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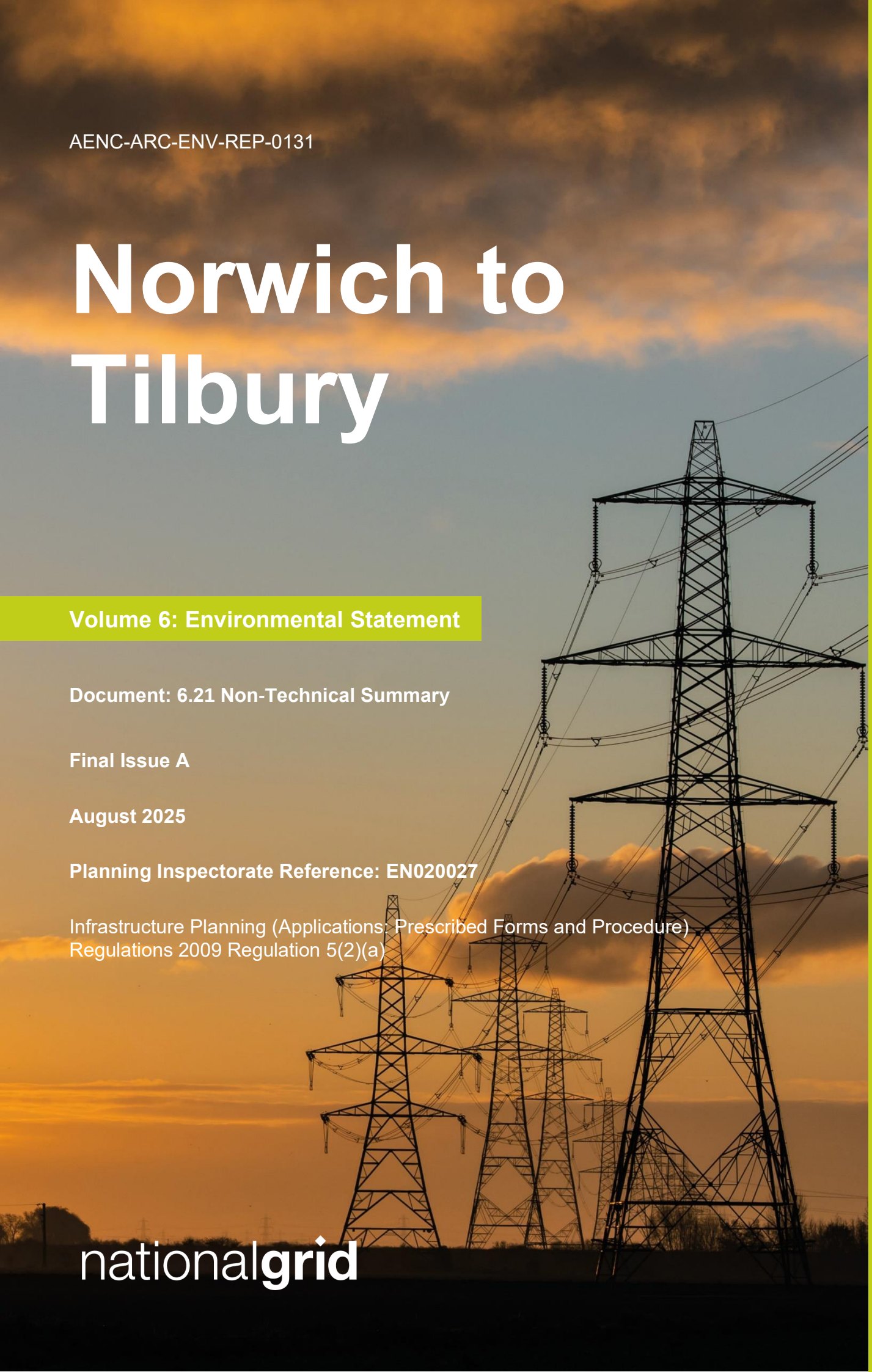

nationalgrid

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1. Introduction

1.1 Overview

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

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

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

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

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

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

1.1.7 The Project is a Nationally Significant Infrastructure Project (NSIP), and National Grid is seeking development consent under statutory procedures set by government. NSIPs are projects of certain types, over a certain size, which are considered by the government to be of national importance, hence permission to build them needs to be given at a national level, by the relevant Secretary of State (in this case the Secretary of State for Energy Security and Net Zero). Instead of applying to the Local Planning Authority (LPA) for planning permission, the developer must apply to the Planning Inspectorate for a Development Consent Order (DCO) that would grant development consent.

1.1.8 National Grid has submitted an application for development consent to the Planning Inspectorate. The Examining Authority (consisting of one or more examining inspectors), after a period of public examination, will make their recommendation to the Secretary of State, who in turn will decide on whether development consent should be granted for the Project.

1.1.9 The Project is identified as critical to delivering a network which supports the clean power pathways for 2030 delivery.

1.2 Purpose of This Non-Technical Summary

1.2.1 This Non-Technical Summary (NTS) presents a summary of the Environmental Statement (ES) prepared for the Project.

1.2.2 The purpose of the NTS is to enable local communities and other stakeholders to understand the likely significant environmental effects arising from the Project, as reported in the ES) (Volume 6 of the DCO application), in a concise manner which is easily understood and accessible by all.

1.2.3 This NTS includes a description of the Project, an outline of the alternatives considered and a summary of the assessment findings in the ES. Table 1.1 sets out further details of each of the chapters of this NTS.

Table 1.1 Contents of the NTS

Section	What Is It About?
1. Introduction	This section introduces the Project, National Grid, why the Project is needed and the consenting process for the Project.
2. Alternatives	This section provides an overview of the alternatives considered and provides a summary of how the design has evolved and developed.
3. Project Description	This section explains how the Project would be built (should it be consented), what new electricity infrastructure would be implemented and how long construction would take.
4. Approach and Methodology	This section explains how the environmental assessment has been undertaken and how it has been informed by consultation and stakeholder engagement.
5. Environmental Impact Assessment	This section provides a summary of the potential environmental effects arising from the Project for each environmental topic chapter.
6. Conclusion	This section explains what happens next in the DCO process and where to find further information.

1.3 Who is National Grid?

1.3.1 National Grid Electricity Transmission plc sits within the wider National Grid Group; within the Group there are distinctly separate legal entities, each with their individual responsibilities and roles. National Grid Group sit at the heart of Great Britain's energy system, connecting millions of people and businesses to the energy they use every day. The Project is being promoted by National Grid Electricity Transmission.

1.3.2 Note that in this NTS, except when referring specifically to other National Grid Group entities below, the term 'National Grid' is used to refer to National Grid Electricity Transmission plc.

National Grid Electricity Transmission (National Grid)

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

1.3.4 National Grid, as the regulated provider of electricity transmission services in England and Wales, is regulated by the Office of Gas and Electricity Markets (Ofgem). Transmission services include maintaining reliable electricity supplies and offering to construct new transmission system assets for new connections to the National Electricity Transmission System (NETS).

1.3.5 In accordance with Transmission Licence requirements, National Grid ensures that the transmission system in England and Wales meets the requirements in respect of transmission system security and quality of service at all times. As part of this requirement, National Grid must ensure that sufficient transmission system capability is provided to meet demand and generator customer requirements and wider transmission system needs that exist and/or are expected.

1.3.6 When planning changes to the transmission system, National Grid must be efficient, co-ordinated and economical and have regard to the desirability of preserving amenity, in line with the duties under s9 and s38 of the Electricity Act 1989.

National Energy System Operator (NESO)

1.3.7 The National Energy System Operator (NESO) is the electricity system operator for Great Britain. NESO ensures electricity is always where it is needed, and the transmission network remains stable and secure in its operation.

1.3.8 As of 1 October 2024, NESO became a public body owned by the Department for Energy Security and Net Zero. It was formerly part of National Grid plc and called the Electricity System Operator (ESO).

1.3.9 NESO has been established to act as the independent organisation responsible for planning Great Britian’s energy system, looking after and operating the electricity and gas networks while also offering expert advice to the sector’s decision-makers.

1.3.10 The National Grid ESO (as it was named) published the Holistic Network Design (HND) report in July 2022 (ESO, 2022a), accompanied by a ‘Network Options Assessment (NOA) Refresh’ document (ESO, 2022b). The HND sets out a single integrated transmission network design that supports the large-scale delivery of electricity generated from offshore wind, with the NOA Refresh indicating which options are ‘HND critical’.

1.3.11 Ofgem (Ofgem, 2022) has subsequently published the Accelerated Strategic Transmission Investment (ASTI) decision, which aims to facilitate the achievement of government targets by streamlining the regulatory approval for the HND critical projects.

1.4 Why is Norwich to Tilbury Needed?

1.4.1 Consistent with the Government's Net Zero target, there has been, and continues to be, growth in the volume of renewable and zero carbon generation that is seeking to connect to the electricity transmission system in the East Anglia and South East regions. UK Government policy clearly sets out the critical requirement for significant reinforcement of the transmission system to facilitate the connection of renewable energy sources and to transport electricity to where it is used. In particular, the British Energy Security Strategy (HM Government, 2022) sets targets for the connection of up to 50 GW of offshore wind by the 2030s as a key part of a strategy for secure, clean and affordable British energy for the long term.

1.4.2 Need for future reinforcement of the East Anglia and South East transmission system.

1.4.3 East Anglia's 400 kV electricity transmission network was built in the 1960s. It was built to supply regional demand, centred on Norwich and Ipswich. For many years, the only significant power stations generating in the East Anglia region were the Sizewell A and the Sizewell B nuclear power stations, Spalding North and Sutton Bridge gas fired power stations, and some further smaller 132 kV connected gas fired power stations.

1.4.4 This generation capacity has recently been added to by several offshore windfarms with the existing generation totalling 6,552.4 MW of installed capacity. This is expected to grow substantially in coming years. In the East Anglia region, connection agreements have been signed for 26,919.9 MW of new generation (total generation of 33,472.3 MW minus existing generation of 6,552.4 MW). These future connection agreements comprise a large volume of offshore wind generation (including East Anglia Offshore Wind), gas-fired generation, energy storage projects, and a nuclear power station (at Sizewell C).

1.4.5 Without reinforcement, the capacity of the East Anglia and South East existing network is insufficient to accommodate the connection of the proposed new power sources. The 'Thermal Boundary Export Limit' – the physical maximum energy capacity the system can accommodate during planned system faults – would be exceeded, preventing export of power to demand centres beyond East Anglia. In these circumstances, generators connecting in the area would be required to reduce their output and would be compensated via a 'constraint' payment. These costs would be passed on to end consumers. National Grid ESO (now NESO) analysis shows that, in this case, predicted constraint costs are likely to significantly exceed those of reinforcement.

The network for reinforcement in East Anglia and South East

1.4.6 To understand current and future demands on the electricity network, the concept of network boundaries is used - 'boundary capacity and capability' plays an important role in system planning. A boundary notionally splits the system into two parts, crossing critical circuit paths that carry power between the areas where power flow limitations may be encountered. Where 'boundary capacity' – the capacity of the circuit(s) across the boundary – is exceeded, the capacity shortfall must be resolved. The standards against which National Grid assesses these shortfalls are set out in the NETS System Security and Quality of Supply Standard (SQSS).

1.4.7 Also relevant are ‘generation groups’, which are groups of existing generating stations and / or proposed generating stations connecting in a particular geographical area of the transmission system. These are considered when assessing the network for compliance with the generation connection criteria of the NETS SQSS.

1.5 The Consenting Process for Norwich to Tilbury

1.5.1 The Project is defined as a NSIP, under s14(1)(b) and s16 of the Planning Act 2008, and as amended by the Planning Act 2008 (Nationally Significant Infrastructure Projects) (Electric Lines) Order 2013, as it involves the installation of a new electric line above ground of more than 2 km, which would operate at 400 kV in England.

1.5.2 For an NSIP, the grant of development consent is required by the making of a DCO under the Planning Act 2008. A DCO may include a range of consents and powers.

1.5.3 The proposed new above ground electricity line would be an NSIP by virtue of the definitions in the Planning Act 2008. Other development, such as underground cables, may be granted development consent as associated development within the meaning of s115 of the Planning Act 2008.

1.5.4 S104(2) of the Planning Act 2008 provides that, in deciding applications for development consent, the Secretary of State must have regard to the relevant National Policy Statements (NPSs).

1.5.5 The Planning Act 2008 was amended through the adoption of the Localism Act 2011. Under the Localism Act 2011, the Planning Inspectorate is responsible for the NSIP planning process. The Planning Inspectorate will allocate a panel of examiners (known as the ‘Examining Authority’) which will examine the DCO application for the Project and make a recommendation to the Secretary of State to either grant or refuse consent.

Environmental Impact Assessment

1.5.6 The Project constitutes Environmental Impact Assessment (EIA) development as defined in the Infrastructure Planning (EIA) Regulations 2017 (the ‘EIA Regulations’). The Project falls within Schedule 1 paragraph 20 of the EIA Regulations, ‘*Construction of* overhead *electrical power lines with a voltage of 220 kV or more and a length of more than 15 km*’. Therefore, an assessment of the likely significant effects of the Project on the environment, referred to as an EIA, is required. The EIA process comprises a number of stages, these are summarised in the paragraphs that follow.

1.5.7 In November 2022 an EIA Scoping Report (document reference 6.19) was issued to the Planning Inspectorate. Following this, in December 2022, the Planning Inspectorate provided National Grid with a formal opinion (the EIA Scoping Opinion (document reference 6.20)) on what should be included within the ES. The EIA Scoping Opinion (document reference 6.20) was informed by comments from stakeholders.

1.5.8 National Grid prepared a Preliminary Environmental Information Report (PEIR) as part of the statutory consultation process required under s42 and s47 of the Planning Act 2008. The PEIR was published on 10 April 2024, to provide preliminary details of the environmental work and anticipated likely significant effects across a range of topics as a result of the Project, and to enable consultees and interested parties to

develop an informed view of the environmental effects of the Project and provide comments on that basis.

1.5.9 The ES (Volume 6 of the DCO application) provides an assessment of the likely significant residual effects in accordance with the EIA Regulations. The ES (Volume 6 of the DCO application) is submitted as part of the DCO application.

1.5.10 Schedule 4 of the EIA Regulations sets out the information to be included in the ES (Volume 6 of the DCO application). As required by Regulation 14(4) of the EIA Regulations, the EIA has been undertaken by competent experts with the relevant and appropriate experience in their respective environmental topics.

1.5.11 The findings of the EIA are reported in an ES (Volume 6 of the DCO application). This NTS provides a summary of the ES (Volume 6 of the DCO application) 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 (Volume 6 of the DCO application) under the Planning Act 2008.

2. Alternatives

2.1 Introduction

2.1.1 National Grid has undertaken a comprehensive alternatives assessment guided by the Infrastructure Planning (EIA) Regulations 2017 and the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2024a) and the NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2024b). This assessment considered a wide range of options across environmental, socio-economic, technical and cost criteria to find a balanced solution that fulfils National Grid's statutory duties under the Electricity Act 1989.

2.1.2 The assessment has been an iterative process spanning several years, involving multiple rounds of and consultation (statutory and non-statutory), design development, and strategic options backcheck reviews. This systematic approach ensured options were refined based on feedback from consultations (statutory and non-statutory), updated environmental information, and evolving technical requirements. While Project decisions were often driven by technical factors such as engineering feasibility, system performance requirements and delivery timescales, this section focuses on the comparison of environmental considerations in accordance with the EIA Regulations and NPSs.

2.1.3 For the assessment, 'reasonable alternatives' are defined as options that meet the identified network reinforcement needs, are technically feasible using established technologies, can be delivered within the required timeframe by 2030[1], and comply with National Grid's statutory duties. The assessment has been guided by established industry principles, including the Holford Rules for overhead line routeing and Horlock Rules for substation siting, which provide a framework for minimising environmental effects, while maintaining technical and economic viability. This definition has guided the selection of alternatives evaluated in the ES.

2.2 Strategic Proposal

2.2.1 An assessment of strategic technological alternatives was first undertaken to determine how the future needs of the NETS could be met. Before considering specific corridor routes and siting of key infrastructure, National Grid first needed to determine the best strategic approach to meet the identified network reinforcement needs in East Anglia. This involved assessing different ways to connect renewable energy generation to the electricity transmission system and strengthen the network to accommodate future demand.

2.2.2 The strategic assessment considered various technology options and connection approaches, including different start and end points for the reinforcement, alternative transmission technologies, and whether connections should be onshore or offshore.

[1] The 2030 deadline is driven by government commitments to achieve net zero emissions by 2050 and the urgent need to connect new renewable energy sources to the electricity grid to meet interim carbon budgets and renewable energy targets established in the Climate Change Act 2008.

A comprehensive evaluation was undertaken comparing a total of 23 strategic options against environmental, technical, and economic criteria.

2.2.3 A comprehensive range of technologies, as well as connection points were considered for the wider network. Technologies considered at this level included:

- Increasing operating voltage
- Alternating current (AC) overhead lines
- AC underground cable
- Alternative overhead AC pylon types
- Direct current (DC) underground cables
- DC overhead lines
- Offshore connections
- Gas insulated lines.

2.2.4 Options were assessed across three main geographic themes to determine the optimal network configuration:

- Eastern Theme: increasing network capacity in East Anglia by strengthening connections across capacity boundaries and linking into the wider National Electricity Transmission System, connecting with existing substations such as Tilbury and Grain, connecting with existing substations such as Tilbury and Grain
- Northern Theme: creating additional capacity by connecting into the north of the existing London area network, connecting with existing substations such as Wymondley, Pelham and Waltham Cross
- Western Theme: creating additional capacity by transporting power westward around London, connecting with existing substations such as East Claydon and West Weybridge.

2.2.5 Following assessment against technical, environmental and cost criteria, the strategic options assessment concluded that the eastern theme, specifically Option East 7, provided the highest overall consumer value. Option East 7 comprised a comprehensive strategic solution including the Norwich to Tilbury onshore reinforcement (the Project), the SeaLink offshore connection between Sizewell and Richborough, and the Tilbury to Grain onshore reinforcement. The Norwich to Tilbury element of Option East 7 identified the need for new 400 kV double-circuit connections: approximately 60 km between Norwich Main and Bramford Substations, and approximately 120 km between Bramford and Tilbury Substations via a new EACN Substation.

2.3 Corridor Routeing and Substation Siting Alternatives

2.3.1 After selecting the preferred Strategic Proposal, it was then subject to routeing and siting analysis, which was carried out across four key areas: Norwich Main to Bramford Substations, Bramford to EACN Substations, the EACN Substation location, and EACN to Tilbury Substations.

2.3.2 Approximately 30 route corridors and siting options were identified through systematic environmental constraints and opportunities mapping. Each option was appraised considering environmental and socio-economics effects, technical feasibility and costs. Options were progressively refined, with some discounted due to poor cost benefit analysis or complex environmental constraints when compared with other alternatives.

Norwich to Bramford Section

2.3.3 For this 60 km section, National Grid assessed seven corridor options through comparative environmental effects analysis. The initial assessment considered four primary corridors: Option NB1 followed the existing overhead line corridor, Option NB2 provided an eastern deviation to avoid residential areas, Option NB3 offered an eastern corridor section, and Option NB4 explored a western alternative route.

2.3.4 The assessment included consideration of how different route sections could be combined to maximise environmental benefits, such as avoiding locally protected landscape areas and reducing the potential for residential properties to be surrounded in close proximity by overhead lines.

2.3.5 Option NB1 was selected as the preferred option. This option was perceived as having the overall lowest level of environmental impact and the best outcome from technical and cost factors, when compared to other options.

Bramford to EACN Section

2.3.6 For this section, National Grid assessed five corridor options through comparative environmental effects analysis. The environmental effects comparison identified a fundamental choice between routes passing through the Dedham Vale National Landscape versus routes avoiding it entirely.

2.3.7 The assessment considered whether undergrounding through the National Landscape would provide environmental benefits compared to longer alternative routes that avoided the designated landscape. While undergrounding through the National Landscape would have temporary effects during construction, it would facilitate a more direct route approximately half the length compared to alternatives that avoid the National Landscape, resulting in reduced overall environmental and cumulative effects.

2.3.8 Option BE5 was selected as the preferred option as the combination of using undergrounding and a more direct corridor to achieve a connection provided the optimal environmental solution when compared to other options. Option BE5 incorporates underground cable technology to pass through the Dedham Vale National Landscape, Cable Sealing End (CSE) compounds positioned north and south of the National Landscape to provide the transition points between overhead lines and underground cables.

EACN Substation

2.3.9 The Tendring peninsula location was specifically preferred over alternatives (such as Felixstowe) because it would avoid the need to cross the Suffolk & Essex Coast & Heaths National Landscape, reduce the complexity of substation siting in constrained areas, and minimize the number of required additional connections. For the EACN Substation location within the Tendring peninsula, National Grid assessed four zones identified from an initial long-list of 45 candidate areas across the peninsula through comparative environmental effects analysis. The assessment considered whether all infrastructure required for the EACN Substation and the three confirmed customer connections (North Falls offshore wind farm, Five Estuaries offshore wind farm, and Tarchon interconnector) could be co-located within one area, or whether areas in close proximity could combine to accommodate all infrastructure requirements.

2.3.10 The evaluation considered the cumulative effects of both the substation and required overhead line connections as well as the customer connections. While Zone A was considered less preferable from a landscape and visual perspective when considering the substation in isolation compared to Zone C, when account was taken of the 400 kV overhead lines, Zone A would require the shortest length of connection, resulting in fewer pylons and fewer effects in the landscape.

2.3.11 Zone A was selected as the preferred option as it would require the shortest length of overhead line connection, avoiding introducing further additional overhead lines into the landscape, and performed the best from an economic cost savings perspective when compared to the other options.

Tilbury North Substation

2.3.12 The Tilbury connection arrangements underwent comprehensive assessment following the 2024 statutory consultation feedback. National Grid evaluated multiple substation sites (Sites 1-6) and connection methods to determine the optimal approach for connecting the Project to the existing electricity transmission network at Tilbury.

2.3.13 The assessment compared environmental, technical, and economic factors for different connection options, including the original direct underground cable connection approach and alternative configurations using a new substation connected to existing overhead lines.

2.3.14 Tilbury North Substation (Site 3) was selected as the preferred solution as it provided significant environmental benefits including removal of approximately 4.5 km of underground cable installation, avoided interactions with the Freeport development area and potential Thames Estuary Marshes Site of Special Scientific Interest (SSSI) designation, and allowed overhead line rather than underground cable crossing of the proposed Lower Thames Crossing project. While requiring a larger footprint than the original approach, the new substation arrangement achieves the same system reinforcement outcome while addressing major infrastructure delivery challenges.

EACN to Tilbury Section

2.3.15 For this section, National Grid assessed 14 corridor sections resulting in six viable end-to-end corridor options through comparative environmental effects analysis. The assessment identified a fundamental choice between coastal routes and inland alternatives.

2.3.16 The evaluation was principally driven by whether to take a coastal route or a more inland route. Coastal routes presented greater potential to result in Likely Significant Effects and potentially Adverse Effects on Site Integrity of international and national designations, including Special Protection Areas (SPAs), Ramsar sites, Special Areas of Conservation (SACs) and SSSIs. It was concluded that where alternatives were available that would not result in such effects, they should be taken forward in preference. Additionally, the coastal route would pass through the Chelmer and Blackwater Navigation Conservation Area which could not be avoided.

2.3.17 Option ET1 was selected as the preferred option as the more inland connection avoided the highest ecological risks, provided better technical deliverability, and outperformed coastal alternatives on economic cost. This option involves overhead line connections along a more direct inland route.

2.4 Cable Sealing End Compounds

2.4.1 CSE compounds are essential infrastructure components that facilitate the transition between overhead lines and underground cables within the Project. These compounds are required at specific locations where environmental constraints, technical considerations, or policy requirements necessitate a change in transmission technology.

2.4.2 Through the iterative design process, four key areas were identified where CSE compounds were required, each evaluated through comparison of environmental effects. Key siting considerations included avoiding areas of high ecological value, minimising impacts on the historic environment, avoiding areas of high landscape value such as National Landscapes, and addressing technical constraints like flood risk zones while ensuring appropriate access for construction and maintenance.

2.4.3 The preferred CSE compound locations were selected based on the locations perceived as having the overall lowest level of environmental impact and the best outcome from technical and cost factors, when compared to other options. The four preferred locations comprised: north of Dedham Vale National Landscape (providing enhanced screening and increased separation from heritage assets), Great Horkesley East and West (facilitating underground cable section through sensitive landscape areas with optimal screening opportunities), Fairstead (enabling underground cable crossing beneath existing 400 kV overhead line infrastructure while utilising existing landform and woodland screening), and Tilbury North (two associated CSE compounds facilitating undergrounding of approximately 0.55 km of the existing ZB overhead line as part of the revised connection arrangement into Tilbury North Substation).

2.5 Post-Consultation Alignment and Siting Alternatives

2.5.1 Project design evolved through extensive consultation and iterative development following multiple consultations. National Grid refined proposals based on consultation feedback, updated environmental information, and technical studies while balancing environmental protection, community concerns, Project requirements and compliance with statutory duties under the Electricity Act 1989.

Post-2022 Design Refinements

2.5.2 A total of 3,787 feedback submissions were received during the 2022 non-statutory consultation period. Following this consultation, National Grid made several significant changes to its proposals, particularly focusing on corridor realignments and technology changes in sensitive areas. The feedback helped shape the development of the 2023 preferred draft alignment.

2.5.3 Major decisions adopted during this phase included:

- Dedham Vale National Landscape undergrounding - Underground cable technology was adopted for the 16.8 km section through and around Dedham Vale National Landscape (approximately 5.7 km within the designation itself) in recognition of the nationally important landscape designation and policy requirements under National Policy Statement EN-5 (DESNZ, 2024b), which creates a presumption for undergrounding in National Landscapes. This decision demonstrated National Grid's commitment to minimising visual impacts in areas of highest amenity value while recognising the increased construction effects and costs associated with underground cable installation.
- West of Wortham Ling diversion - A corridor realignment was adopted in response to consultation feedback requesting avoidance of sensitive receptors. This diversion reduced effects on the Grade I listed Church of St Mary and woodland areas, demonstrating how consultation feedback directly led to environmental benefits despite transferring some effects to other areas.

2.5.4 Key changes included corridor realignments such as the west of Wortham Ling diversion, which was adopted in response to consultation feedback requesting avoidance of sensitive receptors. This diversion reduced effects on the Grade I listed Church of St Mary and woodland areas, demonstrating how consultation feedback directly led to environmental benefits despite transferring some effects to other areas.

Post-2023 Design Refinements

2.5.5 A total of 4,167 feedback submissions were received during the 2023 non-statutory consultation period. This feedback helped guide the development of the 2024 preferred draft alignment, incorporating both permanent and temporary elements of the Project. National Grid undertook further design development work considering a range of design refinements and alternatives in response to consultation feedback, technical studies and comparison of environmental effects.

2.5.6 Key decisions during this phase included both alternatives adopted and alternatives assessed but rejected:

- Waveney Valley Alternative assessment - National Grid undertook a comprehensive assessment of underground cable as an alternative for the 2 km section between overhead line reference points RG80 to RG92 in response to consultation feedback concerning heritage, landscape and visual amenity effects, particularly regarding the Grade I listed Church of St Margaret. Following detailed environmental assessment, this alternative was rejected as the environmental benefits did not justify the additional costs and technical complexities, particularly given challenging ground conditions requiring predominantly open cut trenching through sensitive peat habitats.

