the use of the road network. This has included details of collision records and using mapping to identify sensitive receptors that lie along the construction routes, such as schools and health centres. The study has been supplemented by site surveys in the form of traffic counts along the construction routes.

12.2.3 The existing environment is bounded by the strategic road network of the A14 to the east and the A12 to the south. The northern extent of the affected road network is defined by the A1071 and with the A131 to the west. The A134 lies approximately north-south through the middle of the study area. The local road network in between these routes are typically B roads or less and a number of roads are narrow/single lane, and some are designated as Protected Lanes.

12.3 Likely Significant Effects Pre-Mitigation

Construction

12.3.1 An assessment of change in WCH journey length, severance and pedestrian amenity, fear and intimidation has been undertaken for all road segments and PRoW within the study area. This has concluded that the project would result in no significant effects on all traffic and transport aspects except for a short term moderate (significant) adverse effect on the WCH using Church Road, Twinstead, in terms of amenity, fear and intimidation, due to an increase in traffic resulting from construction staff vehicle movements.

12.4 Proposed (Additional) Mitigation

Construction

12.4.1 Additional mitigation is proposed on Church Road, Twinstead in response to the significant effect reported from the WCH amenity, fear and intimidation assessment. Baseline traffic on this route is fairly low, and while the route passes a church and a village hall, it has no dedicated footpaths. National Grid is proposing the installation of temporary warning signage to inform users of the use of the road by construction traffic.

12.5 Residual Effects Post-Mitigation

Construction

12.5.1 The measure proposed on Church Road, Twinstead, or those of an equivalent effect, are expected to reduce the significance of effect on this road segment from a short term (during construction only) moderate adverse to a short term minor adverse effect, which is not significant.

13. Air Quality

13.1 Approach to the Assessment

13.1.1 The air quality assessment considers construction dust, construction generators and construction traffic emissions and the effects that these would have on people (human receptors) and habitats (ecological receptors).

13.1.2 As noted in Chapter 12, there would be very limited traffic movements during operation. Therefore, operational effects have been scoped out of the air quality assessment.

13.2 Existing Environment

13.2.1 Existing conditions were established through a desk study, which used a 350m buffer around the Order Limits for dust on human receptors and a 50m buffer for ecological receptors. For construction traffic, a 200m buffer was used around the construction routes. The desk study also used background air quality available from the Department for Environment, Food and Rural Affairs and the local authorities.

13.2.2 There is an air quality management area (AQMA) in the centre of Sudbury. Otherwise, the existing rural environment is likely to have good air quality in general and particularly away from main roads and junctions.

13.3 Likely Significant Effects Pre-Mitigation

Construction

13.3.1 The construction routing has avoided the AQMA in Sudbury. During construction, activities such as earthworks and vehicles tracking along the temporary access routes can generate dust. In addition, emissions are released from construction vehicle exhausts and from fixed plant like generators. The assessment undertaken has shown that with the application of good practice measures within the CoCP (**application document 7.5.1**), that there are no likely significant effects in relation to air quality during construction.

13.4 Proposed (Additional) Mitigation

Construction

13.4.1 The EIA has concluded that there are no likely significant effects in relation to air quality receptors during construction. Therefore, no additional mitigation measures have been identified.

13.5 Residual Effects Post-Mitigation

Construction

13.5.1 The assessment has concluded that there are no likely significant effects in relation to air quality during construction.

14. Noise and Vibration

14.1 Approach to the Assessment

14.1.1 The noise and vibration assessment considers the impacts of noise and vibration from construction activities and construction traffic on noise sensitive receptors, including residential properties.

14.1.2 As noted in Chapter 12, there would be very limited traffic movements during operation. Therefore, operational effects from vehicles have been scoped out of the noise and vibration assessment.

14.1.3 The underground cables and the CSE compounds would not generate noise during operation. Operational noise from the overhead lines was scoped out of the assessment as the proposed overhead line system is a 'triple Araucaria' conductor bundle on a lattice pylon which is regarded as practically quiet. Operational noise from the GSP substation was scoped out of the assessment as National Grid committed to including noise enclosures around the transformers at the substation. Therefore, operational noise and vibration have been scoped out of the assessment as no likely significant effects have been identified. However, an assessment of noise impacts from the substation has been conducted for information.