- Great and Little Waltham heritage mitigation - Low height pylons were adopted for the section of overhead line passing between Great Waltham conservation area/Langleys registered park and garden and Little Waltham conservation area. This design refinement reduced visibility of the alignment from Langleys House and conservation area elements, demonstrating targeted design solutions to reduce heritage effects while maintaining overhead line technology.
- Great Horkesley to Colne Valley realignment - A northern route alignment was adopted following the A12 more closely to reduce landscape effects and avoid routing past Colchester in response to consultation feedback about community and environmental impacts.

2.5.7 Changes reflected consideration of environmental, social, and economic effects while aligning with the Holford Rules (guidelines on overhead line routeing) by seeking to avoid areas of highest amenity value where possible.

Post-2024 Design Refinements

2.5.8 The 2024 statutory consultation ran for fifteen weeks from April to July 2024, presenting the preferred draft alignment incorporating both permanent and temporary elements of the Project. Following this consultation, National Grid undertook further design development work considering feedback received alongside environmental and engineering studies. The consultation feedback helped guide refinements to the Project design while maintaining compliance with statutory requirements.

2.5.9 The most significant change concerned the Tilbury connection arrangements. National Grid evaluated multiple substation sites and connection methods, which resulted in the selection of a new approach involving Tilbury North Substation (a new electrical substation facility required to connect the Project to the existing electricity transmission network at Tilbury). This change was the subject of a targeted consultation in March 2025.

2.5.10 Key environmental benefits of this major design change included removal of approximately 4.5 km of underground cable from Thames Estuary and Marshes Special Protection Area zone of influence, elimination of Freeport development restrictions, and avoidance of heritage impacts near the Grade II listed church at West Tilbury.

2.6 Alternative Design and Construction Methods

2.6.1 National Grid considered a range of design and construction alternatives to determine the most appropriate approach for delivering the Project. These alternatives were evaluated against environmental, technical, and economic criteria to ensure optimal outcomes while meeting the Project's strategic objectives.

Technology Alternatives

2.6.2 As mentioned above, an evaluation of transmission technologies was undertaken at the strategic level. Initially, various technology alternatives were considered including increasing operating voltage, AC overhead lines, AC underground cables, DC underground cables, DC overhead lines, and offshore connections. Following professional assessment against Project objectives, AC overhead line technology

was selected as the primary solution, offering proven reliability, significantly lower costs, and reduced construction duration compared to alternatives.

2.6.3 Underground AC cable technology was selected for specific sections where environmental considerations justified the substantially higher costs and construction complexity. The technology selection process aligned with NPS EN-5 (DESNZ, 2024b) guidance regarding underground cables for National Landscapes and areas where particularly significant landscape and visual impacts would occur.

2.6.4 For substation infrastructure, technology alternatives between Air Insulated Switchgear (AIS) and Gas Insulated Switchgear (GIS) were evaluated on a site-specific basis, balancing environmental, technical, and cost considerations to optimise outcomes for each location. AIS technology was selected for the new EACN Substation (Tendring Peninsula) as it uses air as insulation, requiring larger spacing between equipment but offering easier maintenance and lower costs (footprint: 550m x 230m). GIS technology was selected for the new Tilbury North Substation (south of Orsett Golf Club) as it uses gas insulation allowing more compact equipment layout in a specialised building, reducing visual impact but at higher cost (footprint: 340m x 300m with GIS hall building).

Pylon Design

2.6.5 Alternative pylon designs including low height, and T-pylon structures were evaluated as potential embedded mitigation options to reduce visual impacts compared to standard lattice pylons. While these represent different visual forms, they constitute design variations within the same technological approach rather than fundamental strategic alternatives. The assessment process followed National Grid's mitigation hierarchy as recognised in NPS EN-5 (DESNZ, 2024b), which addresses pylon design as part of a mitigation approach rather than as distinct alternatives.

2.6.6 T - pylons were considered as part of the design and mitigation for the project but not taken forwards following an assessment of their suitability as set out in the Design and Development Report (document reference 5.15).

2.6.7 The Project proposes to use standard steel lattice pylons (approximately 50 m height) and low height steel lattice pylons (approximately 40 m height) depending on local environmental constraints and technical requirements. Low height pylons have been adopted at specific locations where visual or heritage benefits justify their use, such as between Great Waltham and Little Waltham conservation areas to reduce impacts on heritage settings.

Underground Cable Installation

2.6.8 Two primary installation methods for underground cables were assessed: open-cut techniques and trenchless crossing techniques . Open-cut construction using ducting, into which the cables are inserted, was selected as the preferred approach, offering a more flexible construction programme and enabling quicker ground reinstatement compared to traditional open-cut direct burial techniques.

2.6.9 Trenchless techniques such as Horizontal Directional Drilling (HDD) were identified for specific locations where open-cut methods are not feasible, such as railway crossings or where environmental mitigation is required. While more expensive and time-consuming, trenchless techniques avoid impacts on specific features but introduce different environmental effects including noise and potential groundwater impacts.

2.6.10 The selection between open-cut and trenchless techniques was made based on site-specific environmental constraints and receptor sensitivity, with the assessment considering both technical feasibility and environmental effects for each location.

2.7 Construction Method Alternatives

Access Routes

2.7.1 Alternative access arrangements were evaluated for specific locations where multiple options were identified, primarily focusing on the new EACN Substation and new Tilbury North Substation access arrangements. The assessment also considered multi-modal transport options including road, rail, and water transport for delivering materials from outside the region.

2.7.2 For the new EACN Substation, four access route options were assessed through comparative environmental effects analysis to determine suitable access arrangements for both construction and operational phases. The preferred option used the existing Bentley Road with a new permanent private access road from the public highway to the substation, providing technically viable access while minimising additional land take requirements.

2.7.3 Tilbury North Substation also requires a new permanent access road to provide suitable access for both construction and operation (and maintenance) phases.

2.7.4 The transport strategy was informed by requirements for moving materials, equipment and personnel, considering the nature and location of existing transport infrastructure including roads suitable for Heavy Goods Vehicle (HGV) movements, available ports, and rail facilities.

Construction Support Methods

2.7.5 Alternative construction support methods including helicopter use for specific activities and use of existing highway networks versus dedicated haul roads were evaluated. These construction methodology alternatives would be subject to further detailed assessment during the detailed design phase (following grant of development consent) in consultation with contractors to determine the most appropriate approaches based on site-specific conditions and constraints.

2.8 Conclusion

2.8.1 The environmental effects of reasonable alternatives have been identified, described and evaluated as part of the Project's development in accordance with the requirements of the EIA Regulations. A comprehensive range of reasonable alternatives have been considered during the evolution of the Project, including alternative locations, routes, technologies and construction methods. The selection of alternatives has been influenced by the EIA process, ground investigations, and feedback received from various consultation stages. The identification and assessment of alternatives has been an iterative process, with alternatives considered at strategic, corridor and alignment levels.

2.8.2 National Grid has undertaken backchecks and reviews of the assessments of alternatives throughout the Project’s development, to ensure that decision-making remained valid and to identify any options to further optimise the proposals. The design presented within the DCO application represents the optimum alignment and technology choice, having systematically incorporated feedback from the assessments and consultation undertaken on the Project. The comprehensive alternatives assessment process, including the application of the Holford and Horlock Rules, structured options appraisal methodology, and integration of stakeholder feedback, provides the Secretary of State with the evidence base to determine that alternatives have been appropriately considered in accordance with policy requirements.

3. Project Description

3.1 General Description

3.1.1 The Project is a proposal by National Grid to upgrade the electricity transmission system in East Anglia between Norwich and Tilbury, comprising:

- A new 400 kilovolt (kV) electricity transmission connection of approximately 180 km overall length from Norwich Main Substation to Tilbury Substation via Bramford Substation, a new EACN Substation and a new Tilbury North Substation, including:
  - Approximately 159 km of new overhead line supported on approximately 509 pylons, either standard steel lattice pylons (approximately 50 m in height) or low height steel lattice pylons (approximately 40 m in height) and some of which would be gantries (typically up to 15 m in height) within proposed CSE compounds or existing or proposed substations
  - Approximately 21 km of 400 kV underground cabling, some of which would be located through the Dedham Vale National Landscape (an Area of Outstanding Natural Beauty (AONB[2])
- Up to seven new CSE compounds (with permanent access) to connect the overhead lines to the underground cables
- Modification works to connect into the existing Norwich Main Substation and a substation extension at the existing Bramford Substation
- A new 400 kV substation on the Tendring Peninsula, referred to as the EACN Substation (with a new permanent access). This is proposed to be an AIS substation
- A new 400 kV substation to the south of Orsett Golf Course in Essex, referred to as the Tilbury North Substation (with a new permanent access). This is proposed to be a GIS substation
- Modifications to the existing National Grid Electricity Transmission overhead lines to facilitate the connection of the existing network into the new Tilbury North Substation to provide connection to the Tilbury Substation
- Ancillary and/or temporary works associated with the construction of the Project.

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

[2] National Landscape is the rebranded name of an Area of Outstanding Natural Beauty (AONB) from 22 November 2023

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

3.1.4 The Project would be designed, constructed and operated in accordance with applicable health and safety legislation. The Project will need to comply with design safety standards including the SQSS, which sets out the criteria and methodology for planning and operating the NETS. This informs a suite of National Grid policies and processes, which contain details on design standards required to be met when designing, constructing and operating assets such as those proposed for the Project.

3.2 Project Sections

3.2.1 The Project has also been sub-divided into eight geographical sections (referenced throughout the ES (Volume 6 of the DCO application)) for reader accessibility, based largely on LPA boundaries. These are shown on Figure 1.1: Site Location Plan and Project Sections (document reference 6.1.F1) and comprise:

- Section A – South Norfolk Council
- Section B – Mid-Suffolk District Council
- Section C – Babergh District Council, Colchester City Council and Tendring District Council
- Section D – Colchester City Council
- Section E – Braintree District Council
- Section F – Chelmsford City Council and Brentwood Borough Council
- Section G – Basildon Borough Council and Brentwood Borough Council (and part of Chelmsford City Council)
- Section H – Thurrock Council.

3.3 Construction Programme

3.3.1 Prior to the grant of DCO consent, a number of pre-construction environmental surveys would be undertaken in 2026.

3.3.2 Should consent be granted, it is anticipated that construction of the Project would commence in 2027 and continue for four years through to 2031 (including demobilisation). Certain pre-commencement operations could take place following the grant of DCO consent and in advance of construction, including:

- Engineering investigations and surveys
- Environmental (including archaeological) investigations and monitoring
- Surveys and monitoring investigations associated with assessing ground conditions
- Diversion and laying of services, protection works comprising utilities protection works or fencing and protection slabs

- Site clearance
- Environmental mitigation measures
- Remediation associated with contamination or other adverse ground conditions
- Site set up works associated with the establishment of construction compounds and temporary laydown areas
- Temporary accesses
- Erection of temporary enclosures or temporary demarcation fencing marking out site boundaries and the temporary display of site notices or advertisements.

3.4 Construction Working Hours

3.4.1 It is assumed that the core working hours for construction (as set out within Requirement 6 of the draft DCO (document reference 3.1)) would be:

- Monday to Friday: 07:00 –19:00
- Saturdays, Sundays, Bank Holidays and other public holidays: 07:00 – 17:00.

3.4.2 No percussive piling works would take place outside of the hours of 07:00 – 19:00 Monday to Friday and 07:00 to 17:00 on Saturdays.

3.4.3 Unless otherwise agreed with the Local Highway Authority, no Heavy Good Vehicle (HGV) deliveries would be made to site outside of the hours of 07:00 to 19:00 Monday to Friday and 07:00 to 17:00 on Saturdays.

- The following operations may take place outside the core working hours:
- Trenchless crossing operations including at landfalls and beneath highways, railway lines, woodlands, nature reserves, Sites of Special Scientific Interest or watercourses
- The installation and removal of conductors, pilot wires and associated protective netting (included but not limited to) across highways, railway lines or watercourses
- The jointing of underground cables
- The continuation of any work activity commenced during the core working hours to a point where they can securely and or safely be paused
- Any highway works requested by the Local Highway Authority to be undertaken on a Saturday or Sunday or outside the core working hours
- The testing or commissioning of any electrical plant installed as part of the authorised development including undertaking of any identified corrective activities
- The completion of works delayed or held up by severe weather conditions which disrupted or interrupted normal construction activities
- Activity necessary in the instance of an emergency where there is a risk to persons or property
- Security monitoring

- Non-intrusive surveys
- Intrusive surveys
- Oil processing of transformers or reactors in substation sites
- Delivery to the transmission works of abnormal indivisible loads and any highway works requested by the Local Highway Authority to be undertaken outside the core working hours
- Mechanical and electrical installation works within buildings once erected and enclosed.

3.4.4 The core working hours exclude:

- Start up and close down activities up to 1 hour either side of the core working hours.

3.4.5 The severe weather conditions referred to means any weather which prevents work from taking place during the core working hours by reason of physical incapacity (whether for reasons of visibility, ground conditions, power availability, site access or otherwise) or being contrary to safe working practices.

3.5 Project Components

3.5.1 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.

New 400 kV Overhead Line

3.5.2 The Project consists of approximately 159 km of overhead line comprising approximately 509 pylons, either standard steel lattice pylons (approximately 50 m in height) or low height steel lattice pylons (approximately 40 m in height) and some gantries (typically up to 15 m in height) within proposed CSE compounds or existing or proposed substations. The new overhead line would use triple Araucaria conductors (or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons). Three types of pylons are proposed as part of the alignment:

- Suspension pylons: used in straight-line positions to suspend the conductor on vertical suspension insulator strings
- Tension (also called angle) steel lattice pylons: support the overhead line where the line changes direction. Tension pylons may also be used in a straight-line situation to break up a long section of suspension pylons for loading and stringing purposes
- Terminal pylons: a type of tension pylon used at the ends of overhead lines where they connect to substations or to underground cables via a CSE compound or substation.

3.5.3 The design assumes standard steel lattice pylons for the majority of the alignment which would be approximately 50 m in height. Pylon extensions would be required in some locations to allow extra height to clear existing features and maintain electrical clearance to the ground.

3.5.4 Pylons would typically be at 330 m spacing, subject to site constraints. Where new pylons are erected parallel to the existing 400 kV infrastructure, an 85 m separation distance would be required.

3.5.5 The working areas around each new pylon would be cleared of vegetation and fenced appropriately. Temporary access to each pylon location would be installed, and temporary appropriate technology / material would be required adjacent to each new pylon location, on which to place plant such as cranes and piling rigs. The stone working areas would typically be 60 m x 60 m. Materials would be brought to site on HGVs and would include the steelwork for the pylons and the conductors (i.e. cabling) wrapped around large drums.

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

Underground Cables

3.5.7 There are four sections of underground cables proposed as part of the Project:

- Dedham Vale National Landscape – 16.8 km (approximately 5.7 km is within the National Landscape designation)
- Great Horkesley – 3.9 km
- Fairstead – 0.15 km
- North Tilbury (related to the ZB/YYJ route) – 0.6 km.

3.5.8 The transfer from overhead line to underground cable would be facilitated by the CSE compounds, as detailed below.

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

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

Trenchless Installation

3.5.11 Where the open-cut technique is not feasible, for example where the alignment crosses an existing live railway line or other drivers such as for environmental mitigation, trenchless installation techniques may be required. An example of which is HDD. Typically, for HDD, a construction corridor approximately 200 m wide[3] is required. The underground cable would typically be at a depth of 10 m below ground level; however, the depth would depend on the methodology employed and local constraints.

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

3.5.13 There are up to five trenchless crossings proposed to construct the Project with approximate lengths as listed below:

- Higham Road – 320 m
- River Stour (north part) – 230 m
- River Stour (south part) – 190 m
- A12 highway crossing – 150 m
- Railway crossing (east of Adleigh) – 100 m.

Cable Sealing End Compounds

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

3.5.15 The CSE compounds typically occupy a footprint of approximately 90 m x 64 m for a 400 kV double circuit. Each CSE compound would have two gantries (typically 26 m wide by 15 m tall) within the CSE compound which then connect to the CSE compound via high voltage busbars and other high voltage electrical equipment. In addition, a small portable relay room may be required in each compound. Each compound would be surrounded by security fencing typically up to 4 m high, to protect the equipment. There would be a minimum 2 m clear zone around the perimeter of the fence to allow maintenance and access. Operational lighting is not required. Task lighting may be required when undertaking specific maintenance activities.

[3] Trenchless crossings require a wider construction swathe and permanent easement than open-cut installation. This is because trenchless crossings require the cables to be installed at a greater depth, and the deeper the installation the greater the separation between the cables needs to be for them to maintain their effective capacity. Additionally, trenchless crossing methods require a degree of separation between drills, ensuring that adjacent drills do not affect or encroach on each other and that cable separation is maintained.

3.5.16 There would be a permanent access road installed to connect each CSE compound to the local road network, providing access for operation (and maintenance) activities, which would be up to 5 m wide (increasing locally for passing places and for tracking of larger vehicles on bends).

Substations

3.5.17 The Project requires reinforcement works to the existing National Grid network, including a substation extension at the existing Bramford Substation and modification works to connect into the existing Norwich Main Substation. The Project also requires the construction of the new EACN Substation and the new Tilbury North Substation. Each substation design would be unique, dependent on the proposed equipment and site-specific conditions. However, they would follow a similar typical construction sequence and programme. The typical construction sequence to construct or extend an electrical substation required for the Project would involve the following:

- Vegetation clearance and stripping of topsoil[4] from the proposed permanent site area and any working areas (topsoil would be stored in bunds on site, for reuse as part of landscaping proposals)
- Set up of temporary access, temporary construction compounds including:
  - Temporary lighting
  - Temporary drainage
  - Temporary fencing
  - Laying and compaction of granular material (and asphalt where required)
- Excavation of drainage attenuation features, installation of pipes, etc.
- Earthworks for construction of permanent site access and platform (including forming temporary soil bunds for storing excavated material). Where practicable, the temporary and permanent access would be combined
- Civil engineering works, to include permanent fencing, access, drainage and foundations of larger structures and/or equipment that is sensitive to ground settlement)
- Percussive piling may be required. This would be confirmed through a programme of ground investigation which would inform the foundation designs to be confirmed at detailed design. Therefore, within the ES (Volume 6 of the DCO application) it is assumed that percussive piling would be required at all new and existing substations
- Installation of structures (e.g. gantries)
- Building works, if the site is to include proposed GIS bays
- Overhead line or underground cabling works, as necessary
- Mechanical and electrical equipment installation

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

- Testing of equipment
- Commissioning/energisation
- Reinstatement of working areas outside the permanent substation boundary (including environmental mitigation and landscaping as required).

Proposed New EACN Substation

3.5.18 The operational footprint of the proposed new AIS EACN Substation is proposed to be approximately 550 m x 230 m with heights up to approximately 15 m excluding any requirement for landscaping and cable/overhead line connections. In addition, several small buildings would be constructed to house electrical equipment, battery storage, workshops, together with suitably sized office/amenity buildings. The site would be surrounded by security fencing typically up to 4 m in height to protect the equipment. There would be a minimum 2 m clear zone around the perimeter of the fence to allow maintenance and access.

Proposed New Tilbury North Substation

3.5.19 The operational footprint of the new GIS Tilbury North Substation is proposed to be approximately 340 m x 300 m with heights of approximately 15 m excluding any requirement for landscaping and cable/overhead line connections. A new GIS hall building is proposed, which would be approximately 135 m x 20 m x 15 m (length x width x height). GIS halls are required for GIS substations to contain the specialist equipment. This is a different technology to what is proposed at the new EACN Substation, which would use AIS. GIS equipment can be positioned closer together as it is not reliant on just air for insulation; as a result the footprint of the substation can be reduced. An associated annex would also be required with dimensions of approximately 135 m x 12 m x 15 m. These buildings would typically be steel framed with a metal sheet cladding finish. The site would be surrounded by security fencing typically up to 4 m in height and other security features to protect the equipment. There would be a minimum 2 m clear zone around the perimeter of the fence to allow maintenance and access.

Modifications to Existing Substations

3.5.20 Modifications to existing substations are required as part of the Project. The details of the likely works required at existing substations are outlined in the paragraphs that follow.

Norwich Main Substation

3.5.21 Modification works are required to allow the Project to connect into the Norwich Main Substation. The works required for the Project would comprise:

- Two new 400 kV full line tension gantries (up to 15 m in height) within Norwich Main Substation
- Installation of new, and modifications to existing, apparatus within the footprint of Norwich Main Substation.

Bramford Substation

3.5.22 An extension would be needed at the existing Bramford Substation. The extension would comprise:

- Extension of the existing site compound with use of existing site access arrangements
- Modifications of the existing external retaining structure
- Equipment up to a maximum typical height of 15 m
- Mix of impermeable concrete ground surfaces surrounded by permeable stone chippings
- Electrified palisade fence typically up to 4 m high
- Exterior[5] and interior lighting to allow for safe movement and the operation (and maintenance) of equipment. Lighting would be designed in accordance with the appropriate design standards. Additional task lighting may be required when undertaking specific maintenance activities
- Drainage works
- Installation of new, and modifications to existing, apparatus within the footprint of Bramford Substation.

Modification and Removal of Existing National Grid Pylons

3.5.23 Sections of the existing YYJ and ZB National Grid overhead lines need to be modified to facilitate the connection of the existing transmission network into the new Tilbury North Substation:

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

[5] The maximum illuminance would be approximately 20 lux within the fence line with an approximate maximum illuminance of 10 lux around the perimeter fence line. The minimum average illuminance would be approximately 6 lux, using LED lighting.

Operation (and Maintenance)

3.5.24 The typical lifespan of an overhead line and underground cables 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 400 kV overhead line.

3.5.25 Operation (and maintenance) activity would require a limited workforce. During operation (and maintenance), National Grid would require infrequent access to ensure the operational Project is appropriately surveyed, assessed, and maintained. Access would typically be made by foot, 4x4 or tractor and trailer.

3.5.26 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
- Servicing of equipment at substations.

3.5.27 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. Approach and Methodology

4.1 What is the Environmental Statement and EIA?

4.1.1 EIA is a process that is used to identify and assess the likely significant effects that could occur as a result of a project and identifies appropriate mitigation measures The EIA process informs the Project design.

4.1.2 The ES (Volume 6 of the DCO application) presents the outcomes of the EIA process - the likely significant effects that would result if the Project was implemented, and any proposed mitigation measures. These will be taken into account by the decision-making body when determining whether to grant development consent.

4.2 EIA Scoping

4.2.1 As the Project is classed as a Schedule 1 development under the EIA Regulations, it was not necessary to obtain a formal EIA Screening Opinion under the EIA Regulations. The first stage in the EIA process undertaken for the Project was therefore scoping. This defined the scope of the assessments proposed to be included within the ES. It described the topics and aspects[6] that had potential to result in significant effects. It also outlined the existing baseline environment and the proposed methodology for undertaking the assessment. The output of the scoping stage was an EIA Scoping Report (document reference 6.19).

4.2.2 On 4 November 2022, National Grid submitted the EIA Scoping Report (document reference 6.19) to the Planning Inspectorate in accordance with the EIA Regulations.

4.2.3 An EIA Scoping Opinion (document reference 6.20) was then prepared by the Planning Inspectorate on behalf of the Secretary of State, after consulting the prescribed bodies. The EIA Scoping Opinion (document reference 6.20) was received on 10 December 2022 and has informed the environmental topics and aspects that have been scoped into the ES (Volume 6 of the DCO application) in accordance with Regulation 14(3)(a) of the EIA Regulations.

4.3 Preliminary Environmental Information

4.3.1 The Project is an NSIP, and as part of the NSIP process (as defined within s42 of the Planning Act 2008), applicants are required to undertake statutory consultation with relevant consultees about the Project proposals. Feedback received during statutory consultation is then used to shape the final proposals within the application for development consent. As part of statutory consultation, applicants typically prepare a PEIR. As per Regulation 12(2) of the EIA Regulations, 2017, a PEIR must set out the information referred to in Regulation 14(2) that '*is reasonably required for the consultation bodies to develop an informed view of the likely significant*

[6] '*The Planning Inspectorate refers to 'aspects' as meaning the relevant descriptions of the environment identified in accordance with the EIA Regulations.*' (Nationally Significant Infrastructure Projects - Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Planning Inspectorate, 2025)).

environmental effects of the development (and of any associated development)'. This information is then used by consultees to inform their responses to statutory consultation. A PEIR for the Project was prepared for statutory consultation which commenced on 10 April 2024.

4.3.2 Further consultations were undertaken between January and April 2025. The published consultation materials for each of the 2025 consultations included 'Environmental Implications of Change' documents. The consultations were prepared in accordance with paragraph 20 of the Planning Act 2008: Guidance on the Pre-application stage for Nationally Significant Infrastructure Projects (Ministry of Housing, Communities and Local Government, 2024) which states that targeted consultation (whether statutory, non-statutory or a combination of the two) *'… will not require the production of PEI* [Preliminary Environmental Information] *provided proportionate and appropriate information on environmental implications of any changes, where necessary, is provided'*.

4.4 Environmental Statement

4.4.1 The ES (Volume 6 of the DCO application) presents the likely significant effects that would result if the Project was implemented, and any proposed mitigation measures. The ES (Volume 6 of the DCO application) will be taken into account by the decision-making body when determining whether to grant development consent.

4.4.2 In general, the assessment in the ES (Volume 6 of the DCO application) follows a receptor-based assessment approach unless specific environmental topic guidance suggests otherwise. Receptors are aspects of the environment which may be sensitive to change as a result of the Project. When deciding on which receptors to include within the ES, consideration has been given to Regulation 5(2) and Schedule 4 paragraph 4 of the EIA Regulations.

4.4.3 All assessment work has applied a precautionary principle and assessed a reasonable worst-case scenario.

4.5 EIA Approach and Methodology

4.5.1 The EIA considers all relevant topics that may be impacted, such as landscape, historic environment, etc. The topics to be included or excluded (or 'scoped out') in the EIA were agreed with the Planning Inspectorate and other stakeholders through the scoping process, with the Planning Inspectorate providing an EIA Scoping Opinion (document reference 6.20). The EIA Scoping Opinion (document reference 6.20) states the information that the Planning Inspectorate requires to be included (and agrees can be excluded) within an ES (Volume 6 of the DCO application).

Current and Future Baseline

4.5.2 Data was gathered to identify the baseline (existing) environment, against which the potential environmental effects of the Project were assessed. Establishing the baseline conditions of a defined Study Area allows an accurate understanding of the type and sensitivity of receptors within the receiving environment. Understanding the baseline conditions also assists in the identification of the most appropriate mitigation measures which can be used to avoid or reduce any significant effects.

4.5.3 A detailed description of the existing 'baseline' and where relevant 'future baseline' has been produced for the Order Limits, and where appropriate the area around the Order Limits, through a combination of desk-based studies, engagement and consultation and site-specific surveys.

4.5.4 Each environmental topic chapter presents the future baseline where it is considered likely that the baseline would change in the absence of the Project. Where no changes to the baseline environment in the absence of the Project are expected, this is also stated.

Parameters and Flexibility

4.5.5 The Project is an NSIP and Order Limits have been defined to encompass the land required temporarily to build the Project and permanently, to operate (and maintain) the Project. The Order Limits include Limits of Deviation (LoD), which represent the maximum lateral, locational or vertical (not including longitudinal) flexibility for infrastructure, such as the overhead line, pylons, 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.

Sensitivity Testing

4.5.6 The environmental topic chapters (document references 6.6 to 6.16) consider sensitivity testing / flexibility in design that may be adopted to determine if there would be new or different significant environmental effects. Sensitivity testing / flexibility in design is assessed within each environmental topic chapter and includes:

- Flexibility in construction programme:
  - Assessment of delays to the construction schedule: Each environmental topic chapter provides an assessment to determine if the environmental effects would be different if the construction programme was delayed
- Flexibility in Design:
  - Flexibility within the LoD, for example changes to the location or height of permanent features such as pylons, within the LoD (other than where locations of specific pylons are committed to, as detailed within the Outline Code of Construction Practice (CoCP) (document reference 7.2))
  - Flexibility within the Order Limits, for example, there are elements of the Project where design flexibility has been identified.

Assumptions and Limitations

4.5.7 Other general assumptions that have been made in the EIA within each environmental topic chapter are as follows:

- The current reported baseline is considered to be the existing state as recorded at the time when baseline surveys were completed
- Information provided by third parties, including publicly available information and databases, is correct at the time of publication and/or specific dates provided.

Significance

4.5.8 Regulation 5(2) of the EIA Regulations states that '*the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors: (a) population and human health; (b) biodiversity…; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; and e) the interaction between the factors referred to in sub-paragraphs (a) to (d)*'.

4.5.9 Schedule 4 paragraph 5 of the EIA Regulations requires a description of the likely significant effects of the development on the environment.

4.5.10 Significance of effects has been assessed using professional judgement considering the sensitivity (or value) of the receptor within the Study Area, and the magnitude of change (impact) likely to be caused by the activities of the Project on that receptor. These factors are combined to give an overall significance of effect.

Embedded, Standard and Additional Mitigation Measures

4.5.11 Each environmental topic chapter of the ES (Volume 6 of the DCO application) has identified proposed mitigation measures (which could fall under 'Avoid', 'Prevent' or 'Reduce') that are required to address potential significant adverse effects of the Project, following the mitigation hierarchy. Mitigation is categorised as follows:

- Embedded Mitigation Measures: are those that are intrinsic to and built into the design of the Project
- Standard Mitigation Measures: comprising management activities and techniques that would be implemented throughout construction of the Project to limit effects through adherence to good site practice
- Additional Mitigation Measures: mitigation measures over and above embedded and standard mitigation measures to reduce environmental effects. This includes, but is not limited to, mitigation required for protected species.

4.5.12 Mitigation measures have been defined within each environmental topic chapter and where relevant to construction and post-construction are detailed in the:

- Outline CoCP (document reference 7.2) secured by Requirement 4 in the draft DCO (document reference 3.1)
- Outline Construction Traffic Management Plan (CTMP) (document reference 7.3) secured by Requirement 4 in the draft DCO (document reference 3.1)
- Outline Public Rights of Way (PRoW) Management Plan (document reference 7.6) secured by Requirement 4 in the draft DCO (document reference 3.1)
- Outline Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (document reference 7.5) secured by Requirement 5 in the draft DCO (document reference 3.1).

4.5.13 Environmental mitigation that relates to the permanent assets is detailed in the Outline CoCP (document reference 7.2) and the Outline Landscape and Ecological Management Plan (LEMP) (document reference 7.4) secured by Requirement 4 of the draft DCO (document reference 3.1).

Enhancement

4.5.14 NPS EN1 (DESNZ, 2024a) details that projects should also not only mitigate effects following the mitigation hierarchy, but they should also consider whether there are any opportunities for enhancement. Enhancement proposed as part of the Project comprises:

- BNG - the Project is committed to delivering at least 10% BNG – further detail can be found within the BNG Report (document reference 7.1)
- Environmental measures contributing towards the natural beauty, special qualities, and key characteristics of Protected Landscapes – further detail can be found within National Landscapes – Duty to Seek to Further the Purposes Report (s85 Countryside and Rights of Way Act 2000) (document reference 5.10).

Assessment of Residual Effects

4.5.15 Residual effects are those that are predicted to remain after mitigation measures have been implemented. Potential significant effects prior to mitigation measures being implemented are not reported in the ES (Volume 6 of the DCO application) unless guidance relevant to the environmental topic chapter requires potential effects to be reported prior to mitigation in accordance with specific guidance. This approach was agreed at the scoping stage. Residual effects are described in each environmental topic chapter. Where new or different significant effects are anticipated through the flexibility provided in the DCO these are also reported in each environmental topic chapter.

Monitoring

4.5.16 Regulation 25(3) of the EIA Regulations introduced a requirement on the Secretary of State to consider whether it would be appropriate to impose monitoring of any significant adverse effects on the environment from a Project where a ‘subsequent consent’ (as defined in regulation 3) is to be granted. Section 8 (Monitoring) of each environmental topic chapter summarises the need for monitoring on the Project, where applicable. Further details of the proposed monitoring are set out in the Outline CoCP (document reference 7.2) (where relevant) and the Outline LEMP (document reference 7.4).

5. Environmental Impact Assessment

5.1 Introduction

5.1.1 This section provides a summary of the environmental assessment of likely residual significant effects to resources and receptors including:

- Agriculture and Soils (ES Chapter 6: Agriculture and Soils (document reference 6.6))
- Air Quality (ES Chapter 7: Air Quality (document reference 6.7))
- Ecology and Biodiversity (ES Chapter 8: Ecology and Biodiversity (document reference 6.8))
- Contaminated Land, Geology and Hydrogeology (ES Chapter 9: Contaminated Land, Geology and Hydrogeology (document reference 6.9))
- Health and Wellbeing (ES Chapter 10: Health and Wellbeing (document reference 6.10))
- Historic Environment (ES Chapter 11: Historic Environment (document reference 6.11))
- Hydrology, Land Drainage and Flood Risk (ES Chapter 12: Hydrology, Land Drainage and Flood Risk (document reference 6.12))
- Landscape and Visual (ES Chapter 13: Landscape and Visual (document reference 6.13))
- Noise and Vibration (ES Chapter 14: Noise and Vibration (document reference 6.14))
- Socio-economics, Recreation and Tourism (ES Chapter 15: Socio-economics, Recreation and Tourism (document reference 6.15))
- Traffic and Transport (ES Chapter 16: Traffic and Transport (document reference 6.16))
- Cumulative Effects (ES Chapter 17: Cumulative Effects (document reference 6.17)).

5.1.2 Environmental constraints and features associated with the environmental topics listed above are presented on Figure A21.1.1 at the end of this NTS.

5.2 Agriculture and Soils

Scope

5.2.1 The scope of the Agriculture and Soils assessment covers the effects on the following during construction and operation (and maintenance):

- Soils: Impacts on soil quality and associated ecosystem services

- Agricultural land (including Best and Most Versatile (BMV) land)
- Agricultural landholdings.

Study Area

5.2.2 The Study Area comprises the area directly affected by the Project, as defined by the Order Limits. A Wider Study Area is also considered, which extends to 1 km around the Order Limits to provide wider environmental context.

Existing Baseline

5.2.3 A desk study was undertaken drawing on information from existing mapping from the British Geological Survey (BGS, 2022), Ordnance Survey, National Soil Association mapping (National Soil Resources Institute (NSRI), 2025), Provisional and (where available) detailed Agricultural Land Classification (ALC) mapping) and maps of agri-environmental, woodland and forestry schemes (Department for Environment, Food and Rural Affairs (Defra), 2024). A detailed ALC survey was also undertaken of approximately 1,011 ha within the Order Limits. Following the detailed ALC surveys, predictive ALC grading was undertaken on a 100 m grid (equivalent to approximately one sample point per hectare) across the entire Order Limits. This approach provides predicted ALC grades for the approximately 856 ha where surveys were not possible.

5.2.4 BMV agricultural land is defined as land of Grades 1, 2 and 3a (excellent, very good and good quality land), which national policy advises should be avoided where possible. Provisional ALC Mapping shows that the Study Area predominately comprises Grade 2 and 3 land, with a large area of Grade 1 land recorded around the Burnt Heath area (Section C). The mapping indicates that some of the land in the Study Area is Grade 3a. The Provisional ALC information available suggests that a large proportion of the Study Area may comprise BMV land.

5.2.5 There are areas of land within the Study Area under specific environmental agreements in relation to how the land is managed, including areas under Countryside Stewardship Agreements (Middle and Higher Tier), with areas of land to the south of Great Tey (Section D) and Edney Common (Section F) being under both entry level plus higher-level stewardship, as well as areas under organic entry level plus higher-level stewardship agreements.

5.2.6 The Study Area also includes small areas of fen peat soils near Roydon and Diss in south Norfolk (Sections A and B).

Mitigation

5.2.7 Embedded measures relevant to Agriculture and Soils include:

- The design would allow for landscape planting at CSE compounds, the new EACN Substation, around the new Tilbury North Substation and at the existing Norwich Main Substation – further details are provided in the Outline LEMP (document reference 7.4)
- Replacement planting – Replacement planting would be undertaken at the earliest opportunity given the right planting season.

5.2.8 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to Agriculture and Soils. The Outline Soil Resource Plan (SRP)

(Appendix C of the Outline CoCP (document reference 7.2)) provides strategy, guidance, and methodology, and provides details of the approach to soil stripping, stockpiling, and reuse (where appropriate). The Outline SRP will be evolved and further developed into the SRP prior to construction commencing, considering, for example, temporary and permanent design, detailed construction approaches and Project programme.

5.2.9 Additional mitigation measures are to be put in place where the Project interacts with organic-rich (peaty) soils identified in the Waveney Valley. The Outline SRP within the Outline CoCP (document reference 7.2) provides guidance and mitigation on the handling of these soils.

Residual Effects

Construction

5.2.10 Construction activities, including soil stripping for both temporary and permanent features, would cause disturbance to soils. 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 standard mitigation measures in the Outline CoCP (document reference 7.2). Further soil reinstatement details are also provided in the Outline LEMP (document reference 7.4). These measures would protect soil quality, reduce the detrimental effects on soil function, and would mean that the reinstated soils are able to provide their associated ecosystem services. Given the scale of the Project and construction activity required there would be a **temporary large** magnitude impact on **very high / high and medium** sensitivity soils (in terms of soil function and associated ecosystem services), which is assessed as a **major adverse effect**, which is **significant**.

5.2.11 The Project would result in a **temporary major adverse** effect on the soil structure of medium to heavy soils, such as clay loams and clay. Whereas, for light soils, including sand, loamy sands, and sandy loams, the Project would result in a **temporary moderate adverse effect.**

5.2.12 There are also potential impacts on agricultural operations and viability due to disruption and the loss of land from agricultural production. To mitigate these effects, standard mitigation measures set out in the Outline CoCP (document reference 7.2) would ensure that access to affected land parcels is maintained or alternative access arrangements are communicated to landowners and occupiers. By the end of construction, all land required temporarily would be reinstated, and effects on agricultural operations during the construction phase would be managed through compensation agreements (which lie outside of the EIA process). The implementation of good practice measures would ensure that disruption is minimised, and combined with reinstatement and compensation agreements, it is therefore considered that the effects on agricultural landholdings would result in a **neutral effect** and would be **not significant.**

5.2.13 It is calculated that 3,461 ha of agricultural land would be temporarily removed from agricultural production during construction. Of this, 2,923 ha (84.4%) are mapped as Grades 1, 2 and 3a and, as such, the temporary removal is considered to have a **temporary negative** effect which would be of **major significance**.

5.2.14 The effect of construction of the Project on all other aspects of agriculture and soils has been assessed **as not significant**.

Operation (and Maintenance)

5.2.15 There would be a permanent loss of areas of BMV agricultural land (approximately 172.7 ha) required for permanent footprint of the foundations of the pylons, substations, CSE compounds and any permanent access routes. This would constitute an irreversible loss of one or more soil functions (in particular the impact on BMV land). Due to the **high sensitivity** of BMV land, the impact on agricultural land is assessed as a **major adverse effect**, which is **significant**.

5.2.16 Any maintenance or repair works required during operation (and maintenance) which would result in disturbance to agricultural land has been assessed as **not significant**.

5.2.17 During operation (and maintenance), there would be limited effects on agricultural operations. There is the potential for restrictions to existing activities immediately over or adjacent to buried cables or under overhead lines; however, these would be dealt with through compensation agreements (which lie outside of the EIA process). Any maintenance or repair works required which would result in disturbance to agricultural operations would be undertaken in accordance with standard practice. Therefore, **no significant effects** on agricultural landholdings during operation (and maintenance) are anticipated.

5.3 Air Quality

Scope

5.3.1 The scope of the Air Quality assessment covers the effects on the following during construction:

- Dust
- Traffic emissions
- Generator and Non-Road Mobile Machinery (NRMM) emissions.

5.3.2 As set out in the EIA Scoping Report (document reference 6.19) and agreed within the EIA Scoping Opinion (document reference 6.20), the operation (and maintenance) phase of the Project would not result in any significant effects to air quality and no further assessment has been carried out in the ES.

Study Area

5.3.3 The baseline Study Area has included a review of sources and available monitoring data within 2 km of the Order Limits.

5.3.4 The Study Area for construction dust (in accordance with the Institute of Air Quality Management (IAQM) dust guidance (IAQM, 2024)) comprises the following:

- 250 m from the Order Limits (50 m for ecological effects)
- 50 m from the Primary Access Routes (PARs) used by construction vehicles on the public highway, up to 250 m from the construction site entrance along haul roads used by HGVs.

5.3.5 The Study Area for construction traffic emissions has been determined from PARs and predicted traffic numbers. For the assessment of construction traffic emissions,

the criteria from the IAQM / Environmental Protection UK (EPUK) guidance (IAQM, EPUK, 2017) have been used to determine the affected road network (ARN). The ARN includes all roads in the traffic model which are predicted to experience changes (as a result of the Project), due to:

- A change of Light Duty Vehicle (LDV)[7] flows of more than 100 Annual Average Daily Traffic (AADT) movements within or adjacent to an AQMA, or more than 500 AADT elsewhere, or
- A change of Heavy Duty Vehicle (HDV)[8] flows of more than 25 AADT movements within or adjacent to an AQMA, or more than 100 AADT elsewhere.

5.3.6 In areas where these criteria are met, human and ecological receptors within 200 m of the road within the ARN are scoped into the assessment.

5.3.7 No specific guidance exists on the definition of a Study Area for NRMM and generator emissions due to the large variation in potential effects from different types of sources. For the purposes of this assessment, a Study Area of up to a 100 m radius from the temporary construction areas / compounds listed within Chapter 4: Project Description (document reference 6.4) is considered appropriate given the potential size and duration of the construction operations to be undertaken and the likely size of plant required.

Existing Baseline

5.3.8 A review of the existing baseline has been undertaken to establish an understanding of the baseline air quality environment to identify areas that are likely to be sensitive to changes in emissions because of the construction of the Project.

5.3.9 There are 14 Part A industrial processes with emissions to air identified within the 2 km buffer from the Order Limits.

5.3.10 There are no Air Quality Management Areas (AQMAs) within 2 km of the Order Limits. However, AQMA No.4 and AQMA No.5, located on the A1306 and A13 (Thurrock Council) (Section H), are located within 200 m of the ARN. AQMA No.4 was declared for exceedances of the annual NO_2 standard while AQMA No.5 was declared for exceedance of the annual NO_2 objective alongside the daily (24-hour) PM_{10} objective. These AQMAs have identified road traffic as a predominant source of pollution, from the surrounding A roads (A1306 and A13).

5.3.11 There is a single automatic monitoring station (CM1), within 2 km of the Order Limits, located in Thurrock Council (Section H), which measured concentrations of NO_2 and $PM_{2.5}$ in 2023, the baseline year. No exceedances of NO_2 or PM_{10} annual mean standard were recorded between 2019 and 2023. No exceedances of the $PM_{2.5}$ annual mean standard were recorded in 2023, the only available year of $PM_{2.5}$ monitoring at this site.

5.3.12 For the assessment of construction dust, the identification of receptors and their sensitivity to dust effects followed IAQM guidance (IAQM, 2024). The Order Limits pass within 250 m of residential receptors in settlements such as Gislingham, Offton,

[7] LDV (vehicles up to 3.5 tonnes)

[8] HDV (vehicles greater than 3.5 tonnes, e.g. heavy good vehicles (HGVs), buses, coaches and 'vocational' vehicles such as gritters, refuse collection vehicles). HGVs are relevant for construction impacts, therefore they are the only type of HDV used for the Project. Also, the best practice mitigation refers to HGVs.

Ardleigh, Little Waltham and Thurrock. There are also schools within 250 m of the Order Limits, including those in Little Waltham and Ardleigh. In addition, a number of **medium sensitivity** (SSSI) and **low sensitivity** (Local Nature Reserve (LNR) and ancient woodland) ecological receptors have been identified within 50 m of the Order Limits.

Mitigation

5.3.13 Embedded measures relevant to air quality include designing the alignment and associated Order Limits to avoid large residential and urban areas and consequently avoid areas of existing poor air quality. In addition, an almost continuous haul roads is proposed as part of the design to reduce construction traffic using the local highway network. By diverting construction vehicles away from large residential and urban areas, the haul roads help to reduce localised emissions and associated air quality impacts in these locations.

5.3.14 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to Air Quality. The Outline Dust Management Plan (Appendix D of the Outline CoCP (document reference 7.2)), would need to be updated to a Dust Management Plan by the Main Works Contractor(s) prior to commencement of construction. The Outline CoCP also includes measures to reduce impacts from NRMM and generators.

5.3.15 There are no additional mitigation measures proposed to minimise effects on Air Quality, beyond the embedded and standard measures identified above.

Residual Effects

Construction

5.3.16 Following the implementation of the proposed standard mitigation measures, the effects of construction on dust soiling, human health and ecological effects, are anticipated to be **not significant** in line with IAQM guidance (IAQM, 2024).

Construction Traffic

5.3.17 Annual mean pollutant concentrations for NO_2, PM_{10} and $PM_{2.5}$ were predicted at 59 sensitive human receptors and all resulted in a predicted **negligible** magnitude of change, and therefore effects are considered to be **not significant**.

5.3.18 For NOx and NH_3 annual means, the highest concentrations were below critical levels. For nitrogen deposition, the assessment has considered contributions from both NOx and NH_3. The assessment of construction effects at designated habitats identified 20 ecological receptors (ancient woodland and LNR) where the predicted process contribution is greater than 1% of the critical load. Where results exceed 1% of the critical load, these have been considered further by ecologists[9].

[9] The 1% threshold has become widely used throughout the air quality assessment profession to define a reasonable quantum of long-term pollution which is not likely to be discernible from fluctuations in background/measurements. For example, for many habitats, 1% of the critical load for nitrogen deposition equates to a very small change of less than 0.1 kgN/ha/yr, well within the expected normal variation in deposition. Its use has not been challenged by the courts, but it should be used in the context of an in-combination assessment.

5.3.19 Seven receptors (ER4, ER16, ER17, ER19, ER37, ER38, and ER39) have been identified with nitrogen levels that fall either within or above the critical load range as defined by the UK Air Pollution Information System (UK Centre for Ecology & Hydrology, 2016). The baseline levels of nitrogen associated with these receptors was already elevated due to their location adjacent to main trunk roads. The small increase in nitrogen levels resulting from the Project during construction is not expected to have a significant effect on these receptors as the construction impact would be experienced for a maximum of four years. **No significant residual effect** is likely to be experienced by these sensitive ecological sites as a result of the minor increase in nitrogen levels that would be caused by the Project.

Generator Use/ NRMM

5.3.20 Generator effects would be sufficiently mitigated by measures including, but not limited to, locating away from sensitive receptors, increasing the release height of emissions for sufficient dispersion, and relevant abatement technology. The use of construction NRMM is unlikely to result in significant effects on local air quality with suitable controls and site management in place. It is therefore considered that effects from emissions from construction equipment and plant are likely to be **neutral** and **not significant.**

Operation (and Maintenance)

5.3.21 The effects of the Project for Air Quality during operation (and maintenance) have been scoped out of the assessment in accordance with the EIA Scoping Opinion (document reference 6.20).

5.4 Ecology and Biodiversity

Scope

5.4.1 The scope of the Ecology and Biodiversity assessment covers effects on the following receptors:

- International sites designated for biodiversity:
  - Thames Estuary and Marshes Ramsar Site and SPA (during construction and operation (and maintenance))
  - Stour and Orwell Estuaries Ramsar Site and SPA (during construction and operation (and maintenance))
  - Norfolk Valley Fens SAC (during construction)
- 19 national sites designated for biodiversity during construction
- National sites designated for biodiversity during operation (and maintenance):
  - Mucking Flats and Marshes SSSI
  - South Thames Estuary and Marshes SSSI
  - National sites which underlie the European sites (listed above)
- Local (13 statutory and 370 non-statutory) sites designated for biodiversity during construction

- Protected / notable[10] habitats and species during construction:
  - Ancient woodland
  - Habitat of Principal Importance (HPI) in England
  - 'Important' hedgerows
  - Vascular and non-vascular plants and fungi
  - Fish, terrestrial invertebrates, reptiles, breeding birds, wintering/passage birds, badger, bats, hazel dormouse, otter, water vole, white-clawed crayfish, amphibians and other species listed under s41 of the Natural Environment and Rural Communities Act 2006
- Wintering/passage birds, bats and other species listed under s41 of the Natural Environment and Rural Communities Act 2006 during operation (and maintenance)
- Groundwater Dependent Terrestrial Ecosystems (GWDTE) during construction and operation (and maintenance)
- Invasive Non-Native Species during construction and operation (and maintenance)
- Other notable mammals (brown hare, hedgehog, and harvest mouse) during construction and operation (and maintenance).

5.4.2 Common species names are used here; the scientific names are used within the technical appendices that support the ES.

Study Area

5.4.3 The Chartered Institute of Ecology and Environmental Management (CIEEM) Ecological Impact Assessment (EcIA) Guidelines (CIEEM, 2018) require assessments to be focused on a Zone of Influence (ZOI) – defined as being the area over which changes arising from construction and operation (and maintenance) could lead to ecologically significant effects.

5.4.4 A 2 km Study Area was used as for all ecology and biodiversity receptors excluding the following:

- SAC where bats are the qualifying feature – 30 km Study Area
- SAC where otters are the qualifying feature – 10 km Study Area
- SPA and Ramsar Sites – 20 km Study Area
- Where the Project overlapped with a SSSI Impact Risk Zone for electricity infrastructure projects the SSSI was also considered part of the Study Area to identify any direct pathways to effects
- Ancient woodland – 200 m Study Area.

[10] Notable species are species of conservation concern as listed under s41 of the Natural Environment and Rural Communities Act 2006, Notable bird species are birds listed under s41 of the Natural Environment and Rural Communities Act 2006, under Schedule 1 of the Wildlife and Countryside Act 1981, as amended and those listed as red or amber in the Birds of Conservation Concern 5 (Stanbury *et al*., 2021).

Existing Baseline

Statutory Designated Sites

5.4.5 A total of 61 statutory designated sites were identified within the Study Areas, comprising 13 Ramsar Sites, 15 SPAs, one SAC, 19 biological SSSIs and 13 LNRs. It should be noted that the impact risk zones associated with the 19 SSSIs coincide with the Order Limits. There are no SACs designated for bats recorded within 30 km of the Order Limits. All Ramsar Sites, SPAs and SACs are of very high value (as sites of international importance), SSSIs are of high value (as sites of national importance) and LNRs are of medium value (as sites of county importance). Of the 61 sites, impact pathways have been identified for 2 Ramsar Sites, 2 SPAs, 1 SAC, 9 SSSIs and 5 LNRs.

Non-Statutory Designated Sites

5.4.6 A total of 370 non-statutory designated sites were identified within the Study Areas, comprising 242 Local Wildlife Sites (LWSs), 111 County Wildlife Sites (CWSs), and 17 Roadside Nature Reserves (RNRs). All non-statutory designated sites are of medium value, as sites of county importance. Of the 370 sites identified within the Study Area, impact pathways have been identified for 11 CWSs, 22 LWSs and one RNR. In addition, 28 CWSs and 26 LWSs have been identified that support GWDTE

Habitats

Ancient Woodland

5.4.7 A desk study has been undertaken to identify areas of ancient woodland within the Order Limits and within 200 m from the Order Limits. This identified 51 blocks of ancient woodland, of which 1.6 ha (six sites) falls within the Order Limits. Thirty-four ancient woodland sites have been identified within 15 m from the Order Limits (15 m is the buffer zone within which effects on root systems of ancient woodland may occur (Natural England and Forestry Commission, 2022)). Ancient woodland is identified as irreplaceable habitat by the UK Government and as such is of high value as a habitat of national importance.

Habitats of Principal Importance (HPI)

5.4.8 In addition, HPI have been identified within the Order Limits, including lowland mixed deciduous woodland, wet woodland, lowland dry acidic grassland, arable field margins, coastal and floodplain grazing marsh, open mosaic habitat on previously developed land, native hedgerows, rivers and streams, and ponds. These habitats are of medium value and county importance.

Important Hedgerows

5.4.9 A total of 34 hedgerows were assessed to be ‘Important’ in terms of the wildlife and landscape criteria under the Hedgerows Regulations 1997. These are of medium value as habitat of regional importance. The other native species hedgerows were categorised as HPI of medium value as habitat of county importance.

Groundwater Dependent Terrestrial Ecosystems (GWDTE)

5.4.10 Designated sites that support GWDTE that are hydrologically linked to the Project comprise four SSSIs, six LNRs, 28 CWSs, and 26 LWSs. The GWDTE have not been assigned a particular value, but they have been valued as a HPI or as an intrinsic part of a designated site.

Other Terrestrial Habitats

5.4.11 The Project falls within a primarily agricultural landscape, dominated by typical farmland habitats such as arable land and grazed-pasture fields, intersected by a network of hedgerows. Additional habitats of value present within the Order Limits comprised other lowland acidic grassland (0.4 ha), other neutral grassland (288.04 ha), reservoirs (1.25 ha), other broadleaved woodland (18.90 ha) and mixed woodland (3.38 ha). These habitats are of low value and local importance.

Aquatic Macrophytes

5.4.12 A desk study for macrophytes was undertaken within the Order Limits and data was available for 18 of the 38 Water Framework Directive (WFD) catchments intersected by the Project. Only one nationally scarce and near threatened plant species was identified, galingale, which was recorded in the Roxwell Brook WFD catchment (Section F). This species of macrophyte is of county importance, which is in line with the supporting habitat (HPI Rivers), therefore the Roxwell Brook is of medium value as a habitat of county importance.

Invasive Plant Species

5.4.13 Three invasive non-native plant species that are associated with watercourses have been recorded within the Order Limits. It is illegal to spread these species in the wild under the Wildlife and Countryside Act 1981. There were 51 findings of these species within and surrounding the Order Limits. Of the 51 findings, 15 were within the Order Limits. Invasive non-native plant species are not of ecological value, but they do pose a risk to ecology and biodiversity.