14.2 Existing Environment

14.2.1 A desk study has been undertaken to identify noise sensitive receptors within the study area. These predominantly consist of isolated dwellings or small hamlets.

14.2.2 Existing conditions were established through a desk study, which used different study areas due to the differing nature of impact. These comprised a 300m buffer around the Order Limits for construction noise and a 100m buffer for construction vibration. For construction traffic, all proposed routes have been assessed.

14.2.3 Existing background noise levels in the Order Limits are generally low, typical of a rural environment, with higher noise levels expected close to existing roads, particularly the A1071, A134 and A131.

14.2.4 Noise surveys were undertaken in relation to operational noise from the GSP substation. No further site surveys were considered necessary, as the construction noise assessment uses the lowest noise thresholds applicable to quiet rural areas.

14.3 Likely Significant Effects Pre-Mitigation

Construction

14.3.1 The EIA identified the potential for noise and vibration impacts at properties in the absence of site-specific measures such as fencing or enclosures around equipment. This was undertaken to identify hotspots where noise levels were anticipated to exceed the noise thresholds.

14.3.2 The assessment concluded that there would be a small number of properties where noise levels could be significant in the absence of additional measures. This included at some pylon locations where piling is assumed and also at the trenchless crossings where certain activities that could not

be safely stopped could occur overnight when thresholds are lower.

14.3.3 Potential significant effects have been identified at:

- Seven noise sensitive receptors due to daytime construction noise;
- Twelve noise sensitive receptors due to potential night-time construction noise in relation to the trenchless crossings; and
- One noise sensitive receptor due to construction vibration resulting from potential piling activities.

14.4 Proposed (Additional) Mitigation

Construction

14.4.1 Additional temporary noise mitigation measures would be put in place to reduce noise levels from construction plant and machinery at the identified noise sensitive receptors where the potential for significant effects have been identified, unless a detailed assessment is undertaken which demonstrates that no significant noise impacts would occur. Examples of additional mitigation measures include using quieter machinery or using screening or enclosures to reduce the noise levels at source.

14.4.2 Additional temporary measures would be put in place to reduce vibration levels from construction plant and machinery at one pylon location, unless a detailed assessment is undertaken which demonstrates that no significant vibration impacts would occur. Examples of additional mitigation include using alternative methods such as press-in piles or pre-boring for piled foundations.

14.5 Residual Effects Post-Mitigation

Construction

14.5.1 The assessment concluded that with the implementation of the additional mitigation, it is anticipated that noise and vibration levels can be reduced such that significant adverse effects during construction are avoided at all noise sensitive receptors.

15. Cumulative Effects

15.1 Approach to the Assessment

15.1.1 Cumulative effects occur when impacts caused by present and reasonably foreseeable activities combine to create an increased level of effect. A single environmental impact resulting from a development may not be significant on its own but may become significant when combined with other environmental impacts of the same development or of other combined developments.

15.1.2 Two types of cumulative effects have been considered in the EIA:

- Intra-project effects, where a receptor is affected by more than one impact, for example noise and traffic, causing a cumulative effect together on people and communities; and
- Inter-project effects, where different projects cause effects that add together making a larger effect on a receptor - for example, the combination of the project and another nearby proposed development, which together might impact the same residential property.

15.2 Existing Environment

15.2.1 The desk study has drawn on the Planning Inspectorate's Programme of Projects for NSIP and local planning authority websites to identify planning applications and proposals. The assessment also drew on the existing environmental conditions presented in the other environmental topic chapters and the environmental reporting for the other planning applications and proposals to identify potential receptors.

15.3 Likely Significant Effects Pre-Mitigation

Intra-Project Cumulative Effects

15.3.1 The intra-project cumulative effects assessment identified that there could be a minor benefit to the local economy in terms of the construction workforce spending money on accommodation and food in the local area (this is known as induced spend). However, the relatively small construction workforce (350 at peak and 180 on average) are unlikely to provide a significant contribution to the local economy. It was also considered that the sourcing of materials and services from the local area for the project would not provide a significant contribution to the local economy.

15.3.2 The assessment also identified that as with any large infrastructure project, there would be disruption to amenity and local residents during construction. Visual, noise and air quality effects could combine into a cumulative effect at a receptor. However, the good practice measures set out in the CEMP and CoCP (**application documents 7.5** and **7.5.1** respectively), would help to avoid or reduce the effects, and the effects would also be localised and short term in any given area due to the phasing of the works. In conclusion, it was considered that intra-project cumulative effects on amenity and local residents during construction would not be significant.