Fauna

Aquatic Macroinvertebrates

5.4.14 None of the species identified in the desk study are protected under conservation legislation. Nine of the catchments were assessed by the Environment Agency to support macroinvertebrate populations indicative of ‘high’ water quality and so of national importance, which comprise: the Tas (Tasburgh to River Yare) and the Tributary of the Tas (Section A); the Little Ouse (upstream of Thelnetham) and the Wattisham Watercourse (Section B); the Stour downstream of River Brett (Sections C and D); the Blackwater (Combined Essex) (Section E); the Ter (Section E and F); and the Chelmer (Great Easton to River Can) and Roxwell Brook (Section F). Fifteen of the catchments were assessed by the Environment Agency to support macroinvertebrate populations indicative of ‘good’ water quality and so of county importance and medium value. Six of the catchments were assessed by the Environment Agency to support macroinvertebrate populations indicative of ‘moderate’ water quality and so of county importance and medium value.

Terrestrial Invertebrates

5.4.15 A total of 36 Invertebrate Survey Areas (ISAs) were confirmed following the initial desk study. Of the 36 ISAs, three were identified where further surveys were required to assess the value of the populations and inform the impact assessment. These were sites ISA 4 (Section A), ISA 24 (Section C) and ISA 29 (Section E). The invertebrate populations associated with two of these sites (ISA 4 and ISA 29) were of low value and local importance; the invertebrate population in ISA 24 was of medium value and county importance.

Fish

5.4.16 A desk study identified that the Order Limits span 38 WFD river catchments. A total of 199 river crossings where in-channel works may take place have been identified. Although no suitable fish spawning habitat was identified within the Order Limits, at least one fish species of conservation concern has been recorded in watercourses in all Project Sections and it is likely that suitable spawning habitat is present elsewhere in the river catchments. As such each Project Section contained watercourses that supported fish populations of medium value and county importance.

Reptiles

5.4.17 It is assumed that common reptile species are present and widespread throughout the Order Limits due to the presence of suitable habitat and because their distribution throughout East Anglia is widely documented. Common reptile species in East Anglia comprise grass snake, common lizard and slow-worm with adder having a more limited distribution. Five potential Key Reptile Sites (KRS) were subject to targeted surveys with three KRSs found to meet the criteria: Sproughton Park (Section C), River Wid Corridor (Section G) and Orsett Golf Course potential LWS (Section H). These three confirmed KRS are of medium value to reptiles supporting populations of county importance.

Birds

Breeding Birds

5.4.18 The Study Area contains habitats that are potentially suitable for a range of breeding bird species, which may be present within the semi-natural habitats within the Order Limits. Species that are specially protected when nesting that have been recorded within the Order Limits comprise barn owl, hobby, kingfisher and red kite. Nine locations were identified as suitable habitat to support notable breeding bird species and subject to six surveys. Of these nine locations six were found to support breeding bird populations of medium value and county importance, the other three locations and the remainder of the land within the Order Limits was assessed to support breeding bird populations of low value and local importance.

Wintering/Passage Birds

5.4.19 A desk study identified 27 sites (either SPA or Ramsar Sites) of international ornithological importance within 20 km of the Order Limits. A total of 19 locations, where overhead lines are proposed to cross watercourses and water bodies across the Project, were surveyed from vantage points. The purpose of this was to collate bird flight details along these locations which may be used as commuting routes by

water birds and assess their collision risk (water birds are thought to be of particular collision concern due to poor manoeuvrability in flight). These surveys revealed that these birds were not recorded in sufficient numbers at height for there to be a collision risk.

5.4.20 Four transect surveys were also undertaken of large open fields to determine the presence of Functionally Linked Land associated with the Stour and Orwell Estuaries Ramsar Site and SPA. A total of 34 wetland species were identified with two key areas for birds which supported wintering bird assemblages of county importance: Survey Location 9 – River Stour (Langham Lake only - Section C) with flooded areas, grassland and large arable fields in the vicinity and Survey Location 11 – Ardleigh Reservoir (Section C). As such they were of medium value.

Bats

5.4.21 Survey effort for bats comprised bat roosting surveys, bat activity surveys and radio-tracking surveys. One SSSI (Hangman's Wood and Deneholes, Section H) designated for bats was identified within the Study Area, approximately 0.49 km south of the Order Limits.

5.4.22 Following the completion of the desk study and field surveys undertaken between 2023 and 2025 the following bats have been identified within the Study Area:

- Barbastelle bat
- Common pipistrelle
- Soprano pipistrelle
- Nathusius's pipistrelle
- *Myotis* species
- Noctule
- Nyctalus species
- Brown long-eared
- Serotine.

5.4.23 Of the 4,562 trees assessed within the Order Limits, a total of 287 trees were assessed as containing at least one potential roost feature suitable for multiple bats and may therefore be used by a maternity colony (PRF-M). A total of 1,773 trees were assessed as Further Assessment Required (FAR) and a total of 587 trees were assessed as having features only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitat (PRF-I).

5.4.24 There were also 41 trees were also identified as having hibernation potential for bats.

5.4.25 There were 13 static detector locations where four or more barbastelle passes were recorded within 60 minutes of sunset.

5.4.26 Surveys revealed that land within the Order Limits supported a bat assemblage of medium value (county importance) to high value (national importance). The tree roost resource has been assessed to be of low value (local importance) to medium (county importance).

Hazel Dormouse

5.4.27 A desk study was undertaken that identified the presence of hazel dormouse across the southern half of the Order Limits, in line with known UK distribution of hazel dormouse. Eight locations were identified where hazel dormouse were confirmed to be present, and the populations of hazel dormouse are of medium value and county importance.

Otter

5.4.28 Otter is a common and widespread species present throughout East Anglia, and it is assumed that they would use both wet and dry watercourses when travelling across a range (territory). Of the 142 surveyed watercourses, 27 had confirmed presence of otter due to sightings or the presence of confirmed otter holts/resting sites, spraint or footprints. The usage of otter holts and resting sites varies across the seasons and across the years and so pre-construction surveys, to include the use of cameras for monitoring, would be required to confirm the status and location of any resting sites. Otter is a species of conservation value, and a natal holt would be of county level importance and of medium value.

Water Vole

5.4.29 A water vole desk study and field survey has been undertaken across the Order Limits. Of the 142 surveyed watercourses, 89 were assessed to be suitable for water vole. Twenty-one had confirmed water vole presence due to sightings or the presence of confirmed water vole latrines. Fifteen watercourses were assigned potential water vole presence due to indicative signs such as potential water vole feeding stations, burrows and footprints. As a species of conservation concern, watercourses that support water vole are of county level importance and medium value.

American Mink

5.4.30 One record of American mink was returned within 2 km of the Order Limits in the western suburbs of Chelmsford (Section F) approximately 1 km north of the River Can (Section C) and 1.44 km east of the Order Limits.

5.4.31 Sightings, scat, footprints or burrows of American mink were recorded in Project Sections A, B, C, F and G.

5.4.32 American mink is an Invasive Non-Native Species (INNS) as listed in the Wildlife and Countryside Act 1981 under Schedule 9. It is not a species of conservation concern. Its presence in a watercourse often leads to the loss of water vole populations in the locality and for this reason eradication programmes are in place in East Anglia to control the spread of American mink.

Species of Principal Importance

5.4.33 Species of Principal Importance in England, not noted elsewhere in the existing baseline, were identified through a desk study and incidental field sightings. The desk study revealed that common toad, brown hare, harvest mouse, hedgehog and polecat were present across the Study Area. They have the potential to be present in suitable habitat throughout the Order Limits, and they are therefore considered to be of local importance and of low value.

Badger

5.4.34 The desk study identified a total of 291 badger records within 2 km of the Order Limits over the last 10 years and it is well documented that badger is common and widespread across East Anglia. A total of 123 badger setts (including potential setts) were identified within the Order Limits with a further 89 recorded within 30 m.

Mitigation

5.4.35 Embedded measures relevant to Ecology and Biodiversity include:

- National Grid has committed to delivering at least 10% BNG with wider environmental and societal benefits
- Sensitive routeing and siting to avoid and reduce as far as practicable effects on identified biodiversity receptors
- Landscape planting around CSE compounds, the new EACN Substation, around the new Tilbury North Substation and around the existing Norwich Main Substation
- Mitigation areas for landscape planting (and BNG) around permanent features are labelled as 'Environmental Areas'
- For access roads and haul roads, the Project requires the crossing of multiple ditches, drains and watercourses. Large or sensitive watercourses, for example those designated as a main river, and those with WFD status, would be crossed by the temporary haul road using temporary clear span bridges
- Temporary and permanent sustainable drainage features form part of Project design to ensure that water quality is protected in the watercourses that would receive surface water from the Project
- Orange spacers and bird diverters are to be applied to the earth wire at the River Waveney between pylons RG87 and RG88 and Ardleigh Reservoir between pylons TB15 and TB16 as set out in the Outline LEMP (document reference 7.4).

5.4.36 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to ecology and biodiversity.

5.4.37 The Outline LEMP (document reference 7.4) has been produced to detail the additional environmental measures that would be implemented to avoid, minimise, mitigate and compensate (where relevant) the landscape and visual and ecological features likely to be impacted during construction and operation (and maintenance). It sets out how the land, vegetation and habitats would be reinstated following construction. It includes details on additional mitigation measures required for ecology during construction and post-construction, as well as detailing any required management of these receptors post-construction.

Residual Effects

Construction

5.4.38 In line with the Scoping Opinion (document reference 6.20), the following impact pathways have been identified during the construction phase:

- Collision of nocturnal species with machinery during construction, within the Order Limits
- Disturbance of protected/notable fauna from lighting during construction, within the Order Limits and up to 500 m dependent on species
- Hydrological changes in surface water during construction and up to 500 m beyond the Order Limits, dependent on habitat/species
- Habitat loss and fragmentation during construction within the Order Limits
- Air quality changes (resulting in habitat loss/ modification): during construction on ancient woodland, up to 15 m from the Order Limits
- Killing or injury of protected / notable species, within the Order Limits.

5.4.39 It was agreed within the EIA Scoping Opinion (document reference 6.20) that the effects from vehicle emissions associated with diverted traffic during construction could be scoped out of the ES (Volume 6 of the DCO applications), provided it can be demonstrated that the predicted volumes of diverted traffic would not exceed the relevant indicative criteria for air quality assessment set out in the IAQM guidance (IAQM, 2019). No significant negative effects on habitats because of construction traffic have been identified in the Air Quality assessment, so air quality effects to habitats and species associated with construction traffic have been scoped out of this assessment.

5.4.40 Following the application of the outlined mitigation, it is concluded that there would be an overall **negligible magnitude** of impact, or the magnitude of impact would be **small-positive** (as a result of regeneration of habitat at a number of ancient woodland sites following removal of third-party (UK Power Networks) infrastructure**)**, with **no significant residual effect** on the identified receptors.

Operation (and Maintenance)

5.4.41 The following impact pathways have been identified during the operation (and maintenance) phase:

- Disturbance of fauna that are protected species / species of conservation concern from noise, vibration or visual stimuli during operation (and maintenance), up to 500 m dependent on species
- Habitat fragmentation or severance during operation (and maintenance), up to 500 m dependent on species
- Killing or injury of protected species/species of conservation concern, within the Order Limits.

5.4.42 Due to the low predicted number of vehicle movements in operation (and maintenance), it was agreed through the EIA Scoping Opinion (document refence 6.20) that vehicle emissions during operation (and maintenance) are unlikely to result in significant effects on biodiversity receptors; this matter has been scoped out of the ES (Volume 6 of the DCO application).

5.4.43 Following the application of the standard mitigation, it is concluded that there would be an overall **negligible magnitude** of impact with **no significant residual effect** on the identified receptors.

5.5 Contaminated Land, Geology and Hydrogeology

Scope

5.5.1 The Contaminated Land, Geology and Hydrogeology assessment considers effects on the following during construction and operation (and maintenance):

- Contaminated land and the receptors that could be affected by existing contaminants within the soil
- Geology including designated geological sites and minerals
- Hydrogeology including groundwater quality, levels, and flow.

Study Area

5.5.2 A desk study has been undertaken to inform the assessment which includes the area defined by the Order Limits plus a 250 m buffer for geology and contaminated land and up to 500 m for hydrogeology. This is considered an appropriate Study Area based on the nature of Project construction and operation activities, and relevant guidance.

Existing Baseline

5.5.3 Baseline conditions have been gathered from desk-based information. The majority of the Order Limits and the 250 m Study Area appears to have remained as undeveloped/agricultural land since the earliest reviewed historical mapping in the late 1800s. In these areas, it is considered that there is a very low risk of significant sources of potential contamination.

5.5.4 However, there are discrete areas within the Study Area that have a history of potentially contaminative land use or where the current land use is potentially contaminative. Where the initial assessment identifies a classification score of moderate or above (in relation to the potential for generating contamination based on historical or current use) within the Study Area, these sites are taken forward for further assessment in relation to the risk to sensitive receptors. Tthe following sites are assessed as presenting a potential moderate or above risk to sensitive receptors from existing contamination:

- PSC B1 – Rookery Farm, Lion Road – Historical landfill (Section B)
- PSC B5 – Bramford Substation (Section B)
- PSC C3 – Former Royal Air Force (RAF) Raydon (Section C)
- PSC D1 – Former RAF Boxted (Section D).

5.5.5 The superficial geology beneath the Study Area within Sections A, B, D, E and F generally comprises the Lowestoft Formation (Diamicton). Where river valleys cross the Order Limits these areas comprise the Lowestoft Formation (Sand and Gravel), Alluvium, River Terrace Deposits, Head Deposits and Kesgrave Catchment Subgroup.

5.5.6 The superficial geology beneath the Study Area within Section C comprises the river valley deposits described above and large areas of Cover Sands.

5.5.7 The superficial geology beneath the Study Area within Section G and Section H is recorded to be largely absent within parts of these sections and where present is dominated by the river valley deposits of Alluvium, River Terrace Deposits and Head Deposits.

5.5.8 Geo-Conservation covers statutory designated sites such as SSSI's (designated for geological purposes) and non-statutory designated sites such as Local Geological Sites (LGS), Regionally Important Geological Sites (RIGS) and County Geodiversity Sites (CGS). Sites of Geological Importance have not been identified within the Study Area in Norfolk. In Suffolk, one Site of Geological Importance (Hascot Hill Pit (Section B)) has been identified within the Study Area, although outside of the Order Limits and therefore impacts on the site are not anticipated. In Essex three sites of geological importance (one LGS and two SSSIs) have been identified within the Study Area but outside of the Order Limits. Ground disturbance at the three sites is not anticipated and therefore impacts on the sites are also not anticipated.

5.5.9 Several areas along the route are designated as Mineral Safeguarding Areas and Mineral Consultation Areas, which protect sand, gravel and clay resources for potential future extraction. The Order Limits cross through a number of these areas for sand and gravel and/or brick clay.

5.5.10 The groundwater conditions vary along the route. Large sections of the Study Area are within groundwater Source Protection Zone 3; a number of SPZ2 and SPZ1 are crossed by the Order Limits and Study Area. A small part of the Order Limits in the north of Section A is located within a groundwater Drinking Water Safeguarded Zone. The assessment has also identified a number of licensed and deregulated groundwater abstractions, and private water supplies, both within the Study Area, and considers the potential impact on these. The information currently received indicates that there are no private water supplies within the Order Limits.

5.5.11 The following receptors have been identified within the Study Area, and are relevant to the potential impacts scoped into the assessment:

- Construction and maintenance workers – high sensitivity
- Minerals resources (medium), existing minerals infrastructure (very high) and potential minerals infrastructure (medium)
- Geologically designated sites – very high for SSSI and Geological Conservation Review sites and medium for RIGS
- Groundwater and groundwater receptors (e.g. groundwater abstractions, ecological receptors, surface water that is groundwater fed) – very high to low sensitivity.

Mitigation

5.5.12 Embedded mitigation measures relevant to Contaminated Land, Geology and Hydrogeology include:

- Avoiding sensitive features and receptors as far as practicable, such as groundwater Source Protection Zone 1, landfills, and geological SSSIs, through the routeing and siting stages
- Incorporating suitable consideration of the ground conditions in the design based on data from site-specific ground investigation and assessment, and therefore that any risks from ground instability, chemical aggressivity of the ground, unexploded ordnance/unexploded bombs, ground gases and radon reports would be considered within the engineering design of the new infrastructure in accordance with best practice.

5.5.13 The Outline CoCP (document reference 7.2) sets out standard mitigation measures that would be implemented during construction to manage any risks related to contaminated land, protect geological features, and safeguard groundwater resources. These measures include standard good practice such as appropriate storage and handling of materials, preventing spills, appropriate personal protective equipment for construction workers, appropriate training for construction workers, and a protocol for dealing with unexpected contamination. If contaminated ground is encountered, it would be managed in accordance with relevant regulations and guidance.

5.5.14 There are no additional mitigation measures proposed to minimise effects on Contaminated Land, Geology and Hydrogeology, beyond the embedded and standard measures identified above.

Residual Effects

Construction

5.5.15 Where significant sources of potential contamination exist within the Order Limits, there is a risk that construction activities such as excavations could disturb existing contaminated soil or create new pathways for contamination. However, with the implementation of the measures set out in the Outline CoCP (document reference 7.2), the assessment concludes that the potential temporary construction impacts from existing contamination are considered to be very small and would result in an overall **negligible effect**, which would be **not significant**.

5.5.16 Pollution releases and the introduction of new sources of contamination into the environment (for example uncontrolled leaks and spills from machinery) also have the potential to affect sensitive receptors. However, with the implementation of the measures set out in the Outline CoCP (document reference 7.2), the potential temporary construction impacts from the introduction of new contamination (including breakout of drilling fluids) are considered to be very small. It is considered that for groundwater receptors (**very high to negligible sensitivity**), this would result in an overall **negligible effect**, which would be **not significant**.

5.5.17 Sites of Geological Importance have not been identified within the Order Limits where construction activities are proposed to take place. Therefore, there would be no change from the baseline conditions on Sites of Geological Importance (**very high and medium sensitivity**), which would result in **no effect**, which would be **not significant.**

5.5.18 The Order Limits have been identified to cross a limited number of existing mineral extraction sites (with a very high sensitivity). The temporary construction impacts on existing minerals infrastructure (**very high sensitivity**) would be very small. This would result in a **minor effect** which would be **not significant**.

5.5.19 A number of candidate minerals sites are also located within the Study Area and National Grid has and will continue to engage with the mineral proposers to discuss potential mitigations if appropriate. The temporary construction impacts on candidate minerals sites (**medium sensitivity**) are considered to be very small, which would result in a **negligible effect** on candidate minerals sites which is considered **not significant.**

5.5.20 Dewatering during construction could affect groundwater due to potential changes in groundwater levels and flows, which could have a potential impact on surrounding sensitive receptors, such as groundwater abstractions. However, it was concluded that for areas of new overhead line and open-cut trenches, the temporary construction impacts on groundwater and groundwater receptors (**very high to negligible sensitivity**) would be very small. This would result in a **negligible effect** which would be **not significant**.

5.5.21 At trenchless crossing locations, the assessment has concluded that for HDD or the direct pipe method of installation, either dewatering is not anticipated to be required or there are no groundwater receptors within the radius of influence of any potential drawdown from dewatering and therefore impacts on sensitive groundwater abstractions are not anticipated. In relation to the pipe jacking method of installation, dewatering that actively lowers the groundwater table is unlikely to be required, therefore there is unlikely to be an impact on sensitive groundwater receptors. Therefore, within the areas of trenchless crossing, the temporary construction impacts on groundwater and groundwater receptors (**very high to negligible sensitivity**) would be very small. This would result in a **negligible effect** which would be **not significant.**

5.5.22 Following completion of ground investigation, including groundwater monitoring and the detailed design of the Project, if dewatering is proposed for any locations not previously anticipated, then a Hydrogeological Risk Assessment will be undertaken in accordance with commitment GH11 in the Outline CoCP (document reference 7.2). Therefore, the temporary construction impacts on groundwater and groundwater receptors would be very small. This would result in **negligible effects** which would be **not significant**.

5.5.23 The assessment has concluded that with appropriate mitigation measures in place, the temporary construction impacts on groundwater and groundwater receptors are considered to be very small, which would result in a **negligible effect**, which would be **not significant**.

Operation (and Maintenance)

5.5.24 During operation (and maintenance), the Project infrastructure would be in place permanently. It has been concluded that there would be no change from the baseline conditions on Sites of Geological Importance (**very high and medium sensitivity**), which would result in **no effect**, which would be **not significant**.

5.5.25 Less than 1.5% of Mineral Safeguarding Areas / Mineral Consultation Areas would be affected. Given the small proportion of the mineral resource areas that would be crossed, the effects on mineral resources are considered to be very small. For safeguarded minerals resources (**medium sensitivity**), this would result in a **negligible effect** which is considered **not significant**.

5.6 Health and Wellbeing

Scope

5.6.1 The scope of the Health and Wellbeing assessment covers the effects on the following during construction and operation (and maintenance):

- Health-related environmental change (for example, air quality, noise, traffic, and transport related effects), drawing on the assessments of other environmental topics as presented in the ES
- Mental health and wellbeing, including the perceptions of impacts from Electric and Magnetic Fields (EMFs) arising from the Project.

5.6.2 The assessment presents information on the potential impacts to health and wellbeing for receptors including the general population and vulnerable groups / communities (for example those defined by characteristics such as age, ethnic diversity, economic status, disability, sex / gender) who may be disproportionately affected by such changes. The assessment also makes reference to the potential residual effects of the Project related to health inequalities, i.e. the differences in health status or the distribution of health resources across different population groups.

Study Area

5.6.3 In the absence of any standard guidance, the Study Areas for the Health and Wellbeing assessment has been defined using professional judgement and experience of other similar linear projects.

5.6.4 A Wider Study Area is defined by the boundaries of the LPAs in which the Project is located. In order to provide a more detailed basis for assessment, a Local Study Area has been identified which comprises wards that intersect with the Order Limits.

5.6.5 The Health and Wellbeing assessment also takes account of the Study Areas of related topics that may affect environmental change, notably Chapter 6: Agriculture and Soils (document reference 6.6), Chapter 7: Air Quality (document reference 6.7), Chapter 13: Landscape and Visual (document reference 6.13), Chapter 14: Noise and Vibration (document reference 6.14), Chapter 15: Socio-economics, Recreation and Tourism (document reference 6.15), and Chapter 16: Traffic and Transport (document reference 6.16).

Existing Baseline

5.6.6 Baseline information has been gathered from desk-based sources. The overall population across the Wider Study Area shows a general upward trend in population across the region. Population density is generally low, reflecting the rural nature of the Study Area.

5.6.7 The Local Study Area is less ethnically diverse than England as a whole, with Thurrock (Section H) showing the greatest diversity, and having the only ward (Little Thurrock Blackshots) which is more ethnically diverse than England.

5.6.8 Generally, the Local Study Area shows a lower level of deprivation when compared to England as whole. Tendring (Section C) has the highest level of income deprivation and child poverty within the Local Study Area. With the exception of Brentwood (Section G), all the LPAs within the Wider Study Area have a higher-than-average rate of fuel poverty.

5.6.9 In terms of economic activity, all wards in Thurrock (Section H) have higher levels of economic activity than the England average, whereas all wards in South Norfolk (Section A) and the north of Mid Suffolk have less economically active populations.

5.6.10 All the LPAs in the Wider Study Area have a lower rate of unemployment than England as a whole, with the exception of Tendring (which is roughly equal to that for England) and Thurrock (which is higher).

5.6.11 Health indicators across the Local Study Area show a varied composition in comparison to the national context. Across the Local Study Area, there is generally a similar or lower rate of childhood obesity when compared to England as a whole. By Year 6, all the LPAs record childhood obesity rates in line with or lower than the average for England. The percentage of physically inactive adults within the Local Study Area is generally in line with the England average.

5.6.12 In relation to mental health and wellbeing, the happiness measure, across the Wider Study Area, is generally in line with or higher than the England average, with the exception of Colchester City Council, which falls 0.8 below the England average. On the life satisfaction measure, the LPAs areas of Tendring, Braintree and Basildon rank the lowest, falling below the England average.

5.6.13 Crime rates for public order offences are generally low throughout the Wider Study Area.

5.6.14 Baseline data has been used to inform the sensitivity to change of communities living in those wards which intersect with the Order Limits. A series of health-related indicators has been reviewed for individual wards.

Mitigation

5.6.15 Embedded measures relevant to Health and Wellbeing include:

- Sensitive routeing and siting to avoid and reduce as far as practicable effects on identified environmental and socio-economic receptors, such as centres of population and community, healthcare and education facilities
- The Project has been designed in accordance with National Grid design standards and complies with the guidelines and policies relating to EMF as stated in NPS EN-5 (DESNZ, 2024b), including the International Commission on Non-Ionizing Radiation Protection guidelines (ICNIRP, 1998)
- The Project has been designed to comply with design safety standards including the NETS SQSS and the suite of National Grid policies and processes which contain details on design standards required to be met when designing, constructing, and operating its projects
- New permanent Non-Motorised User (NMU) routes are proposed at two locations in order to mitigate impacts arising from the expected increase in construction traffic. The NMU routes along Bentley Road and Ardleigh Road in Essex and Hoford Road in Thurrock would comprise an off-road path to separate vulnerable users from the construction traffic
- The Project includes the rationalisation of existing electricity transmission infrastructure, with several existing overhead and underground third-party services requiring diversion, removal, undergrounding, or other protection to facilitate the Project.

5.6.16 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to Health and Wellbeing. Interactions with PRoWs would be managed in line with measures outlined in the Outline PRoW Management Plan (document reference 7.6) to manage potential effects on PRoWs and users of PRoWs. The Outline CTMP (document reference 7.3) details National Grid's proposals for minimising disruption from construction activities to existing users on the public highway network and properties adjacent to it. The Outline CTMP (document reference 7.3) will be adopted by the appointed Main Works Contractor(s) and will inform the Final CTMP, a comprehensive and overarching management procedure which they will follow.

5.6.17 There are no additional mitigation measures proposed to minimise effects on Health and Wellbeing, beyond the embedded and standard measures identified above.

Residual Effects

Construction

Health Effects

5.6.18 The Project would result in a **negligible** and **not significant** effect on health for both general and vulnerable population groups as a result of air quality effects during construction.

5.6.19 Chapter 14: Noise and Vibration (document reference 6.14) identifies no significant effects in relation to construction noise as a result of construction activities. However, the chapter identifies a large (negative) magnitude impact for PAR 30 (Bentley Road) in relation to noise as a result of construction traffic. However, the chapter identifies a large (negative) magnitude impact for PAR 30 (Bentley Road) in relation to noise as a result of construction traffic. From a health perspective, any health effect is likely to be experienced at individual rather than at population level. The magnitude of impact on health is therefore considered to be very low with a resulting **negligible and not significant** effect across all wards for both general and vulnerable populations.

5.6.20 Whilst there is scientific evidence that identifies a link between visual change and health outcomes, during construction this is not considered to result in extensive change and health deprived populations would not be disproportionately affected. Therefore, a **minor adverse** (**not significant**) health effect is anticipated as a result of changes in visual amenity during construction for the general population and vulnerable groups.

5.6.21 The Project would result in a **negligible** (**not significant**) health effect as a result of changes in community traffic (road safety) during construction for the general population and vulnerable groups.

5.6.22 In relation to access to social infrastructure, the health effect would be **negligible** and **not significant** for both general population and vulnerable populations.

5.6.23 The change in agricultural land availability during construction of the Project is likely to be very small in the national context, therefore the significance of effect is **negligible** and **not significant** for both general and vulnerable population groups in relation to food security.

5.6.24 In terms of access to jobs and training, there is a clear relationship between good quality employment and factors that promote health or are protective against poor health, particularly mental health. However, the number of new local employment opportunities that would be provided over the course of the construction period is low. Although individuals may therefore benefit, at population level the magnitude of effect for both general and vulnerable populations is low, resulting in **a negligible** and **not significant** effect.

5.6.25 A number of significant adverse impacts have been identified in Chapter 15: Socio-economics, Recreation and Tourism (document reference 6.15) (for example in relation to acquisition of land currently used for recreational purposes or in relation to length of diversion routes for PRoWs), however, the effects of the Project on physical activity are considered to be **negligible (not significant)** for the general population and **minor adverse (not significant)** for vulnerable groups.

Mental Health and Wellbeing

5.6.26 The Project is not likely to have an impact on an individual's ability to make healthy choices or to access opportunities for self-help. Similarly, the Project is not likely to have an impact in relation to improving control associated with lifestyle changes as a result of changes in employment or financial security due to the relatively small number of construction jobs that the Project is likely to create.

5.6.27 The Project is not likely to have an impact on people's cognitive/social functioning, spirituality or opportunity for arts and creativity. Participation in key life activities, community or social activities and the continuation of social networks are not

anticipated to be affected during construction. The Project is not likely to have any impact on challenging the stigma of mental illness or challenging discrimination. The Project is not likely to have an impact on people's ability to trust others, feel safe at home or engender positive identities.

5.6.28 Overall, **no likely significant effects** are identified in the ES (Volume 6 of the DCO application).

Operation (and Maintenance)

5.6.29 Operational noise from overhead lines is scoped out of the ES (Volume 6 of the DCO application) in accordance with the Scoping Opinion (document reference 6.20), on the basis that a low noise conductor system is proposed. The proposed overhead line system would use 'triple Araucaria' conductors or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons for reducing operational noise. This would be regarded as practically quiet and assessed as **very low and not significant**. The Project would result in a **negligible and not significant** effect on health for both general and vulnerable population groups as a result of operational noise. The assessment is based on early design information and standard noise mitigation measures. Further detailed design will be undertaken, including consideration of specific noise mitigation measures.

5.6.30 There are likely to be individuals in every ward intersecting with the Order Limits who experience some degree of impact on their mental health and wellbeing (for example anxiety or stress) due to the operation (and maintenance) phase of the Project. There is scientific evidence that identifies a link between visual change and health outcomes; there is also evidence that suggests habituation and adaptation with time. However, the change is not considered to be at a significant scale or to disproportionately affect health deprived populations. This results in **a minor adverse (not significant)** health effect for both the general population and vulnerable groups.

5.6.31 In relation to perceived effects of EMF during operation (and maintenance), the significance of effect would be **minor adverse** for the general population (**not significant**) and **minor to moderate adverse** for vulnerable groups (a moderate adverse effect would be significant). Significance would likely be reduced to **minor adverse (not significant)** through the introduction of suggested measures relating to communication and public education activities.

5.7 Historic Environment

Scope

5.7.1 The Historic Environment assessment considers the likely significant effects on the following:

- Direct physical effects on archaeology during construction (including from movement of contaminants or pollutants and permanent changes to groundwater flows as a result of underground cabling)
- Setting and indirect effects on archaeology during construction and operation (and maintenance)
- Setting and indirect effects on built heritage during construction and operation (and maintenance)
- Indirect physical effects on built heritage as a result of vibration or subsidence caused by changes to groundwater during construction and operation (and maintenance)
- Direct physical effects on designated historic landscapes (comprising registered parks and gardens) and non-designated historic landscapes during construction
- Setting effects on designated historic landscapes (comprising registered parks and gardens) during construction and operation (and maintenance).

Study Area

5.7.2 The Study Area for the Historic Environment comprises the Order Limits plus a 250 m buffer for non-designated heritage assets. In addition, two wider Study Areas have been defined:

- 2 km from the Order Limits - for all designated heritage assets (scheduled monuments, Grade I, II* and II listed buildings, Grade I, II* and II registered parks and gardens and conservation areas)
- Up to 3 km from the Order Limits - for designated assets of the highest value (scheduled monuments, Grade I and II* listed buildings and Grade I and II* registered parks and gardens).

5.7.3 In certain locations, and in accordance with the approach for the Landscape and Visual Impact Assessment (LVIA), including the Zone of Theoretical Visibility (ZTV), the 2 km and 3 km Study Areas have been increased, for example where topography allows for more distant views. This is to ensure that heritage assets, where their setting could be affected, are included in the assessment.

Existing Baseline

5.7.4 The baseline has been informed by a desk study which has drawn on information sources including Historic Environment Record (HER) data (Norfolk County Council, Suffolk County Council, Essex County Council, Colchester City Council), Historic England's National Heritage List for England (https://historicengland.org.uk/listing/the-list/data-downloads/) and historic maps/aerial photography. A site walkover of the Order Limits and setting survey of

designated assets within the Study Areas has also been undertaken to inform the baseline and assessment in the ES.

5.7.5 In support of the DCO application, and in consultation with the archaeological advisors to the Local Planning Authorities and Historic England, certain portions of the Project were also identified as 'priority areas' for archaeological evaluation fieldwork. The selection of the priority areas was based on the scale of the potential impact of the Project construction works, and the future ability for detailed design to microsite to avoid or reduce impacts to archaeology. On this basis, the underground cable, CSE compounds, substations and temporary construction compound works were identified as priority areas for geophysical survey and archaeological trial trenching. For geophysical survey, HER data and analysis of aerial photography and satellite imagery undertaken by the Project also identified areas with high archaeological potential that may represent medium or high value below ground assets within the Order Limits, and these locations were also identified as priority areas. The geophysical survey commenced in summer 2023 and archaeological trial trenching has been ongoing since autumn 2024. Geoarchaeological and archaeological monitoring and assessment of Ground Investigation works to date has also been undertaken.

Designated Heritage Assets

5.7.6 There are no World Heritage Sites and no registered battlefields within the Study Area.

5.7.7 Scheduled monuments are nationally important heritage assets designated for their archaeological interest. The 13 scheduled monuments that are within the 3 km Study Area and which are included in the ES (Volume 6 of the DCO application) assessment are counted by Project section below:

- Section A - one
- Section B - one
- Section C - three
- Section E - two
- Section F - one
- Section G - two
- Section H - three.

5.7.8 Listed buildings are nationally important heritage assets designated for their historical and aesthetic interest. The 478 listed buildings that are within the 3 km Study Area and which are included in the ES (Volume 6 of the DCO application) assessment are counted by Project section below:

- Section A - 44
- Section B - 128
- Section C - 66
- Section D - 64
- Section E - 55

- Section F - 71
- Section G - 31
- Section H - 19.

5.7.9 Conservation areas are nationally important heritage assets designated for their historical and aesthetic interest. The 12 conservation areas that are within the 2 km Study Area and which are included in the ES (Volume 6 of the DCO application) assessment are counted by Project section below:

- Section A - two
- Section B - two
- Section C - two
- Section D - one
- Section F - two
- Section G - two
- Section H - one.

5.7.10 Registered parks and gardens are nationally important heritage assets designated for their historical and aesthetic interest. The single registered park and garden that is within the 3 km Study Area and which is included in the ES (Volume 6 of the DCO application) assessment is Langleys Grade II registered park and garden (Section F).

Non-Designated Heritage Assets

5.7.11 The 1,252 non-designated heritage included in the ES (Volume 6 of the DCO application) assessment are of prehistoric through to modern date and are counted by Project section below:

- Section A - 252 assets of medium to negligible value
- Section B - 320 assets of high to negligible value
- Section C - 150 assets of high to negligible value
- Section D - 172 assets of medium to negligible value
- Section E - 107 assets of medium to negligible value
- Section F - 100 assets of high to low value
- Section G - 85 assets of medium to low value
- Section H - 66 assets of high to negligible value.

Mitigation

5.7.12 Embedded measures relevant to Historic Environment include:

- Sensitive routeing and siting - Avoid and reduce as far as practicable effects on identified heritage assets
- Use of low height pylons for the section of overhead line that passes between Great Waltham Conservation Area/ Langleys registered park and garden and

Little Waltham Conservation Area, to reduce visibility of the alignment from Langleys House and more distant elements of the conservation areas and park and garden

- Underground cable - Underground cables are proposed in four locations, including through the Dedham Vale National Landscape. The Dedham Vale National Landscape is a nationally important and designated landscape. With the proposed underground cable, the effects on views and setting would be reduced. This would also reduce effects on the setting of heritage assets located within the National Landscape although this would increase the area of potential physical impact for buried archaeology.

5.7.13 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to the Historic Environment.

5.7.14 For archaeology the process, guiding principles and methods for the planning and implementation of additional archaeological mitigation works (and any post-consent archaeological work) is specified through an Outline Archaeological Mitigation Strategy and Outline Written Scheme of Investigation (AMS-OWSI) (document reference 7.5). That document details the types of additional archaeological mitigation proposed to reduce the effect of the Project on archaeological remains and also presents the approach to engagement and approvals, project management, and the post-excavation analysis and publication stages.

Residual Effects

Construction

5.7.15 The construction phase of the Project is predicted to result in a range of effects on heritage assets, some of which are assessed as significant and some not significant.

5.7.16 A total of 157 designated heritage assets (15 in Section A, 48 in Section B, 10 in Section C, 23 in Section D, 33 in Section E, eight in Section F, 13 in Section G, and six in Section H) are predicted to experience a **medium** or **high adverse** magnitude of impact resulting in a temporary **moderate adverse** significance of effect (which is **significant**) due to changes in their settings that affect their value during the construction phase of the Project.

5.7.17 A total of 306 designated heritage assets (29 in Section A, 47 in Section B, 59 in Section C, 44 in Section D, 24 in Section E, 67 in Section F, 20 in Section G and 16 in Section H) are expected to experience a **negligible/low adverse** magnitude of impact resulting in a temporary **minor/negligible adverse** residual significance of effect, which is **not significant**, due to changes in their setting that affect their values during the construction phase of the Project.

5.7.18 One grade II listed building would experience a **low beneficial** impact resulting in a temporary **minor beneficial** residual significance of effect (**not significant**) due to changes in setting that affect its value during the construction phase of the Project.

5.7.19 A total of 76 high or medium value non-designated assets (eight in Section A, 35 in Section B, five in Section C, 13 in Section D, four in Section E, five in Section F and six in Section H) are predicted to experience a **medium adverse** magnitude of impact resulting in a **moderate adverse** significance of effect (which is **significant**) due to changes in their settings that affect their values or due to physical impacts during the construction phase of the Project.

5.7.20 A total of 120 high or medium value non-designated heritage assets (27 in Section A, 40 in Section B, 23 in Section C, none in Section D, 10 in Section E, nine in Section F, five in Section G and six in Section H) are expected to experience a **negligible/low adverse** magnitude of impact resulting in a temporary **minor/negligible adverse** residual significance of effect, which is **not significant,** due to changes in their setting that affect their values or due to physical impacts during the construction phase of the Project.

5.7.21 As detailed in Appendix 11.2 Historic Environment Assessment Tables (document reference 6.11.A2) there are other non-designated assets of negligible or low value that would experience permanent residual not significant effects due to physical impacts.

5.7.22 There are no impacts to historic landscapes in any Project Section which result in significant effects.

Operation (and Maintenance)

5.7.23 A total of 41 designated heritage assets (two in Section A, 11 in Section B, one in Section C, 12 in Section D, three in Section E, four in Section F, six in Section G, and two in Section H) are predicted to experience a **medium adverse** magnitude of impact resulting in a permanent **moderate adverse** significance of effect, which is **significant**, due to changes in their settings that affect their values during the operation (and maintenance) phase of the Project.

5.7.24 A total of 384 designated heritage assets (45 in Section A, 84 in Section B, 53 in Section C, 33 in Section D, 51 in Section E, 71 in Section F, 28 in Section G and 19 in Section H) are expected to experience a **negligible/low adverse** magnitude of impact resulting in a permanent **minor/negligible adverse** residual significance of effect, which is **not significant**, due to changes in their settings that affect their values during the operation (and maintenance) phase of the Project.

5.7.25 **Low beneficial** impacts resulting in a permanent **minor beneficial** residual significance of effect (**not significant**) are predicted at the following assets due to changes in setting their settings that affect their values during the operation (and maintenance) phase of the Project:

- Section B – one high value Grade I listed building, five medium value Grade II listed buildings
- Section E - two medium value grade II listed buildings

5.7.26 A total of 29 high or medium value non-designated assets (eight in Section A, eight in Section B, seven in Section D, three in Section F, and three in Section H) are predicted to experience a **medium adverse** magnitude of impact resulting in a permanent **moderate adverse** significance of effect, which is **significant**, due to changes in their settings that affect their values during the operation (and maintenance) phase of the Project.

5.7.27 A total of 130 high or medium value non-designated heritage assets (30 in Section A, 53 in Section B, eight in Section C, five in Section D, 13 in Section E, ten in Section F, five in Section G and six in Section H) are expected to experience a **negligible/low adverse** magnitude of impact resulting in a permanent **minor/negligible adverse** residual significance of effect, which is **not significant,** due to changes in their settings that affect their values during the operation (and maintenance) phase of the Project.

5.7.28 **Low beneficial** impacts resulting in a permanent **minor beneficial** residual significance of effect (**not significant**) are predicted at the following assets due to changes in setting their settings that affect their values during the operation (and maintenance) phase of the Project:

- Section B - three medium value Suffolk HER assets
- Section C – two medium value Suffolk HER assets

5.8 Hydrology, Land Drainage and Flood Risk

Scope

5.8.1 The scope of the Hydrology, Land Drainage and Flood Risk assessment covers the effects on the following:

- Hydromorphology, surface water quality and existing water interests (abstractions and discharges) during construction
- Land drainage (including agricultural drainage) and flood risk from all relevant sources, during construction and operation (and maintenance).

Study Area

5.8.2 A desk study has been undertaken to inform the assessment which includes the area within the Order Limits and extends to a 500 m buffer around the Order Limits. This is considered an appropriate Study Area based on the nature of Project construction and operation (and maintenance) activities and technical knowledge of similar schemes.

5.8.3 The assessment has been supported by information gathered during the aquatic ecology surveys and surveys of watercourses at proposed crossing locations, which are ongoing. The information collected has informed the Project's approach to watercourse crossings and the additional data that will be gathered will be used by the Main Works Contractor(s) to shape the detailed designs of these crossings.

Existing Baseline

5.8.4 There are 38 main rivers in the Study Area, 26 of which are crossed by the Order Limits. There are also numerous tributaries of these rivers in the Study Area, which are classified as ordinary watercourses. There are numerous ponds and lakes, some of which are part of sites designated for nature conservation. Where surface waters play a key role in sustaining the designated interest features of these sites, they have been included as a receptor in the assessment, and potential effects have been assessed in collaboration with the Project ecologists.

5.8.5 There are a number of main rivers crossed by the Order Limits and located within the Study Area. There are no canals in the Study Area.

5.8.6 The Study Area also covers the catchments of several WFD surface waterbodies. The WFD classifications for these are informed by Environment Agency monitoring of a range of parameters that are indicators of riverine health.

5.8.7 Most of the Study Area is in a Drinking Water Safeguard Zone (surface water) as defined by the Environment Agency.

5.8.8 There are multiple consented discharges to watercourses in the Study Area from single and groups of domestic dwellings, involving small volumes; and several consents for larger volumes of discharges from wastewater pumping stations and treatment works.

5.8.9 The majority of the Project, including the new substations, proposed works to existing substations and the CSE compounds, would be located within Flood Zone 1 (where there is an annual chance of flooding from rivers and the sea of less than 1 in 1,000 (0.1%)). The Wenham Grove CSE compound is partially situated in Flood Zone 3 (an annual chance of flooding from rivers of 1 in 100 (1%) or greater or with an annual chance of flooding from the sea of 1 in 200 (0.5%) or greater). However, this CSE would be situated within the defined LoD to avoid Flood Zone 3. The proposed temporary construction compounds would also be within Flood Zone 1.

5.8.10 The majority of the permanent Project infrastructure would be located outside of the areas shown to be at 'high' risk of surface water flooding in the Environment Agency Risk of Flooding from Surface Water map. Of the places where the Project interacts with the high risk zone for operation, the majority of these are access roads. However, the Tilbury North Substation and Tilbury North (Tilbury side) CSE compound would be located where the mapping indicates there are existing surface water overland flow routes.

5.8.11 A small number of pylons are proposed within river floodplains, for which compensatory storage would be provided, whereby the volume of storage that is lost for floodwaters is recreated by the Project by locally lowering ground levels. For pylons in the floodplain, associated floodplain storage losses have been calculated, and indicative floodplain storage compensation areas have been identified.

5.8.12 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 and river flows. These future conditions are considered to factor in resilience into the Project's design.

Mitigation

5.8.13 Embedded measures for Hydrology, Land Drainage and Flood Risk include:

- The Project has avoided sensitive features, such as the floodplains of watercourses, through the corridor and routeing studies where practicable
- Pylons would be located a minimum of 8 m from the top of bank of any designated main river and a minimum of 3.5 m from the top of bank of any ordinary watercourses
- For access roads and haul roads, the Project requires the crossing of multiple ditches, drains and watercourses. Large or sensitive watercourses, for example those designated as main river, and those with WFD status, would be crossed by the haul roads using temporary clear span bridges. Soffit heights at clear span crossings would be set on a site specific basis, following more detailed survey and design work by the appointed Main Works Contractor(s). On watercourses achieving High or Good WFD status for aquatic invertebrates, soffit heights would be set as high as practicable above the Q95 water level (indicative of a summer, low flow condition), accounting for site specific constraints

- Surface water runoff from construction sites, haul roads and operational assets would be managed using Sustainable Drainage Systems (SuDS) techniques appropriate to local conditions.

5.8.14 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures relating to Hydrology, Land Drainage and Flood Risk.

5.8.15 Additional mitigation comprises measures over and above any embedded and standard mitigation measures, for which assessment within this ES (Volume 6 of the DCO application) has identified a requirement to further reduce significant environmental effects.

5.8.16 Any works with the potential to affect the floodplain or flow regime of a main river would be subject to consent under the Environmental Permitting (England and Wales) Regulations 2016. Powers to undertake works with potential to impede land drainage or the flow regime of any ordinary watercourse would be within the draft DCO (document reference 3.1), following agreement of protective provisions with the land drainage authorities.

5.8.17 The Flood Risk Assessment (document reference 7.9) describes the proposed mitigation measures/commitments to ensure no detrimental effects on flood risk from rivers and the sea or the functioning of flood defences. This includes the provision of compensatory storage for any losses of floodplain storage (up to the 1% annual chance plus climate change flood event) due to the construction of proposed pylons and flood defence monitoring (where established as necessary in consultation with the Environment Agency) to enable detection of any effects on the structural integrity/condition of flood defence assets during construction of the Project.

5.8.18 There is an existing abstraction point (AN/036/0018/002) for spray irrigation on the River Stour in the vicinity of the eastern of the proposed River Stour crossings. As per the Outline CoCP (document reference 7.2), the Project would avoid irrigation pipes where practicable or provide alternative supplies where temporary interactions are unavoidable.

Residual Effects

5.8.19 The assessment concluded that there are no likely significant residual effects in relation to Hydrology, Land Drainage and Flood Risk receptors during construction or operation (and maintenance).

Construction

Watercourses – Water Quality and Hydromorphology

5.8.20 During construction, new crossings of watercourses would be required for temporary access and could result in channel bed/ bank modifications, causing disruption to flow regimes and effects on hydromorphology and an associated risk of pollution from construction traffic using these temporary access routes, for example linked to mud from tyres. Other construction activities with a risk of opening pollution pathways to water environment receptors include the dewatering of excavations and drilling for trenchless crossings.

5.8.21 All watercourse crossing designs would follow the standard mitigation measures set out in the Outline CoCP (document reference 7.2). Pollution risks and the potential negative effects of the temporary watercourse crossings such that a **negligible**

effect is assessed on the water quality attributes of watercourses (assigned a value of high to medium). This results in a **negligible significance** of effect, which is **not significant**.

5.8.22 Whilst temporary negative effects on the hydromorphology of the watercourses that are crossed by culverts cannot be avoided, the design of temporary crossings would reduce temporary effects on the watercourses' flow regimes and channel forms. For the watercourses assigned medium sensitivity for hydromorphology, this corresponds to a **minor significance** of effect. For the watercourses assigned low sensitivity for hydromorphology, this corresponds to a **negligible significance** of effect. These are **not significant** in EIA terms. For the larger watercourses to be crossed by clear span bridges (for example those with WFD status) a **negligible impact** is assessed on their hydromorphology attributes (assigned high to low value). This results in a **negligible significance** of effect, which is **not significant**.

5.8.23 There would be limited physical disturbance to the channels, beds, riparian corridors, or flow regimes of watercourses in the overhead line sections or from third party infrastructure works. The River Stour is the only main river that would be crossed by the cable sections, and it would be crossed using a trenchless technique. **No change** to the hydromorphology of the River Stour (medium sensitivity) is anticipated as a result of cable crossing.

5.8.24 The other watercourses that would be crossed by the cables would be ordinary watercourses. The crossing designs would adhere to standard mitigation measures. For the ordinary watercourses that would be crossed by the cable with an open cut methodology, a temporary **minor adverse** impact is assessed. This corresponds to a **minor adverse significance** of effect or **negligible significance** of effect for watercourses assigned medium or low sensitivity for their hydromorphology attributes respectively, which are **not significant**.

5.8.25 Soil stripping and the subsequent stockpiling and storage of soil could cause deterioration of surface water quality through generation of silted or polluted runoff. The protocols described in the Outline CoCP (document reference 7.2) would manage worksite runoff and reduce the potential for pollution via this pathway. Material storage areas would be located outside of the fluvial floodplain where practicable. A **negligible impact** is therefore assessed which corresponds to a **negligible significance** of effect on surface water receptors (watercourses, ponds, lakes and Ardleigh Reservoir) assigned high to low sensitivity for their water quality attributes. This is **not significant**.

5.8.26 The majority of CSE compounds, temporary construction compounds and substation works are not located near watercourses and other surface water bodies. Therefore, there are no pathways for potential pollutants arising from construction activities at most locations to reach surface water receptors. Where work near receptors is unavoidable, good practice pollution prevention and water quality safeguarding measures would be in place. For construction works near watercourses, a **negligible significance** of effect on water quality is assessed **(not significant)**. For construction works not located near watercourses, **no change** to their water quality attributes is expected.

Sites Designated for Nature Conservation

5.8.27 Potential pathways for effects on sites designated for nature conservation with a surface water hydrological link could occur through changes to water quality as well as changes to flow in the watercourses and drainage regimes that support the sites. With standard mitigation measures in place, **negligible significance** of effect, which is **not significant**.

Flood Risk and Drainage

5.8.28 There is the potential for the Project to increase flood risk during construction through the creation of soil stockpiles and temporary works areas, which could result in the temporary loss of floodplain storage or could impede flood flows. With embedded and standard mitigation measures in place, the change to fluvial and tidal flood risk during construction is assessed to be of **minor adverse significance** of effect for the River Stour and a **negligible significance** for the other watercourses (not significant). For people and existing development within the floodplain, a minor adverse to **negligible significance** of effect is assessed **(not significant)**.

5.8.29 In terms of effects on 'people / existing development within the floodplain', there would be a **minor adverse significance** of effect for the very high and high sensitivity receptors (essential infrastructure, highly vulnerable or more vulnerable development) and a **negligible significance** for the medium sensitivity receptors (less vulnerable development), which is **not significant**.

5.8.30 There would be changes to land surface permeabilities at the substations, CSE compounds and at permanent access tracks which could disrupt the current land drainage regime. The Project would introduce new areas of temporary impermeable land cover, such as temporary construction compounds and haul roads, along the cable section and roads providing access to pylons, along with topsoil stripping and earthworks. Temporary measures would be put in place to maintain such drainage routes during construction, then the systems would be reinstated post-construction. This is assessed as a **negligible significance** of effect on the land drainage regime , which is **not significant**.

5.8.31 Access roads, haul roads and compound areas would have suitable drainage provisions, providing for attenuation of runoff and encouraging infiltration of surface water runoff to ground (for example, French drains).

5.8.32 A **negligible significance** of effects is also assessed in relation to works for third party infrastructure, which is **not significant**.

5.8.33 The construction of the Project is unlikely to increase flood risk from groundwater and, given dewatering arrangements that would be in place where required, the Project is anticipated to have low vulnerability to flooding from groundwater. Effects on baseline groundwater flood risk are anticipated to be **neutral** and **not significant**.

Operation (and Maintenance)

Flood Risk and Drainage

5.8.34 Flood risk and land drainage effects during operation (and maintenance) have been avoided through design, such as the reinforcement would generally be elevated (overhead line) or buried (underground cable) and locating the CSE compounds in Flood Zone 1 (the lowest risk of the three categories of flood risk, as defined by the

Environment Agency). Permanent above ground infrastructure for the Project in the floodplain would be limited to a small number of the pylons for the overhead line.

5.8.35 The Flood Risk Assessment (document reference 7.9) outlines the proposed mitigation measures/commitments to ensure the Project is safe from flooding over its lifetime and that there are no detrimental effects on flood risk from rivers and the sea.

5.8.36 **No impacts** are therefore anticipated on the local land drainage regime nor on the flood flow storage or conveyance attributes of watercourses (assigned very high for the River Stour, high for the remainder of the main rivers and medium to low for the ordinary watercourses). Effects therefore would be **not significant**.

5.8.37 In terms of effects on 'people / existing development within the floodplain', **no change** to flood risk is anticipated during operation (and maintenance) given the proposed mitigation measures/commitments. Effects therefore would be **not significant**.

5.8.38 Surface water runoff from the CSE compounds, substations and any permanent access roads would be drained using appropriate SuDS techniques to meet with LLFA discharge requirements. The change to the land drainage regime (assigned medium sensitivity) is assessed to be **negligible** and effects would be of **negligible significance** which are **not significant**.

5.8.39 The Project is considered to be of low vulnerability to groundwater flooding during operation (and maintenance) and is not anticipated to increase risk of flooding from this source. Effects on baseline groundwater flood risk are anticipated to be **neutral** and **not significant**.