Inter-Project Cumulative Effects

15.3.3 The inter-project cumulative effects assessment has identified that there is the potential for significant cumulative effects around Bramford Substation due to the presence of a number of large infrastructure projects. These include the converter station component of East Anglia THREE, the new 400kV overhead lines associated with East Anglia GREEN, and the overhead lines from the project around Bramford Substation. This is anticipated to result in a significant cumulative effect to landscape and views immediately around Bramford Substation during both construction and operation. Effects during construction would be short term and temporary.

15.3.4 There is also the potential for significant cumulative landscape and visual effects due to short-term and temporary cumulative effects between the project and a proposal to extend the Stoke by Nayland Golf Course during construction.

15.3.5 No significant effects have been identified for other aspects or for other locations within the study area during either construction or operation.

15.4 Proposed (Additional) Mitigation

Intra-Project Cumulative Effects

15.4.1 No significant intra-project cumulative effects have been identified and therefore no additional mitigation is proposed.

Inter-Project Cumulative Effects

15.4.2 Significant cumulative effects have been identified during construction at and around Bramford Substation and where the project lies close to the proposal to extend the Stoke by Nayland Golf Course. No additional mitigation is proposed during construction as these effects would be temporary and short-term, and screening of construction sites is impractical and could itself create a visual intrusion.

15.4.3 Significant cumulative effects have been identified during operation at and around Bramford Substation. No additional mitigation is proposed because the significant operational effects arise from the presence and visibility of large pylons which cannot be fully screened by tree planting due to the height of the pylons.

15.5 Residual Effects Post-Mitigation

Intra-Project Cumulative Effects

15.5.1 The EIA has shown that there are no likely significant intra-project cumulative effects during construction or operation of the project.

Inter-Project Cumulative Effects

15.5.2 In relation to the likely significant cumulative effects associated with construction and operation of the projects at and around Bramford Substation and near the Stoke by Nayland Golf Course development no additional mitigation is available, therefore the cumulative effects remain significant.

16. Conclusion

16.1 What Happens Next?

16.1.1 This NTS forms part of the application for development consent submitted to the Planning Inspectorate.

16.1.2 After receipt of the application, the Planning Inspectorate has 28 days to review the application and decide whether or not to accept it for examination. If the application is accepted, the pre-examination phase would begin. At this point, National Grid would publish a notice saying where application documents can be viewed.

16.1.3 During the registration period of the pre-examination phase, members of the public can register as interested parties. This would entitle them to make "relevant representations" to the Planning Inspectorate. Information on how to register can be found on the Planning Inspectorate's website for the project:

https://infrastructure.planninginspectorate.gov.uk/projects/eastern/bramford-to-twinstead/

16.1.4 Stakeholders, local communities, and members of the public can comment on the assessments undertaken, and the conclusions reached as part of their responses to the application for development consent itself. Once the application has been accepted by the Planning Inspectorate timescales will be set out for commenting.

16.1.5 The pre-examination phase ends just prior to the preliminary meeting, which registered interested parties are invited to attend. At the preliminary meeting, the Planning Inspectorate would decide the key issues to take into account when examining the application.

16.1.6 The preliminary meeting marks the start of the examination phase during which any necessary hearings would be held to address key issues identified at the preliminary meeting.

16.1.7 Registered interested parties can send written representations to the Planning Inspectorate and can ask to speak at a public hearing. The examination would last a maximum of six months.

16.1.8 The Planning Inspectorate then has three months to consider the recommendations from the examination. The recommendations and a supporting report are passed to the Secretary of State, who would have three months to decide whether or not to grant development consent.

16.1.9 When the Secretary of State's decision is published, there is a High Court challenge period. Once the DCO is issued, the decision is final.

16.2 Delivering the Project

16.2.1 If National Grid is successful in gaining development consent for the project, it would deliver the project in accordance with the DCO and the various controls contained within this, for example, the management plans secured through Requirement 4 of the DCO. The project would allow National Grid to maintain a robust network, remain in accordance with its licence obligations, and to allow new sources of electricity generation to connect. This is vital to facilitate the ambitious targets set by the Government, for secure, clean and affordable energy for the long term.

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