5.8.40 No operational flood risk impacts associated with the third party infrastructure works are anticipated.

5.9 Landscape and Visual

Scope

5.9.1 The Landscape and Visual assessment has considered the likely significant effects of the Project on landscape and visual amenity, during construction and operation (and maintenance). The following receptors were considered:

- Effects on visual amenity, including effects upon potential receptors (people) and viewing groups caused by changes in the appearance of the landscape, as follows:
  - Effects on visual receptors at settlements / communities / groups of properties
  - Effects on receptors travelling on roads
  - Effects on recreational receptors, including users of PRoWs and long-distance routes and visitor attractions
  - Effects on visual receptors at representative viewpoints
- Effects on landscape character and resources, including effects upon the physical elements (e.g. landform or vegetation), character and/or qualities of the landscape, with reference to Landscape Character Areas (LCAs) and Landscape Character Types (LCTs)

- Effects on designated landscapes – Dedham Vale National Landscape
- Effects on designated landscapes, landscape character and visual amenity at night due to the potential effects of lighting (where applicable)
- Effects on visual amenity for individual properties and groups of properties, considered in a Residential Visual Amenity Assessment.

Study Area

5.9.2 The LVIA Study Area was determined by the nature and scale of the Project and the nature of the surrounding area and considers the landscape and/ or views from where there is the potential for a significant effect to arise as a result of the Project. The LVIA Study Area encompasses the following:

- 3 km from lateral/ longitudinal LoD for the 400 kV overhead line, underground cable route, Bramford, the new EACN and new Tilbury North Substations, and 400 kV and 275 kV CSE compounds (with some viewpoints considered up to 5 km)
- 2 km from lateral LoD for the 132 kV overhead line removal
- 1 km from lateral LoD for the 132 kV underground cable route and EACN Substation permanent access road.

Existing Baseline

5.9.3 Desk studies were supplemented by field survey work which was carried out during multiple visits under differing weather conditions. Records were made in the form of field notes and photographs. Field survey work included visits to the Order Limits, viewpoints and designated landscapes, and extensive travel around the Study Area to consider likely effects on landscape character and on experiences of views seen from designated landscapes, settlements / communities, and routes. Field work was undertaken in all seasons to fully understand the maximum level of visibility as part of the Landscape and Visual baseline.

Landscape Character

5.9.4 The landscape varies within the Study Area. In landscape character terms, the Study Area typically comprises a flat to gently undulating plateau, dissected by the valleys of major rivers and their tributaries. These valleys include the Tas Valley (Section A), Waveney Valley (Sections A and B), Gipping Valley (Section B), Stour Valley (Section C), Colne Valley (Section D), Blackwater and Brain Valleys (Section E), and Ter, Chelmer and Can Valleys (Section F). In Section H the landscape is characterised by its extensive tracts of flat land, and forms part of a low-lying coastal landscape in its southern extents.

Designated Landscapes

5.9.5 The River Stour and its enclosing valley sides and plateau edge form part of the Dedham Vale National Landscape. The National Landscape is a lowland river valley landscape, located on the Essex / Suffolk border. It covers the lower reaches of the River Stour and is very low-lying, with the valley floor typically lying at between 0 m and 20 m Above Ordnance Datum (AOD), rising to gentle ridges to the north and south, lying at between 30 m and 60 m AOD.

5.9.6 The ‘special qualities’ of the National Landscape are summarised in the Dedham Vale AONB Natural Beauty and Special Qualities and Perceived and Anticipated Risks (Alison Farmer Associates, 2016) as follows:

- ‘*Iconic lowland river valley associated with the artist John Constable RA, the views he painted are still recognisable today;*
- *Historic villages with timber framed housing and prominent churches;*
- *Valley bottom grazing marshes with associated drainage ditches and wildlife;*
- *Naturally functioning River Stour with associated tributaries, meres and historic river management features;*
- *Semi natural ancient woodlands on valley sides and associated wildlife;*
- *Traditional field boundaries intact and well managed;*
- *Apparent and buried archaeology indicating millennia of human occupation;*
- *A sense of relative tranquillity;*
- *Surprisingly long-distance views from higher ground along the valley in an area associated with large skies*’.

Visual Receptors and Views

5.9.7 Visual receptors within the Study Area include residents, both in larger settlements and smaller or scattered communities. Larger settlements and communities include Mulbarton, Forncett End and Diss / Roydon (Section A), Palgrave, Mellis, Gislingham, Mendlesham, Stowupland, Stowmarket, Needham Market and Bramford (Section B), Capel St Mary, Stratford St Mary, Dedham and Ardleigh (Section C), Colchester, Great Horkesley, West Bergholt and Marks Tey (Section D), Coggeshall, Feering, Kelvedon, Silver End, Witham and Black Notley (Section E), Great Leighs, Great and Little Waltham, Roxwell, Writtle and Chelmsford (Section F), Ingatestone, Stock, Billericay, Brentwood, and Basildon (Section G), and Bulphan, Horndon on the Hill, Orsett, Stanford-le-Hope, Chadwell St Mary and East Tilbury (Section H). Visual receptors also include users of the road network, and recreational receptors on PRoWs, long distance paths and cycle routes. Existing views within the Study Area vary considerably, from long-distance and elevated panoramas, to views which are contained by the undulating topography and/or layers of woodland and field boundary vegetation.

Mitigation

5.9.8 Embedded measures are those that are intrinsic to and built into the design of the Project. Those relevant to Landscape and Visual include:

- Sensitive routeing and siting of the alignment and Order Limits – as far as practicable, effects on identified environmental (including landscape and visual, ecology and heritage assets) and socio-economics receptors have been avoided and reduced
- Undergrounding is proposed in four locations, including through the Dedham Vale National Landscape and part of its setting

- Several existing overhead and underground third-party services would be diverted, removed, undergrounded, or protected
- The use of full line tension gantries at CSE compounds and substations (where design allows). The use of full tension gantries removes the need for a bulkier terminal pylon adjacent to the CSE compound which would reduce visual clutter and therefore help to reduce Landscape and Visual effects
- Landscape planting within identified Environmental Areas around CSE compounds, the new EACN Substation, south of the new Tilbury North Substation and the existing Norwich Main Substation and its extension
- Replacement planting
- Consideration of the proposed materials and colour palette for the CSE compounds and new substations / substation extension buildings to be sensitive to the environment they are located in.

5.9.9 The Outline CoCP (document reference 7.2) and Outline LEMP (document reference 7.4) contain relevant mitigation and compensation measures relating to landscape and visual amenity.

5.9.10 National Grid has committed to additional mitigation comprising a 3:1 replacement for individual trees and trees within groups. The tree planting strategy will prioritise replanting within the Order Limits, although offsite provision may be required. Offsite tree planting is considered to be landscape compensation.

Residual Effects

Construction

5.9.11 **Significant adverse** effects related to the introduction of construction activity and equipment, including the loss of some landscape features including farmland and field boundary vegetation are predicted for the LCAs and LCTs within and outside the Order Limits of the Project.

5.9.12 **Significant adverse** effects during construction are predicted for visual receptors within all of the Visual Receptor Areas (VRAs) that would be directly affected by construction activity within the Order Limits, with significant effects expected to extend up to approximately 1.5 km.

5.9.13 Within Dedham Vale National Landscape, construction would **have major and significant adverse** effects on the iconic lowland river valley associated with the painting of artist John Constable and a sense of relative tranquillity. Two of the special qualities would be subject to **major and significant (adverse)** effects during construction: '*Iconic lowland river valley associated with the artist John Constable RA, the views he painted are still recognisable today*', and '*A sense of relative tranquillity*'. Two of the special qualities would be subject to **moderate and significant (adverse)** effects during construction: '*Valley bottom grazing marshes with associated drainage ditches and wildlife*', and '*Naturally functioning River Stour with associated tributaries, meres and historic river management features*'.

Operation (and Maintenance)

5.9.14 At Year 1 of operation, there would be **significant adverse** landscape effects for most of the LCAs and LCTs which would be directly affected by the introduction of the overhead line, CSE compounds or substations/substation extensions. **Significant adverse** effects would also extend to the surrounding landscape, up to a distance of approximately 1.5 km. There would also be **significant adverse** landscape effects along the route of the sections of underground cable, where reinstated vegetation would still be immature. Along the proposed underground cable alignment effects would reduce to **not significant** by Year 15 of operation, due to maturing of the reinstatement planting which would integrate the areas (noting that trees would not be replanted over the cable route). Effects relating to the proposed overhead line, CSE compounds and substations/ substation extensions would remain **significant and adverse** at Year 15 of operation.

5.9.15 At Year 1 of operation, there would be **significant adverse** visual effects related to the introduction of the proposed overhead line, CSE compounds, substations or substation extensions into close to medium distance views on visual receptors within most of the VRAs within the LVIA Study Area. By Year 15 of operation, effects on some visual receptors in proximity to CSE compounds, substations and substation extensions would reduce as a result of landscape mitigation within Environmental Areas, although effects in relation to the proposed overhead line would remain.

5.9.16 Effects on the special qualities of Dedham Vale National Landscape would reduce to **minor and not significant (adverse)** during operation once the underground cables are covered over and land use and landcover reinstated as far as practicable.

5.9.17 People living in residential properties in proximity to the Project would experience a change in views. The Residential Visual Amenity Assessment (RVAA) undertaken for the Project concluded that, although many properties would experience a **high magnitude** of effect, this would not be so great as to breach the 'Residential Visual Amenity Threshold', i.e. permanently affect living conditions or Residential Amenity.

5.10 Noise and Vibration

Scope

5.10.1 The scope of the Noise and Vibration assessment covers the effects from the following sources on noise and vibration sensitive receptors (NSRs), during construction and operation (and maintenance):

- Construction noise
- Construction vibration on people within buildings
- Construction vibration on buildings and structures
- Construction traffic noise
- Noise from proposed overhead lines during operation
- Noise from the proposed new EACN Substation and Tilbury North Substation during operation
- Vibration during operation
- Noise and vibration from substantial maintenance activities.

Study Area

5.10.2 The following Study Areas have been used for the Noise and Vibration assessments:

- Construction Noise: a 300 m buffer from the proposed construction works (based on BS 5228-1 (BSI, 2014a) and Design Manual for Roads and Bridges (DMRB) LA 111 (National Highways, 2020) guidance)
- Construction Traffic Noise: a 50 m buffer from construction traffic routes (based on technical memorandum Calculation of Road Traffic Noise (Department of Transport, 1988))
- Construction Vibration: a 100 m buffer from the closest construction activity with the potential to generate vibration effects (based on guidance from BS 5228-2 (BSI, 2014b) and DMRB LA 111 (National Highways, 2020))
- Operational Noise from substations: a 1 km buffer from the EACN Substation and Tilbury North Substation (based on ISO 9613-2:2024 (ISO, 2024))
- Operational Maintenance: a 300 m for noise and 100 m for vibration buffer from substantial maintenance activities (based on guidance from British Standard 5228-1 (BSI, 2014a), BS 5228-2 (BSI, 2014b) and DMRB LA 111 (National Highways, 2020)).

Existing Baseline

Noise

5.10.3 The Order Limits pass in proximity to a number of larger built-up areas including (north to south): Mulbarton, Diss (in Section A), Gislingham, Stowmarket, Needham Market (in Section B), Capel St Mary, East Bergholt, Ardleigh (in Section C), Aldham (in Section D), Coggeshall, Silver End (Section E), Little Waltham, Broomfield, Chelmsford, Great Oxney Green, Margaretting (in Section F), Ingatestone, Billericay, Hutton, Dunton (in Section G), Horndon on the Hill, Stanford-le-Hope, Southfields, Linford, Chadwell St Mary, Thurrock, and West Tilbury (in Section H). The Order Limits also cross over or are located close to a number of main transport routes, and 36 Noise Important Areas are located within the 300 m Study Area.

5.10.4 The area around the proposed EACN Substation in Tendring District (Project Section C) is predominantly rural in nature with several relatively isolated dwellings in the vicinity. There are no major sources of noise in the area, with two main transport routes approximately 3 km to the south and 5 km to the west respectively, and the Great Eastern Main Line Railway approximately 1.5 km to the west. The main source of noise in the area is therefore likely to be road traffic on local roads. Ambient and background noise levels are therefore considered likely to be relatively low. The background noise levels in the vicinity of the proposed EACN Substation are between 26 and 34 decibels (dB) L_{A90} during daytime periods and 21 and 25 dB L_{A90} during night-time periods. These background levels are typical of a predominantly rural area.

5.10.5 The area around the proposed Tilbury North Substation, Tilbury (Project Section H) is a semi-rural area close to main transport routes. The main sources of noise in the area are from road traffic on the A13 and A1013 to the north, and the A1089 to the west. Typical background sound levels at nearby NSRs range from 36 to 46 dB L_{A90} during daytime periods and 33 to 40 dB L_{A90} during night-time periods

Vibration

5.10.6 Acceptable levels of vibration during construction are higher than those that would be acceptable during normal conditions. It is therefore assumed that existing vibration levels at NSRs are negligible compared to the construction vibration threshold values. Construction vibration impacts are therefore assessed against fixed thresholds, rather than relative thresholds informed by an assessment of the baseline.

Mitigation

5.10.7 Embedded mitigation measures relevant to Noise and Vibration include:

- The route alignment and siting have been designed as far as practicable to avoid sensitive Noise and Vibration features as set out in the Corridor and Preliminary Routeing and Siting Study (National Grid, 2022). This included avoiding settlements and residential areas, passing predominantly through rural areas, with the majority of nearby NSRs being isolated dwellings and small settlements
- The Project would include triple Araucaria conductors (or alternative technology that performs to the same or better standard in relation to noise on standard lattice pylons) for new transmission infrastructure[11]. Due to its geometrical configuration, the triple Araucaria design is the least electrically stressed conductor system that National Grid uses. It is the best design for reducing the effects of line crackle (corona discharge) and would reduce the generation of noise from the proposed overhead lines during operation (and maintenance)
- Substations – noise control measures: The proposed new substations would include any required noise mitigation measures by design. This may include, plant selection, siting, screening, and enclosures, as appropriate
- Substations – vibration control measures: Plant with moving parts, such as cooling equipment and transformers, would be expected to be mounted on suitable anti-vibration mounts to protect the plant from potential vibration effects and to attenuate vibration generated by the plant.

5.10.8 The Outline CoCP (document reference 7.2) contains relevant standard mitigation measures and Best Practicable Means (BPM) relating to Noise and Vibration. Appendix F: Outline Noise and Vibration Management Plan of the Outline CoCP (document reference 7.2) will be updated to a Noise and Vibration Management Plan, incorporating the findings of the Main Works Contractor(s) detailed assessment and associated site-specific mitigation, prior to commencement of construction.

5.10.9 There are no additional mitigation measures proposed to minimise Noise and Vibration effects, beyond the embedded and standard measures identified above.

[11] Where modifications for existing transmission overhead lines are required, like for like conductors are proposed.

Residual Effects

Construction

Construction Noise – Daytime/Night-time

5.10.10 With the use of mitigation in the form of BPM, the magnitude of impact of construction noise is expected to be negligible to small at all nearby residential and low to medium sensitivity non-residential NSRs, and negligible at all nearby high-sensitivity non-residential NSRs during daytime and night-time periods. The residual effect of construction noise is therefore **not significant** at all nearby NSRs during daytime and night-time periods.

Construction Noise - Weekends

5.10.11 With the use of mitigation in the form of BPM, including consideration of temporal restrictions during weekend and bank holiday periods, significant adverse effects from construction noise can be avoided. With appropriate mitigation measures, the effects of construction noise during weekend and bank holiday periods would be **not significant**.

Construction Vibration

5.10.12 With the use of mitigation in the form of BPM, the magnitude of impact of construction vibration is expected to be negligible to small at all nearby residential and low to medium sensitivity non-residential NSRs, and negligible at all nearby high-sensitivity NSRs. The residual effect of construction vibration effects on people in buildings is therefore **not significant** at all nearby NSRs.

5.10.13 A small number of structures or buildings have been identified where there is the potential for damage from vibration from potential piling activities without mitigation. However, with the use of mitigation in the form of BPM, the vibration magnitude threshold for potential damage to buildings or structures is not expected to be exceeded due to any proposed construction works at any NSRs. The residual effect of construction vibration effects on buildings and structures is therefore **not significant** at all nearby NSRs.

Construction Traffic Noise

5.10.14 The assessment indicates that construction traffic noise impacts are negligible or small on most routes. The impact of noise from construction traffic is therefore not significant on most routes. However, Link PAR 30 - Bentley Road (Section C) has the potential for a **large (negative) magnitude** impact.

5.10.15 Jasmine Cottage is located immediately adjacent to Bentley Road at a distance of approximately 1 m from the carriageway edge. The predicted noise increase at this specific property is 11.4 dB due to the increase in construction traffic, which is a **large magnitude adverse** impact. Additionally, the absolute noise level would be above the construction noise Significant Observed Adverse Effect Level (SOAEL), principally due to the small distance between the property and the carriageway.

5.10.16 Illustrative construction traffic mitigation measures on Bentley Road are identified in the Outline CTMP (document reference 7.3) and includes temporary speed limits which may serve to reduce construction traffic noise. However, **major significant adverse** effects from construction traffic noise would still be expected on Bentley Road.

Operation (and Maintenance)

Substation Operational Noise

5.10.17 With embedded and standard mitigation measures, the impact of operational noise from the proposed EACN Substation and the Tilbury North Substation on all nearby NSRs, has been assessed as having a negligible or small magnitude of impact, during both daytime and night-time periods, taking account of context. This would result in a residual **negligible to minor adverse** effect at all nearby NSRs, which is considered to be **not significant**.

Substation Operational Vibration

5.10.18 The effects of vibration from the operation of the proposed EACN Substation and the Tilbury North Substation would be **not significant** at all nearby NSRs with standard vibration mitigation measures incorporated in the design.

Noise and Vibration from Substantial Maintenance Activities

5.10.19 Noise and vibration effects from more substantial maintenance activities, such as reconductoring or transformer replacement, would be expected to be similar to those during the construction phase. In these circumstances the Main Works Contractor(s) would undertake detailed noise and vibration assessments and determine BPM to reduce the effects of noise and vibration at nearby NSRs. Noise and vibration from substantial maintenance activities would therefore have a negligible to small impact at all nearby residential and low to medium sensitivity non-residential NSRs, and negligible impact at all nearby high-sensitivity NSRs, resulting in a **negligible to minor** effect, which is considered to be **not significant**.

5.11 Socio-economics, Recreation and Tourism

Scope

5.11.1 The Socio-economics, Recreation and Tourism assessment has considered the likely significant effects of the Project on the following:

- Employment, local economy and tourism economy during construction
- Disruption of access to community facilities during construction and operation (and maintenance)
- Disruption of access to businesses during construction and operation (and maintenance)
- Disruption of access to tourism, recreational assets and open space during construction and operation (and maintenance)

- Pressures on local visitor accommodation during construction
- Severance and ‘sterilisation’ of land in the context of its potential for future development during construction and operation (and maintenance).

Study Area

5.11.2 The Socio-economics, Recreation and Tourism chapter considers the potential for effects within three Study Areas:

- Local Study Area – This comprises the Order Limits
- 3 km Study Area – For the assessment of potential effects on businesses where visual effects are an economic consideration, businesses are considered where they fall within 3 km of the Local Study Area (Order Limits)
- Wider Study Area – This comprises the spatial extent of the LPA areas through which the Order Limits pass through. The Wider Study Area therefore comprises the following: Norwich City Council, South Norfolk Council, Mid Suffolk District Council, West Suffolk Council, Ipswich Borough Council, Babergh District Council, Tendring District Council, Colchester City Council, Braintree District Council, Chelmsford City Council, Basildon Council, Brentwood Borough Council and Thurrock Council.

Existing Baseline

5.11.3 The overall population across the Wider Study Area was 1,918,400 in 2021, and increased by 8.5% between 2011 and 2021, suggesting a general upward trend in population across the region.

5.11.4 Economic activity rates are generally high, suggesting a generally strong workforce population across the area, with some local variations, for example Mid Suffolk and Tendring, which exhibit a below national average economic activity rate. The workforce shows diverse occupational distribution, however there is a noticeable skills gap, with higher proportions of the population with lower or no qualifications compared to regional and national figures. The dominant industries are Wholesale and Retail, with higher-than-average employment in Manufacturing and Construction industries. Overall, the Wider Study Area is considered to have a readily available labour force, with potential skills gaps in some areas.

5.11.5 A total of four community facilities have been identified in the Local Study Area, including allotment, education facilities and place of worship.

5.11.6 A number of built and other assets have been identified within the Local Study Area. These include visitor accommodations, sports clubs, event venues, sports activities, catering businesses with outdoor seating, a museum, a tourist attraction and a quarry. Further built and other assets have been identified within the 3 km Study Area, including visitor accommodations, event venue and aviation sports club.

5.11.7 A total of 13 recreational lands have been identified within the Local Study Area, including Countryside and Rights of Way (CRoW) land (excluding roadside verges), navigable rivers, a playing field, a National Landscape, a local green space, a reservoir, a Woodland Trust wood and a park.

5.11.8 There are a number of recreational routes within the Local Study Area, including PRoWs, long distance paths, circular walks and cycleways.

5.11.9 Visitor accommodation reached its highest occupancy rate of approximately 83% on average across serviced and non-serviced accommodation in the past 12 months in July 2024. When applying the 2016 England visitor accommodation bedspace numbers (VisitBritain, 2016) in the Wider Study Area to the November 2023 to October 2024 bedspace occupancy rate, this suggests there were likely approximately 10,000 and 19,000 surplus bedspaces during peak and off-peak months in the Wider Study Area, respectively.

5.11.10 There are a number of planning applications with planning approval or pending decision, and Local Plan allocations located within the Local Study Area which have not been constructed at the time of writing this assessment.

Mitigation

5.11.11 Embedded measures relevant to Socio-economics, Recreation and Tourism are summarised below:

- Underground cabling at up to four locations instead of overhead line, including (but not limited to) areas through the Dedham Vale National Landscape, and areas located immediately north and south of the Dedham Vale National Landscape
- Avoidance of community facilities, businesses, tourism, and recreational assets as far as practicable through the corridor and routeing studies.

5.11.12 The Outline CoCP (document reference 7.2) sets out the required mitigation measures and environmental commitments that will be implemented during the construction phase of the Project. An Outline LEMP (document reference 7.4) and Outline CTMP (document reference 7.3) are submitted as part of the DCO application.

5.11.13 Additional mitigation measures include National Grid working with event organisers in advance of their events to ensure effective coordination and support. This aims to minimise disruption to events, such as the Little Bromley 10 km Run, Corbeau Seats Rally, Tour de Tendring, and Ford RideLondon-Essex 100.

Residual Effects

Construction

5.11.14 The Project is not anticipated to have significant effects on the local economy, local employment or tourism economy.

5.11.15 There are no significant residual effects identified for community facilities during construction.

5.11.16 The following built and other assets, and recreation land located within the Local Study Area have been identified where the residual construction effects would be **temporary or permanent, long-term, moderate or major adverse and significant**:

- Paxman's Angling Club (Section C) – Due to the temporary acquisition of land, temporary closure of the angling club for a short period may be required
- Fishing lake north-west of Ardleigh (Section C) – There would be permanent closure of the angling site as a result of the Project

- Ardleigh Caravan and Camping Park (Section C) – There would be temporary acquisition of land to enable the use of the land as a construction work area. There would be potential air quality and noise effects during construction due to the proximity of the business
- Porters Farm (Section E) – There would be temporary acquisition of land. There would be potential air quality and noise effects during construction due to the proximity of the business
- Essex International Jamboree (Section F) – There would be temporary land take which cuts through the event field
- Angling Lake West of Basildon (Section G) – There would be temporary acquisition of land and permanent closure of the lake as an angling site as a result of the Project
- Orsett Golf Course (Section H) – There would be temporary acquisition of land from the golf course where temporary partial closure of the business anticipated.

5.11.17 The following built and other assets located within the 3 km Study Area has been identified where the residual construction effects would be **permanent, long-term, moderate adverse and significant:**

- Chase Farm Airstrip (Section G) – The proposed construction of overhead lines are not likely to comply with the recommended clearance parameters. The business is anticipated to be unable to operate safely as a result of the overhead lines and is likely to require permanent closure.

5.11.18 For the following recreational routes, including PRoWs, located within the Local Study Area, the full length or a section would be temporarily stopped up and diverted and therefore the residual construction effect would be **permanent, long-term, moderate or major adverse and significant**:

- Two footpaths within Mid Suffolk
- Three footpaths within Colchester
- One footpath within Chelmsford
- One footpath within Brentwood.

5.11.19 There are no significant residual effects identified for tourism accommodation bedspace demand, or planning and development during construction.

Operation (and Maintenance)

5.11.20 There are no significant residual effects identified for community facilities during operation (and maintenance).

5.11.21 The following built and other assets, and recreation land located within the Local Study Area have been identified where the residual operation (and maintenance) effects would be **permanent, long-term, moderate or major adverse and significant**:

- Fishing lake north-west of Ardleigh (Section C) – The angling site would require permanent closure where a 30 m angling exclusion zone for safety reasons would not be available during operation (and maintenance) of the Project

- Ardleigh Caravan and Camping Park (Section C) – The Project would be visible to the campsite with the closest pylon located approximately 140 m from the campsite
- Essex International Jamboree (Section F) – There would be two pylons located within the field with overhead lines located directly above the field at the event location. It is likely to affect the operation of the event due to safety reasons
- Angling Lake West of Basildon (Section G) – The angling site would require permanent closure where a 30 m angling exclusion zone for safety reasons would not be available during operation (and maintenance) of the Project.

5.11.22 The following built and other assets, and recreation land located within the 3 km Study Area have been identified where the residual operation (and maintenance) effects would be **permanent, long-term, moderate adverse and significant**:

- Chase Farm Airstrip (Section G) – The proposed overhead lines are not likely to comply with the recommended clearance parameters. The business is anticipated to be unable to operate safely as a result of the overhead lines.

5.11.23 There are no significant residual effects identified for recreational routes, or planning and development during operation (and maintenance).

5.12 Traffic and Transport

Scope

5.12.1 The Traffic and Transport assessment considers the likely effects during construction of the Project. The assessment covers the temporary increase in baseline traffic flows as a result of the Project, due to the use of the surrounding local highway network by construction vehicles, and the potential effects related to the following:

- Driver delay and public transport delay to passengers
- Pedestrian, cyclist and horse-rider delay
- Pedestrian, cyclist and horse-rider severance
- Pedestrian, cyclist and horse-rider amenity
- Fear and intimidation
- Collisions and road safety
- Parking and loading.

5.12.2 The assessment excludes the operation (and maintenance) and decommissioning phases due to the expected infrequent and low vehicle movements associated with the operation (and maintenance) of the Project.

Study Area

5.12.3 The Study Area for Traffic and Transport includes all local roads to be used as construction routes (referred to as PARs), which connect the Project to the Strategic Road Network and Major Road Network. Roads are included in the assessment where they meet specific criteria based on the Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement (IEMA, 2023):

- Roads where traffic flows are predicted to increase by more than 30% (or the number of HGVs is predicted to increase by more than 30%)
- Other specifically sensitive areas where traffic flows are predicted to have an increase by 10% or more
- Any highway link where there are significant changes in the composition of traffic, e.g. a large increase in the number of HGVs
- Roads that are likely to be significantly affected by temporary road restrictions and traffic management measures required to construct the Project.

5.12.4 Sensitive areas have been identified and are defined by the presence of sensitive receptors, such as hospitals, residential properties, community centres, conservation areas, schools, equestrian facilities, or collision black spots and routes with road safety concerns, or junctions and highway links that are currently at (or over) capacity, located within a 300m wide corridor along each PAR (radius of 150 m from the centreline of each PAR).

Existing Baseline

5.12.5 Baseline conditions have been established through traffic surveys undertaken in 2023, 2024 and 2025, supplemented by Department for Transport traffic count data, and existing traffic data obtained from Suffolk County Council and the Lower Thames Crossing project. The surveys collected traffic volume data over seven-day periods during school term time to ensure representative data.

5.12.6 Appropriate growth factors derived from Trip End Model Presentation Program (TEMPro) were applied to the 2023/2024 traffic flows to account for growth in background traffic between the year the surveys were undertaken and future baseline year for peak construction activity.

5.12.7 The area affected by the Project includes a variety of road types, from major trunk roads forming part of the Strategic Road Network and Major Road Network, to local roads and rural lanes. The baseline traffic flows vary considerably across the route, with some rural roads carrying very low traffic volumes while major roads carry significantly higher volumes.

5.12.8 Public transport services operate on many of the PARs, with bus services connecting local communities. PRoW surveys were also undertaken to understand existing usage patterns for pedestrians, cyclists, and horse-riders. In general, the monitored PRoW network showed low usage during weekdays, with higher usage observed at weekends.

Mitigation

5.12.9 The Project has embedded measures into the design to reduce traffic and transport impacts, including the provision of a largely continuous haul roads . Construction vehicles would use the haul roads to progress to different areas of the Project, reducing construction traffic on the local road network and confining traffic to the PARs and designated crossing locations.

5.12.10 The Outline CoCP (document reference 7.2) sets out the required mitigation measures and environmental commitments that will be implemented during the construction phase of the Project.

5.12.11 The Outline CTMP (document reference 7.3) sets out measures that would be implemented during construction to manage traffic impacts and ensure the safety of all road users. The Plan would be implemented by the Main Works Contractor(s). These measures would include:

- Designated construction traffic routes to and from the Project
- An appropriate control system for the arrival and dispatch of all vehicles to monitor adherence to designated routes and prevent congestion around worksites
- Monitoring of any delay or congestion along the PARs and at junctions
- Management of temporary road closures and diversions where required (typically for no more than four weeks)
- Provision of temporary bus stops in suitable locations if existing stops need to be temporarily closed, following agreement with the relevant highway authority and bus operators.

5.12.12 Additional mitigation measures include the requirement for construction traffic drivers to be subject to driving briefings, vegetation maintained .to improve visibility at road junctions and appropriate signage provided where necessary

Residual Effects

Construction

5.12.13 The assessment concluded that the majority of traffic and transport effects during construction would not be significant. While there are instances where traffic flows would increase notably on some road links, particularly those with low baseline flow, the increases in actual vehicle numbers are considered relatively minor.

5.12.14 For driver delay, the significance of effect varies between PARs and ranges from neutral to large adverse effects. In general, **temporary short to medium-term minor adverse effects** are anticipated at junctions where mitigation is proposed, but these are **not significant**. Some temporary road closures would be required for construction activities, but in general these are expected to be for no more than four weeks and would be managed to minimise disruption.

5.12.15 For bus passenger delay, the significance of effect varies between PARs and ranges from neutral to large effects. Where significant effects are identified, temporary measures would be put in place such as alternative bus stop locations following agreement with the relevant highway authority and bus operators. Therefore, **no**

significant effects associated with changes to the bus network or infrastructure are expected.

5.12.16 For pedestrians, cyclists, and horse-riders, **short term neutral or slight effects** are expected for the majority of PRoWs subject to temporary management and diversion and overall are **not significant**. While some leisure routes may experience moderate to large effects due to increased walking distances, these are leisure routes where an increase in walking distance may not necessarily have adverse effects.

5.12.17 There are no expected long-term closures or diversions of footways or the cycle network as a result of the construction activities. Several cycle routes located on the PARs would experience a temporary increase in traffic during construction but over a short duration of time. However, in general, there would be **temporary short-term slight adverse** effects, but these are **not significant**.

5.12.18 For pedestrians, cyclists and horse-riders, short term negligible effects are expected for the majority of road links in terms of severance and amenity. There are, however, some road links where the increase in traffic flows result in **temporary, short-term large or moderate adverse** effects, which would be **significant**.

5.12.19 For pedestrians, cyclists and horse-riders, short-term **slight or neutral adverse** effects are expected in terms of fear and intimidation, which are **not significant**.

5.12.20 For pedestrians, cyclists and horse-riders, **short-term slight adverse** effects are expected in terms of road safety, which are **not significant**.

5.12.21 For road links where temporary loss of parking is expected, **short-term slight adverse** effects are expected, which are **not significant**.

Operation (and Maintenance)

5.12.22 The effects of the Project for Traffic and Transport during operation (and maintenance) have been scoped out of the assessment due to the expected infrequent and low vehicle movements associated with the operation (and maintenance) of the Project.

5.13 Cumulative Effects

Approach to the Assessment

5.13.1 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 developments.

5.13.2 Two categories of cumulative effects are considered:

- Intra-project cumulative effects, where a resource, receptor or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development. For example, a community may be affected by both noise and dust impacts resulting from the construction phase activities of a single development

- Inter-project cumulative effects, where a resource, receptor or group of receptors are potentially affected by more than one development at the same time. For example, the construction traffic effects of a development in isolation may not be significant, but when combined with the construction traffic effects of another development may result in significant cumulative effects on the surrounding highways network.

Intra-Project Cumulative Effects

5.13.3 The methodology adopted to undertake the intra-project cumulative assessment has comprised a stepped process with potential intra-project cumulative effects being identified by reviewing the predicted residual effects on common receptors assessed in each environmental topic chapter set out in the ES (Volume 6 of the DCO application).

5.13.4 Effects that were assessed as negligible in the environmental topic chapters are scoped out of the intra-project cumulative effects assessment as agreed with the Planning Inspectorate in the EIA Scoping Opinion (document reference 6.20). Minor effects, while not significant on their own, are considered in the assessment as multiple minor effects could result in a significant effect on a common receptor. In addition, moderate and major effects (or equivalent) are also considered within the assessment.

5.13.5 The following common receptors were identified that were anticipated to be experience multiple minor, moderate or major effects (or equivalent) within multiple topic chapters:

- Community and land assets (construction phase only)
- Development land and businesses (construction phase only)
- Pedestrians, cyclists and horse riders (construction phase only).

5.13.6 Consideration has been given to whether there would be a cumulative effect on these common receptors and if so, whether that effect is likely to be significant.

5.13.7 The only common receptor that is anticipated to experience significant intra-project cumulative effects are pedestrians, cyclists and horse riders using PRoWs, cycle routes and minor roads affected by the Project.

5.13.8 A number of PRoWs, cycle routes and minor roads would be affected during construction, in terms of access/severance of routes, delay in journey time, amenity (including noise and visual effects), fear and intimidation. Pedestrians, cyclists and horse riders may experience magnification of effects as a result of the interaction on recreational experience of the receptors and visual amenity, with access and delay effects. The magnitude and duration of potential effect varies according to location along the Project route. Construction noise effects are anticipated to be of minor significance within 30 m of construction activities; in addition to this, visual effects are anticipated to decrease with distance from the Order Limits and would be less significant in areas where intervening landforms and built form or existing vegetation provide screening.

5.13.9 Owing to the significance of visual impacts within 500 m of the Order Limits, and as further mitigation is unlikely to be practicable, it is anticipated that the residual cumulative effect of visual and noise amenity.

Inter-Project Cumulative Effects

5.13.10 The Study Area for inter-project effects comprises a number of ZOIs. A ZOI is the geographic area within which a project is likely to affect environmental receptors. The ZOIs for each environmental topic for the inter-project cumulative effects assessment are:

- Agriculture and Soils - 1 km
- Air Quality - 2 km
- Ecology and Biodiversity - 0.2 km to 2 km
- Contaminated Land, Geology and Hydrogeology - 0.5 km
- Health and Wellbeing - 0.5 km to 2 km
- Historic Environment - 3 km
- Hydrology, Land Drainage and Flood Risk - 0.5 km
- Landscape and Visual - 3 km
- Noise and Vibration - 0.3 km
- Socio-economic, Recreation and Tourism - LPA boundaries that the Project intersects within 3 km
- Traffic and Transport - Primary Access Routes.

5.13.11 The baseline information has drawn from the reviews of the Planning Inspectorate's Programme of Projects for NSIPs, major planning applications, allocations from relevant LPA websites, and planning applications from the LPA records within the ZOIs. An assessment was undertaken of the effects on the receptors relevant to each topic, to identify the likely significance of the effects, should all developments be progressed.

5.13.12 The assessment has shown that for most environmental aspects no residual significant adverse cumulative effects are predicted. However, for agriculture and soils, historic environment and landscape and visual, there are likely to be residual significant adverse cumulative effects during construction and operation (and maintenance).

Agriculture and Soils Residual Inter-Project Cumulative Effects

5.13.13 Based on the data available on the other developments it was determined that inter-project cumulative effects on agriculture and soils receptors within the areas surrounding the Project would be **significant**, both during construction and operation (and maintenance).

5.13.14 The Project has a major adverse effect on its own due to permanent loss of BMV land, therefore any further loss of BMV land associated with the shortlisted other developments would be cumulatively **significant**. As effects relate to the permanent loss of agricultural land there are no additional mitigation measures that could be adopted to reduce effects.

Historic Environment Residual Inter-Project Cumulative Effects

5.13.15 Based on the data available on the other developments it was determined that inter-project cumulative effects on designated heritage assets within the areas surrounding the Project would be **significant**, both during construction and operation (and maintenance).

5.13.16 The inter-project cumulative assessment identified eight shortlisted other development that would result in significant adverse cumulative effects with the Project. This would affect two scheduled monuments, one grade I listed building, one grade II* listed building and six grade II listed buildings, which would experience **moderate adverse and significant** cumulative effects during construction and operation (and maintenance).

Landscape and Visual Residual Inter-Project Cumulative Effects

5.13.17 Significant cumulative landscape and visual effects could arise during construction of the Project in combination with the construction phases of 47 shortlisted other developments. The significant effects are anticipated to be temporary and short-term. No mitigation has been proposed as screening of linear and mobile construction sites is impractical and could itself create a visual intrusion.

5.13.18 Significant cumulative landscape and visual effects on the landscape and visual amenity could arise during operation (and maintenance) of the Project in combination with the operational phases of 32 shortlisted other development.

5.13.19 The assessment identified three shortlisted other development (DCO2, DCO3 and CH17) with the potential to contribute to **major adverse significant** inter-project effects for landscape and visual receptors during construction, and two during operation (and maintenance).

5.13.20 No mitigation has been identified to reduce these significant cumulative effects during operation (and maintenance) as it is considered that the combined presence and visibility of the 400 kV pylons associated with the Project and other developments could not be fully screened by tree planting due to the height of the pylons.

Assessment of Total Cumulative Effects from Clusters of Other Development

5.13.21 When considering the total potential cumulative effect of all the other developments combined with the Project, there is the potential for significant total cumulative effects for agriculture and soils and landscape and visual receptors.

5.13.22 The Project has a major adverse effect on its own due to permanent loss of BMV land, therefore any further loss of BMV land associated with the shortlisted other developments would be cumulatively **significant**. As effects relate to the permanent loss of agricultural land there are no additional mitigation measures that could be adopted to reduce effects. The total loss of BMV agricultural land from other developments combined with the Project would likely be **significant**.

5.13.23 The cumulative effects from the Project and clusters of multiple shortlisted other developments on the following landscape and visual receptors are anticipated to be **significant**:

- LCA B1: Tas Tributary Farmland (from other developments DCO1, DCO6, SN3, SN19, SN24, SN27, SN47) – **Moderate adverse** during construction and operation (and maintenance)
- LCA D1: Wymondham Settled Plateau Farmland (from other developments SN3 and SN26) – **Moderate adverse** during construction and operation (and maintenance)
- Rolling Valley Farmlands and Furze LCT and Ancient Plateau Claylands LCT (Waveney Valley area) (from other developments BMS44, BMS63 and BMS69) – **Moderate adverse** during construction and operation (and maintenance)
- Ancient Plateau Claylands LCT and Rolling Valley Farmland LCT (Bramford Substation area) (from other developments DCO2, BMS31, BMS42, BMS45**,** BMS52, BMS68, BMS70) – **Moderate adverse** during construction and operation (and maintenance)
- Bromley Heaths LCA (from other developments DCO8, DCO9, ECC27, T3, T17) – **Major adverse** during construction and operation (and maintenance)
- LCA B1: Central Essex Farmland (from other developments B8, B42, CH17, CH18, CH24, CH26, CH28, ECC13, ECC19, DCO13) – **Moderate adverse** during construction and operation (and maintenance)
- LCA C5: Chelmer Valley (from other developments CH3, ECC13, ECC19) – **Moderate adverse** during construction
- LCA D2: Brentwood Hills (from other developments A3 (BrBC), A5 (BrBC), A11 (BrBC), BA13, BR2, BR5, BR11) – **Moderate adverse** during construction and operation (and maintenance)
- LCA 13: Dunton Settled Claylands (from other developments BA6, BA13, BA20, BA24) – Moderate adverse during construction and operation (and maintenance)
- LCA H1: East and West Tilbury Open Undulating Farmland (from other developments DCO3, TH12, TH18, TH22, TH30, TH40) – **Major adverse** during construction and operation (and maintenance)
- Visual receptors within VRA A1 Swardeston (from other developments DC01, DCO6, SN27, SN47) – **Moderate adverse** during construction and operation (and maintenance)
- Visual receptors within VRA A2 Stoke Holy Cross (from other developments DCO1, DCO6, SN3, SN24, SN27, SN47) – **Moderate adverse** during construction and operation (and maintenance)
- Visual receptors within VRA A3 Mulbarton and Wreningham (from other developments SN3, SN26, DCO6) – **Moderate adverse** during construction and operation (and maintenance)
- Visual receptors within VRA B1 Wortham (from other developments BMS44, BMS69) – **Moderate adverse** during construction and operation (and maintenance)

- Visual receptors within VRA B12 Elmsett (from other developments DCO2, BMS31, BMS42, BMS52, BMS68) – **Major adverse** during construction and operation (and maintenance)
- Visual receptors within VRA B13 Somersham (from other developments BMS45, BMS70) – **Major adverse** during construction
- Visual receptors within VRA C13 Little Bromley (from other developments DCO8, DCO9, T3) – **Moderate adverse** during construction
- Visual receptors within VRA E2 Rivenhall (from other developments B8, B13, B44) – **Moderate adverse** during construction
- Visual receptors within VRA E4 Silver End (from other developments ECC35, B8, B42) – **Moderate adverse** during construction and operation (and maintenance)
- Visual receptors within VRA F2 Peverel's Farm (from other developments CH24, CH26 (construction only), ECC13, ECC19, DCO13) – **Moderate adverse** during construction and operation (and maintenance)
- Visual receptors within VRA F4 Little Waltham (from other developments CH17, CH24) – **Major adverse** during construction and operation (and maintenance)
- Visual receptors within VRA G4 Ingrave and Herongate (from other developments BA13, BR2, A3 (BrBC)) – **Moderate adverse** during construction and operation (and maintenance)
- Visual receptors within VRA G6 Basildon (from other developments BA6, BA24) – **Moderate adverse** during construction
- Visual receptors within VRA H6 Southfields (from other developments TH30, TH40, DCO3) – **Major adverse** during construction and operation (and maintenance)
- Visual receptors within VRA H7 Linford (from other developments TH22, TH30, TH40, DCO3) – **Major adverse** during construction and operation (and maintenance).

6. Conclusion

6.1 What Happens Next?

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

6.1.2 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.

6.1.3 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:

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

6.1.5 The pre-examination phase ends just prior to the close of 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.

6.1.6 The close of 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.

6.1.7 Registered Interested Parties can send written representations to the Planning Inspectorate and can ask to speak at a public hearing.

6.1.8 The Examination stage is where the Examining Authority will consider the proposed development and ask questions.

6.1.9 After the Examining Authority has completed all its enquiries and understood everyone's views during the Examination, it will then write its recommendation report. The report must be completed and sent to the relevant Secretary of State within three months of the end of the Examination.

6.1.10 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, subject to any legal challenge.

6.2 Delivering the Project

6.2.1 If National Grid is successful in gaining development consent for the Project, it would deliver the Project in accordance with 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.

6.3 What If I Would Like Further Information?

6.3.1 This document is a non-technical summary of the ES (Volume 6 of the DCO application) for the proposed Norwich to Tilbury Project. The ES (Volume 6 of the DCO application) provides more detailed and technical information which is available on the Planning Inspectorates website.

6.3.2 Further information can also be obtained via:

- Email: contact@n-t.nationalgrid.com
- Telephone: 0800 915 2497 (lines are open Monday to Friday, 9am-5:30pm)
- Address: FREEPOST N TO T (please write this in capitals.

6.4 What Happens Next and How Can I Have My Say?

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

6.4.2 After receipt of the application, the Planning Inspectorate has up to 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.

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://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN020027

6.4.3 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.

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

6.4.5 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.

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

6.4.7 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.

6.4.8 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.

Abbreviations

Abbreviation	Full Reference
AC	Alternating current
AIS	Air Insulated Switchgear
ALC	Agricultural Land Classification
AMS-OWSI	Archaeological Mitigation Strategy and Outline Written Scheme of Investigation
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
APIS	Air Pollution Information System
AQMA	Air Quality Management Area
ARN	Affected road network
ASTI	Accelerated Strategic Transmission Investment
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
BPM	Best Practicable Means
CGS	County Geodiversity Sites
CIEEM	Chartered Institute of Ecology and Environmental Management
CoCP	Code of Construction Practice
CRoW	Countryside and Rights of Way
CSE	Cable Sealing End
CTMP	Construction Traffic Management Plan
CWS	County Wildlife Site
DC	Direct current
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
DMRB	Design Manual for Roads and Bridges
EACN	East Anglia Connection Node
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIC	Environmental Implication of Change

Abbreviation	Full Reference
EMF	Electric and Magnetic Field
EPUK	Environmental Protection United Kingdom
ES	Environmental Statement
ESO	Electricity System Operator
FAR	Further Assessment Required
FLL	Functionally Linked Land
GCR	Geological Conservation Review
GIS	Gas Insulated Switchgear
GREEN	East Anglia Green Energy Enablement
GW	Gigawatt
GWDTE	Groundwater Dependent Terrestrial Ecosystems
ha	hectare
HDD	Horizontal Directional Drilling
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HND	Holistic Network Design
HPI	Habitat of Principal Importance
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IDBs	Internal Drainage Boards
IEMA	Institute of Environmental Management and Assessment
INNS	Invasive Non-Native Species
ISA	Invertebrate Survey Area
km	kilometre
KRS	Key Reptile Site
kV	kilovolt
LCA	Landscape Character Area
LCT	Landscape Character Type
LEMP	Landscape and Ecological Management Plan
LGS	Local Geological Sites

Abbreviation	Full Reference
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LoD	Limits of Deviation
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
LWS	Local Wildlife Sites
m	metre
MW	Megawatt
NETS	National Electricity Transmission System
NESO	National Energy System Operator
NH_3	Ammonia
NMU	Non-Motorised User
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NOA	Network Options Assessment
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
NSR	Noise Sensitive Receptor
NSRI	National Soil Resources Institute
NTS	Non-Technical Summary
PAR	Primary Access Route
PC	Process Contribution
PEIR	Preliminary Environmental Information Report
The Project	Norwich to Tilbury
$PM_{2.5}$	Particulate matter (2.5 micrometres or less in diameter)
PM_{10}	Particulate matter (10 micrometres or less in diameter)
PRoW	Public Right of Way
RAF	Royal Air Force
RIGS	Regionally Important Geological Sites

Abbreviation	Full Reference
RNR	Roadside Nature Reserve
RVAA	Residential Visual Amenity Assessment
SAC	Special Area of Conservation
SOAEL	Significant Observed Adverse Effect Level
SPA	Special Protection Area
SQSS	Security and Quality of Supply Standards
SRP	Soil Resource Plan
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TEMPro	Trip End Model Presentation Program
UK	United Kingdom
VP	Vantage Point
VRA	Visual Receptor Area
WFD	Water Framework Directive
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Glossary

Term	Description
Additional mitigation measures	Comprises measures over and above embedded and standard mitigation measures to reduce environmental effects. This would include, but not be limited to, mitigation required for protected species.
Alignment	The proposed overhead line and underground cable route.
Ancient woodland	Land that has been continually wooded since at least 1600 in England. Regarded as 'irreplaceable habitat' in national planning policy and guidance. Ancient woodland greater than 2 ha is recorded on the Natural England Ancient Woodland Inventory.
Angle/tension pylon	Pylon where a horizontal insulator string attaches the conductors. Tension or 'angle' pylons are used at points where the overhead line alignment changes direction.
Archaeological remains	The material remains of human activity from the earliest periods of human evolution to the present. These may be buried traces of human activities, sites visible above ground, or moveable artefacts.
Archaeological Mitigation Strategy and Outline Written Scheme of Investigation	Sets out the scope, guiding principles and methods for the planning and implementation of additional archaeological mitigation works associated with the construction of the Project.
Authorised development	The development and associated development described in Part 1 of Schedule 1 (authorised development) of the draft Development Consent Order and any other development authorised by the Order, which is development within the meaning of s32 of the Planning Act 2008.
Bellmouth	A flared vehicular access point connecting a construction site to the public highway, designed to accommodate turning movements by large vehicles.
Best practicable means	A term used under the Control of Pollution Act 1974 and Environmental Protection Act 1990 to refer to measures which are reasonably practicable, having regard to local conditions and circumstances, to the current state of technical knowledge and to financial implications, concerning the mitigation of noise and other potential nuisance.
Biodiversity	The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this

Term	Description
	includes diversity within species, between species and of ecosystems.
Biodiversity Net Gain	An approach for developments to ensure habitats for wildlife are left in a measurably better state than they were before the development.
Biosecurity	Measures aimed at preventing the spread of harmful organisms (e.g. viruses and bacteria) to crops and livestock in order to reduce the risk of transmission of infectious diseases.
Busbar	The common connection point of two or more transmission circuits.
Circuit	A set of wires along which current flows and returns. It is necessary to have a complete circuit for current to flow. The National Grid standard for overhead lines operating at 400 kV is for pylons to carry two circuits, each consisting of three phases, i.e. a double circuit configuration.
Cable	An insulated conductor designed for underground installation.
Cable Sealing End	Structures used to transfer transmission circuits between underground cables and overhead lines.
Cable Sealing End compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Cable Sealing End platform	Electrical infrastructure used as the transition point between overhead lines and underground cables. A platform on the pylon acts as the principal transition point.
Code of Construction Practice	A code of construction practice sets out the standards and procedures to which a developer (and its contractors) must adhere in order to manage the potential effects of construction works.
Commitments	Measures that a developer commits to delivering as part of a project, with the purpose of limiting, mitigating or compensating potential effects of the project.
Conductor	The overhead wire that carries electricity from one place to another, for example the line between two pylons.
Conservation Area	An area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance as defined in s69(1)(a) in the Planning (Listed Building and Conservation Areas) Act 1990.
Construction Traffic Management Plan	Plan detailing the procedures, requirements and standards necessary for managing the traffic effects during

Term	Description
	construction of the Project so that safe, adequate and convenient facilities for local movements by all transport modes are maintained throughout the construction process.
Contaminated Land	Land where a substance or contaminant is in or under the land which has the potential to cause significant harm or the significant possibility of significant harm to human health, property or protected species, or significant pollution or the significant possibility of significant pollution to controlled waters.
Corona discharge	An electrical discharge caused by the ionisation of fluid such as air surrounding a conductor carrying a high voltage. It represents a local region where the air (or other fluid) has undergone electrical breakdown and become conductive. A corona occurs at locations where the strength of the electric field (potential gradient) around a conductor exceeds the dielectric strength of the air.
County Wildlife Site	Non-designated areas of land important for their wildlife and nature conservation value.
Culvert	A channel or pipe that carries water below the level of the ground.
Dewatering	The removal of groundwater (e.g. by pumping) to keep a below-ground works area dry.
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.
Distribution Network Operator	Companies that own and operate the power lines and infrastructure that connect the National Grid network to individual properties.
Electric and Magnetic Fields	All equipment that generates, distributes or uses electricity produces Electric and Magnetic Fields (EMFs), and EMFs also occur naturally. Electric fields are created by differences in voltage: the higher the voltage, the stronger the resultant field. Magnetic fields are created when electric current flows: the greater the current, the stronger the magnetic field.
Embedded design measures	Mitigation measures are those that are intrinsic to and built into the design of the Project.
Environmental Impact Assessment (EIA)	An assessment of the likely effects of a development project on the environment, which is reported in an Environmental Statement that is publicised and consulted on and taken into account in the decision on whether a project should proceed.

Term	Description
Environmental Areas	These are locations identified for environmental embedded measures, mitigation and/or Biodiversity Net Gain/environmental enhancement.
Environmental Statement (ES)	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (EIA) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
Environmental topic	A subject area covered within the EIA, for example landscape and visual or biodiversity.
Flood Risk Assessment	A Flood Risk Assessment is an assessment of the risk of flooding, particularly in relation to residential, commercial and industrial land use. In England and Wales, the Environment Agency requires a Flood Risk Assessment to be submitted alongside planning applications in areas that are known to be at risk of flooding.
Full-time equivalent	Unit of measurement used to calculate the total full time hours worked by staff.
Full line tension gantries	Types of gantries which allow conductors to connect into a substation or compound directly from a pylon, without requiring a bulky terminal pylon. This allows a larger span between the final pylon and the gantry.
Gantry	An overhead bridge-like structure supporting electrical equipment. A transition point from overhead line equipment to equipment in a compound.
Groundwater	Water that is in the ground. This is usually referring to water in the saturated zone below the water table.
Habitats Regulations Assessment	The process by which plans and projects are assessed as to whether they are likely to have a significant effect on a European site either alone or in combination with other plans or projects, under the Conservation of Habitats and Species Regulations 2017 (as amended).
Haul roads	A route used by construction traffic within the Order Limits to access a working area from a site access point.
Heavy Goods Vehicles	Goods vehicles weighing more than 3,500 kg.
High voltage	275,000 volts and over. National Grid's transmission lines generally operate at 275,000 and 400,000 volts. Lower voltage lines, such as 132,000 volts and 33,000 volts, are generally owned by local distribution companies.

Term	Description
High voltage alternating current	The transmission and distribution of electrical energy using alternating current (AC) at high voltage levels.
Horizontal directional drilling	Trenchless method for the installation of pipes, in a shallow arc using a surface-launched drilling rig. In particular, it applies to large-scale crossings in which a fluid filled pilot bore is drilled without rotating the drill string, and this is then enlarged by a washover pipe and back reamer to the size required for the product pipe.
Insulator	Used to attach the conductors to the pylons, preventing electrical discharge to the steelwork.
Kilovolt	1,000 volts
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Lattice pylon	Pylon type widely used on the national electricity transmission networks. Both standard lattice pylons (approximately 50 m in height) and low hight lattice pylons (approximately 40 m in height) are proposed on the Project.
Limits of Deviation (LoD)	LoD allow for adjustment to the final positioning of the permanent features, for example to avoid localised constraints or unknown or unforeseeable issues that may arise. This could include previously unidentified poor ground conditions which require a pylon to be moved slightly for geotechnical reasons, such as ground stability. The horizontal LoD define the parameters within which the position on the ground of proposed permanent features may deviate from the position shown on the plans. This applies to both linear (for example overhead lines and underground cables) and non-linear (for example the new EACN Substation and CSE compounds) proposed infrastructure. Vertical LoD limit the maximum vertical height, or the depth below ground, of any new infrastructure.
Listed building	A measure of a building's special architectural and historic interest. There are three categories of listed buildings, Grades I, II* and II, depending on the level of interest.
Local Nature Reserve	Sites dedicated by the Local Planning Authority under s21 of the National Parks and Access to the Countryside Act 1949 for nature conservation which have wildlife or geological features that are of special interest locally.
Local Planning Authority	The public authority whose duty it is to carry out specific planning functions for a particular area.
Main Works Contractor(s)	Contractor(s) appointed by National Grid to construct the Project

Term	Description
Mitigation	The action of reducing the severity and magnitude of change (impact) to the environment. Measures to avoid, reduce, remedy or compensate for significant adverse effects.
National Electricity Transmission System Security and Quality of Supply Standard	The NETS SQSS sets out a coordinated set of criteria and methodologies that the Transmission Licensees shall use in the planning and operation of the National Electricity Transmission System.
National Landscape (an Area of Outstanding Natural Beauty)	Formally designated under the National Parks and Access to the Countryside Act of 1949 to protect areas of the countryside of high scenic quality that cannot be selected for National Park status due to their lack of opportunities for outdoor recreation (an essential objective of National Parks). As of November 2023, all AONBs became 'National Landscapes'. This reflects ambitions for the areas to play a key part in the international '30 by 30' commitment (to protect and conserve a minimum of 30% of land and sea for biodiversity by 2030).
Nationally Significant Infrastructure Project	Typically a large scale development of national importance that requires development consent from the Secretary of State, under the Planning Act 2008.
Order Limits	The maximum extent of land within which the authorised development may take place.
Overhead line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Permanent access	Access required to infrastructure during the operational phase of the Project, for operational and maintenance purposes.
Piling	Engineering process of installing elongated structural elements, known as piles, into the subsoil. This technique is employed to transfer structural loads to deeper, more competent strata, thereby providing stable foundations for construction projects. Essentially, it addresses situations where surface soils lack sufficient bearing capacity to support intended structures.
Primary Access Routes (PAR)	These are the roads on the local road network that would be used by construction vehicles between the strategic road network and the access points within the Order Limits.
Project Section	Geographical 'sections' have been identified that break the Project down into smaller units for ease of description within the documentation. These Project Sections are broken down into eight sections based largely on Local Planning Authority boundaries.

Term	Description
Public Right of Way (PRoW)	A footpath, bridleway or byway accessible to all members of the public.
Pylon	Structures that support the overhead line (conductors).
Scoping	Scoping is the process of determining the content and extent of matters that should be covered in the Environmental Impact Assessment.
Scoping Report	Report determining the content and extent of matters that should be covered in the Environmental Impact Assessment.
Site access points	A location connecting a construction site to the public highway.
Standard mitigation measures	Comprise management activities and techniques, which would be implemented throughout construction of the Project to limit effects through adherence to good site practices.
Subsoil	Weathered soil layer extending between the natural topsoil and the unweathered basal layer (geological parent material, either solid or drift) below.
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Suspension pylon	Pylon where conductors are suspended by a vertical insulator string. Suspension pylons support the conductors on straight stretches of overhead line.
Temporary overhead line diversions and pylons	Temporary diversions of existing overhead line may be required to ensure electricity flows are maintained at all times during construction of the Project to limit the disruption to the electricity network. These typically comprise a short section of overhead line with temporary structures or pylons which electricity flows are diverted along.
Terminal pylon	Pylons erected at the end of the overhead line to terminate the line at substations or where overhead lines are connected to underground cables. Because of the uneven load on one side of the pylons, much deeper and heavier foundations are required on the unloaded side.
Transmission line	A National Grid overhead line and underground cable which transmits electricity between National Grid's substations. Power is transmitted at high voltages (275 kV or above) between power stations where it is generated and the local electricity supply networks of the regional Distribution Network Operators where it is transformed to lower voltages

Term	Description
	(132 kV or below) for supply via distribution lines to local communities.
Transport Assessment	Transport Assessment is a comprehensive and systematic process that sets out transport issues relating to a proposed development. It identifies what measures will be taken to deal with the anticipated transport effects of the Project. It is separate to Chapter 16: Traffic and Transport (document reference 6.16).
Trenchless crossing	A crossing installation method that has limited above-ground disturbance which is used to avoid a sensitive feature such as an environmental feature.
Topsoil	Material which developed originally at the top of the soil profile and is characteristically darker in colour and has a higher organic matter content than subsoil material.
Temporary construction compounds	Temporary compounds installed during the construction phase of the Project. Each compound may contain storage areas including laydown areas, soils storage and areas for equipment and fuel, drainage, generators, car parking and offices and welfare areas (portacabins).
UK Power Networks	UK Power Networks (Operations) Limited (registered company number 03870728) and/or its affiliate Eastern Power Networks plc (registered company number 02366906) as applicable.
Underground cable	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two Cable Sealing End compounds.
Voltage	The electrical potential difference between two points.
Water Framework Directive	The Water Framework Directive (2000/60/EC) commits European Union member states to achieve good qualitative and quantitative status of all water bodies. It is transposed into law in England and Wales via The Water Environment (Water Framework Directive) (England and Wales) 2017 Regulations, which were retained via the European Union (Withdrawal) Act 2018.
Working area	Working area required to construct elements of the Project, such as pylons, underground cables, CSE compounds.

Bibliography

British Geological Survey (2022) *BGS Geology Viewer* [online] Available at: https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ Accessed May 2025

British Standards Institution (BSI) (2014a). *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*.

British Standards Institution (BSI) (2014b). *BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*.

CIEEM (2018) *Guidelines for Ecological Impact Assessment (EcIA)* [Online] Available at: https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/ (Accessed June 2025).

Department for Environment, Food and Rural Affairs (2024) *Multi-Agency Geographic Information for the Countryside (MAGIC)* [online] Available at: https://magic.defra.gov.uk/home.htm Accessed May 2025

Department for Energy Security and Net Zero (2024a) *National Policy Statement (NPS) EN-1*

Department for Energy Security and Net Zero (2024b) *National Policy Statement (NPS) EN-5*

Department of Transport. (1988). *Calculation of Road Traffic Noise*.

Environment Agency (2025) *Risk of Flooding from Surface Water map* [Online] Available at: https://environment.data.gov.uk/dataset/b5aaa28d-6eb9-460e-8d6f-43caa71fbe0e (Accessed February 2025)

HM Government (2020) *Energy White Paper: Powering our Net Zero Future*.

HM Government (2022) *British Energy Security Strategy*.

Institute of Air Quality Management / Environmental Protection UK (2017) *Land-Use Planning & Development Control: Planning For Air Quality* [Online] Available at: https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf (Accessed June 2025)

Institute of Air Quality Management (2019) *A guide to the assessment of air quality impacts on designated nature conservation sites* [Online] Available at: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf (Accessed June 2025)

Institute of Air Quality Management (2024). *Guidance on the assessment of dust from demolition and construction* [Online] Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf (Accessed June 2025)

Institute of Environmental Management and Assessment (IEMA) (2023) *IEMA Guidelines: Environmental Assessment of Traffic and Movement* (EATM)

International Commission on Non-Ionizing Radiation Protection (ICNIRP) (1998) *ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHZ).* Published in Health Physics 74 (4):494-522.

International Organization for Standardization (2024). *ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors*.

Ministry of Housing, Communities and Local Government (2024) *Planning Act 2008: Pre-application stage for Nationally Significant Infrastructure Projects.*

National Grid (2022a) *East Anglia Green Energy Enablement (GREEN) – Corridor and Preliminary Routeing and Siting Study Report*.

National Grid Electricity System Operator (ESO) (2022a) *Pathway to 2030: Holistic Network Design*.

National Grid Electricity System Operator (ESO) (2022b) *Network Options Assessment 2021/22 Refresh*.

National Highways (2020). *Design Manual for Roads and Bridges LA 111 Noise and vibration*.

National Soil Resources Institute (NSRI) (2025) *National Soil Association mapping*

Natural England and Forestry Commission (2022) *Ancient woodland, ancient trees and veteran trees: advice for making planning decisions* [Online] Available at: https://www.gov.uk/guidance/ancient-woodland-ancient-trees-and-veteran-trees-advice-for-making-planning-decisions (Accessed: June 2025).

Ofgem (2022) *Decision on accelerating onshore electricity transmission investment*.

Planning Inspectorate (2025) *Advice Note Seven: Environmental Impact Assessment: process, preliminary environmental information and environmental statements* [Online] Available at: https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-an (Accessed May 2025)

Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021) *The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain*. British Birds 114: 747.

UK Centre for Ecology & Hydrology (2016) *UK Air Pollution Information System (APIS)* [Online] Available at: https://www.apis.ac.uk/ (Accessed August 2025)

VisitBritain (2016) *Accommodation Stock Audit.* [Online] Available at: https://www.visitbritain.org/accommodation-stock (Accessed November 2024).

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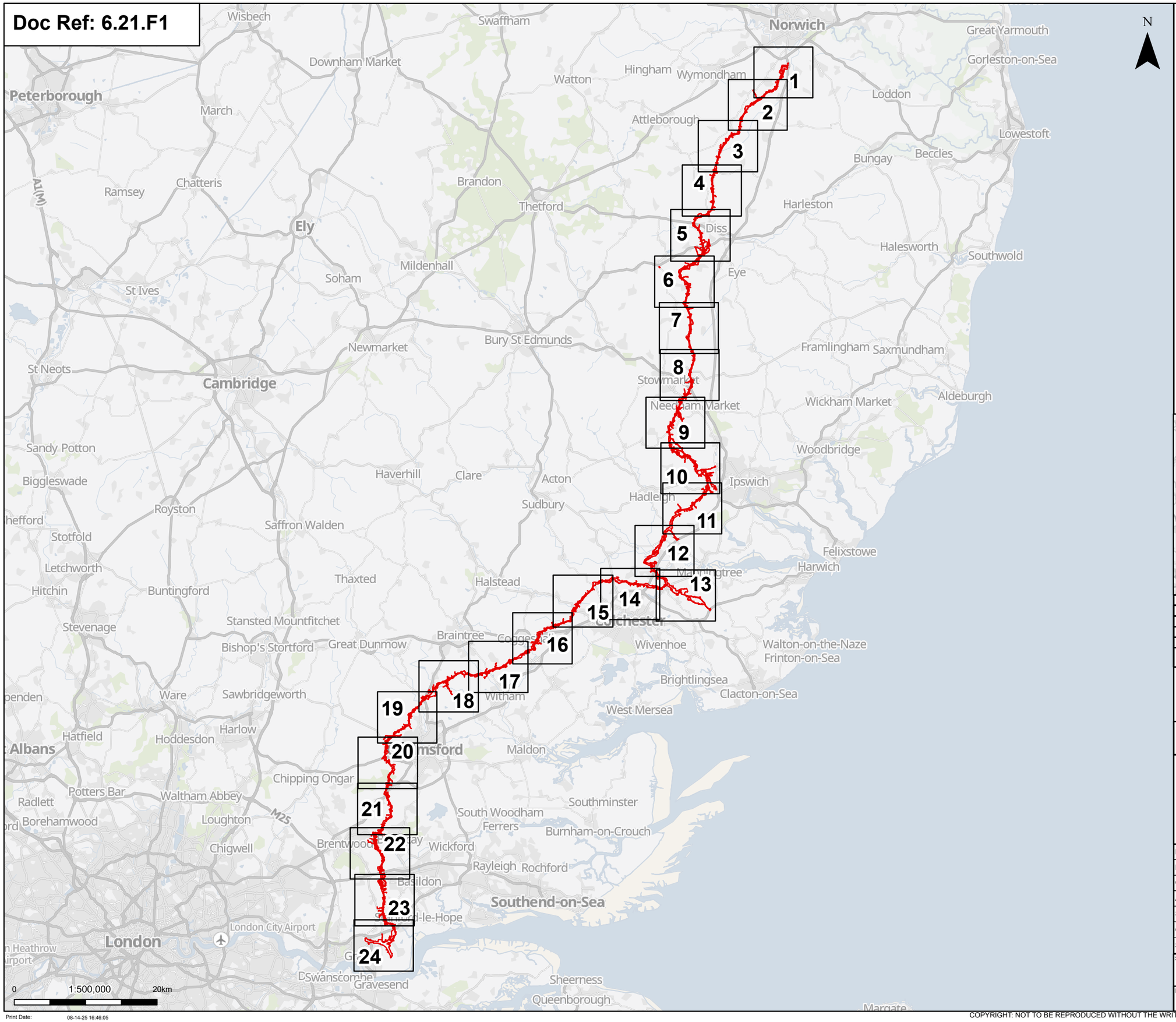

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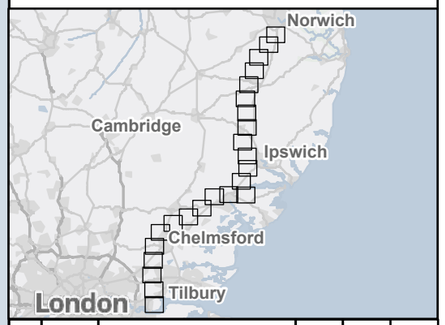

Rev	Date	Description	Drawn	Check	Approv
A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan Overview

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
Scale:	1:500,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

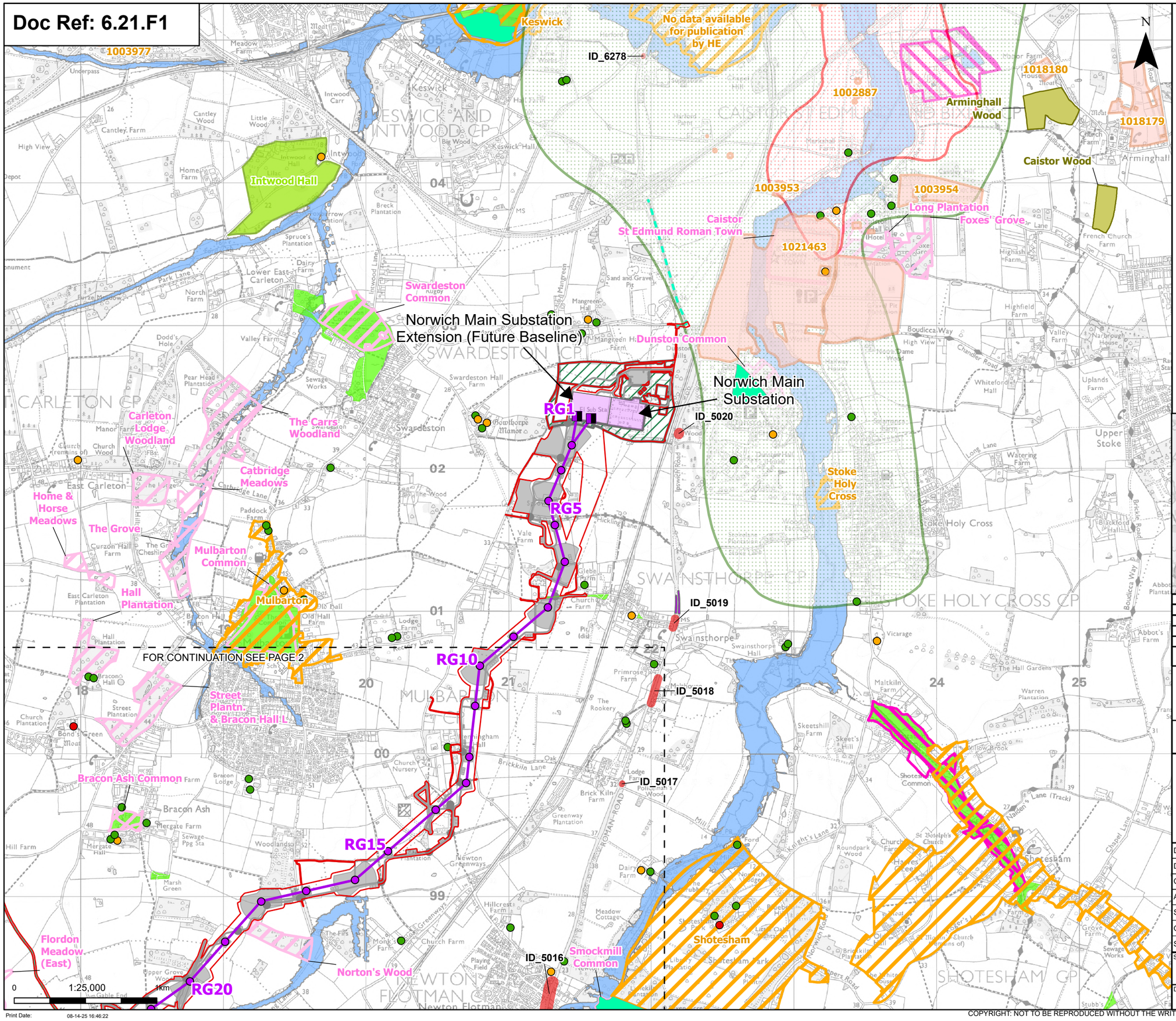
Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

Print Date: 08-14-25 16:46:05

Doc Ref: 6.21.F1



- Order limits
- Sheet index cutline

Proposed project design details

- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed standard lattice pylon location
- Norwich Main Substation
- Norwich Main Substation Extension (future baseline)
- Environmental area
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings

- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones

- Zone I - inner protection zone
- Zone II - outer protection zone
- Conservation Areas
- Sites of Special Scientific Interest
- Roadside Nature Reserves
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Registered Parks and Gardens
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan Page 1 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
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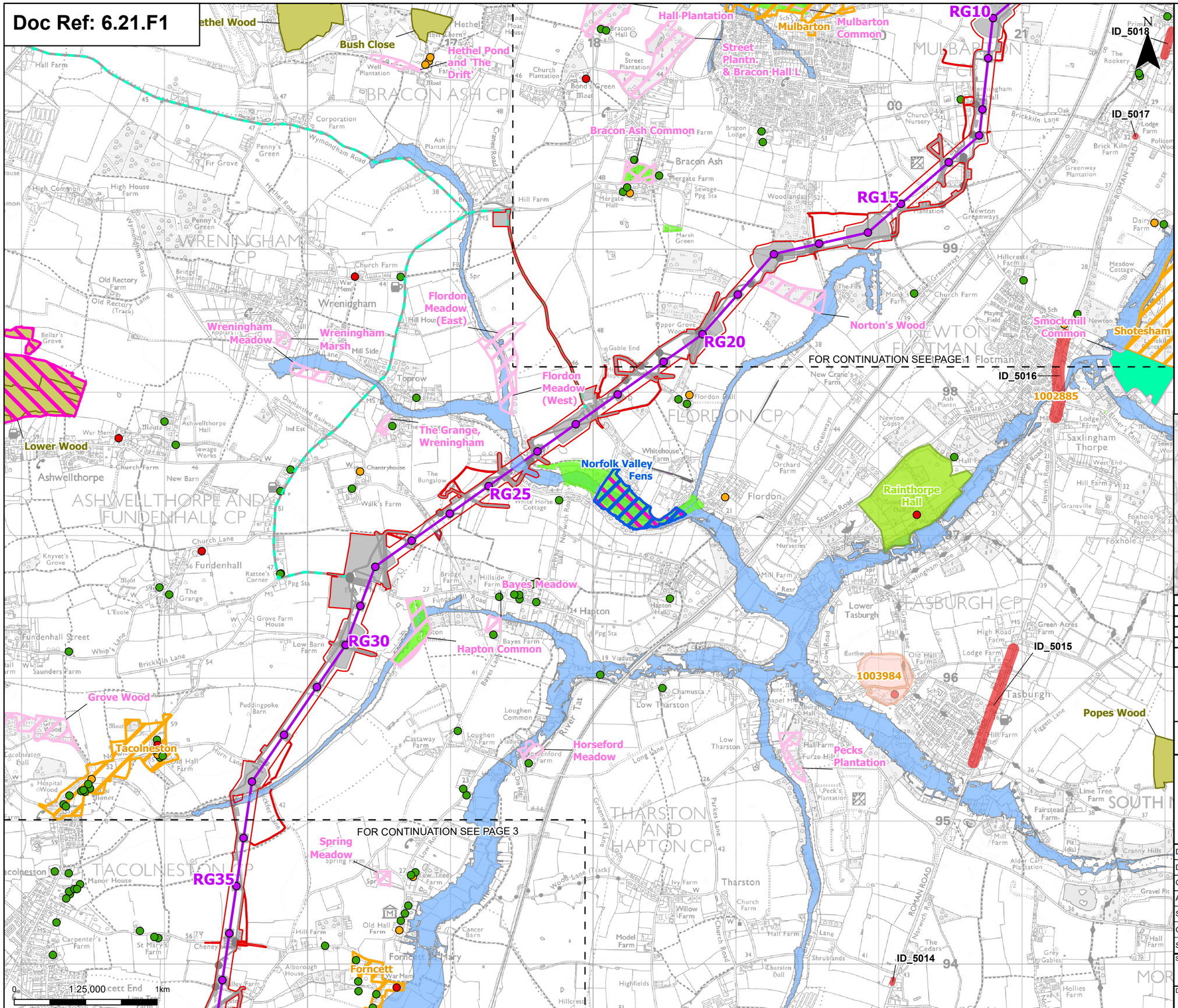
Suitability Code:	A2	Project Number:	10059280

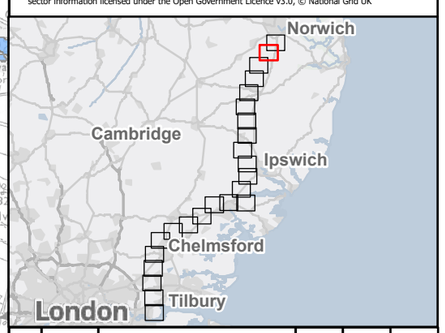
Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

Doc Ref: 6.21.F1





Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*

Primary access route
Special Areas of Conservation
Conservation Areas
Sites of Special Scientific Interest
Roadside Nature Reserves
Local Nature Reserves
Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Registered Parks and Gardens
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
Ancient Woodland
Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan Page 2 of 24

Designed	N. Lear	Date	21 Aug 25
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Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
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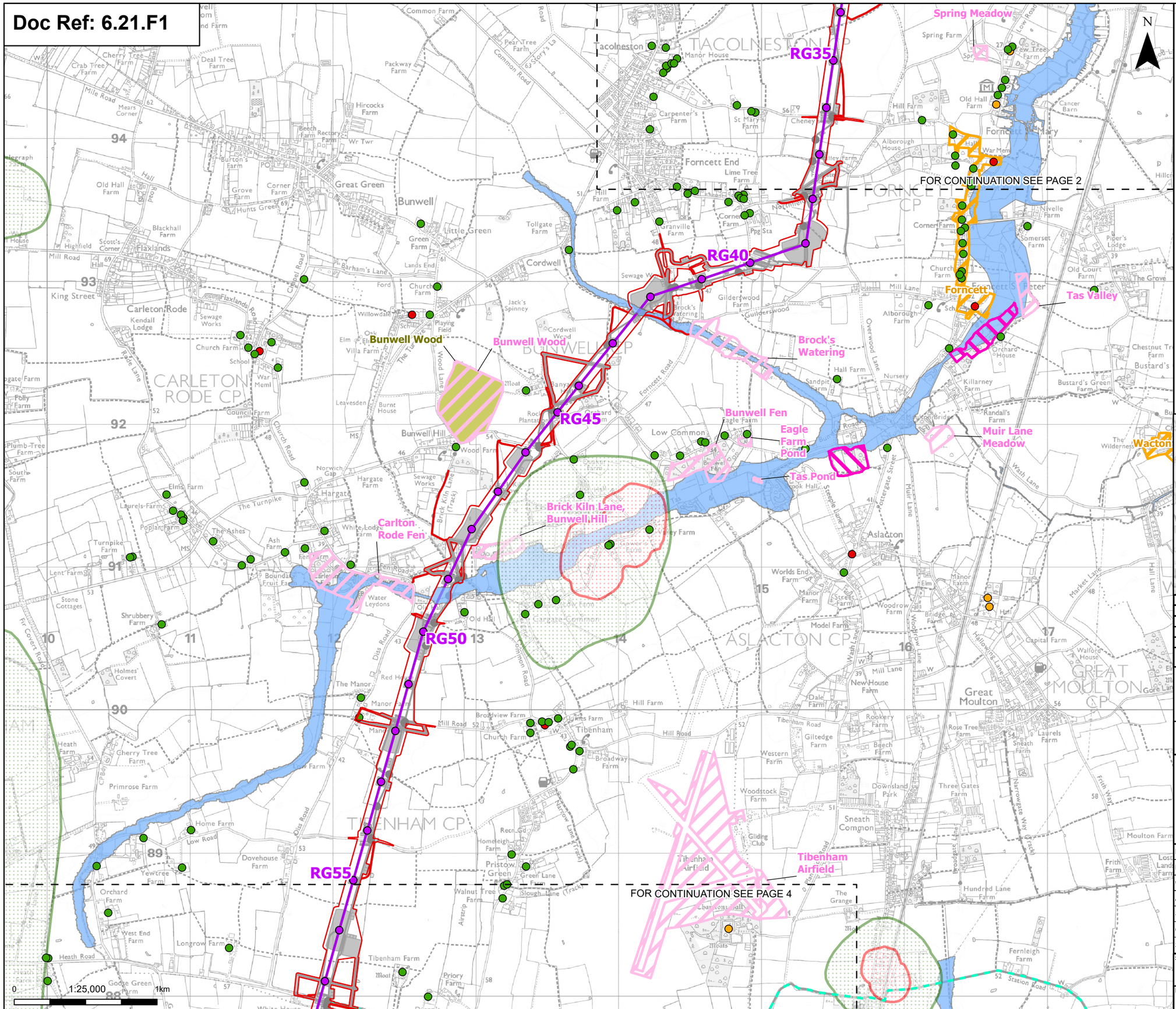
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

Doc Ref: 6.21.F1



Order limits
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Proposed project design details

Proposed overhead line alignment
Proposed standard lattice pylon location
Other temporary and permanent construction and operational works

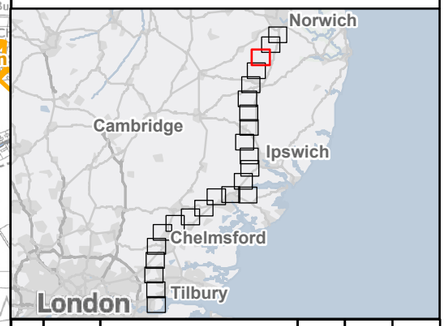
Discipline specific constraints

Listed Buildings
Grade I
Grade II
Grade II*
Primary access route

Source protection zones
Zone I - inner protection zone
Zone II - outer protection zone

Conservation Areas
Sites of Special Scientific Interest
County / Local Wildlife Sites
Ancient Woodland
Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



Rev	Date	Description	Drawn	Check	Approv
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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan
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Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
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Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

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Revision: A

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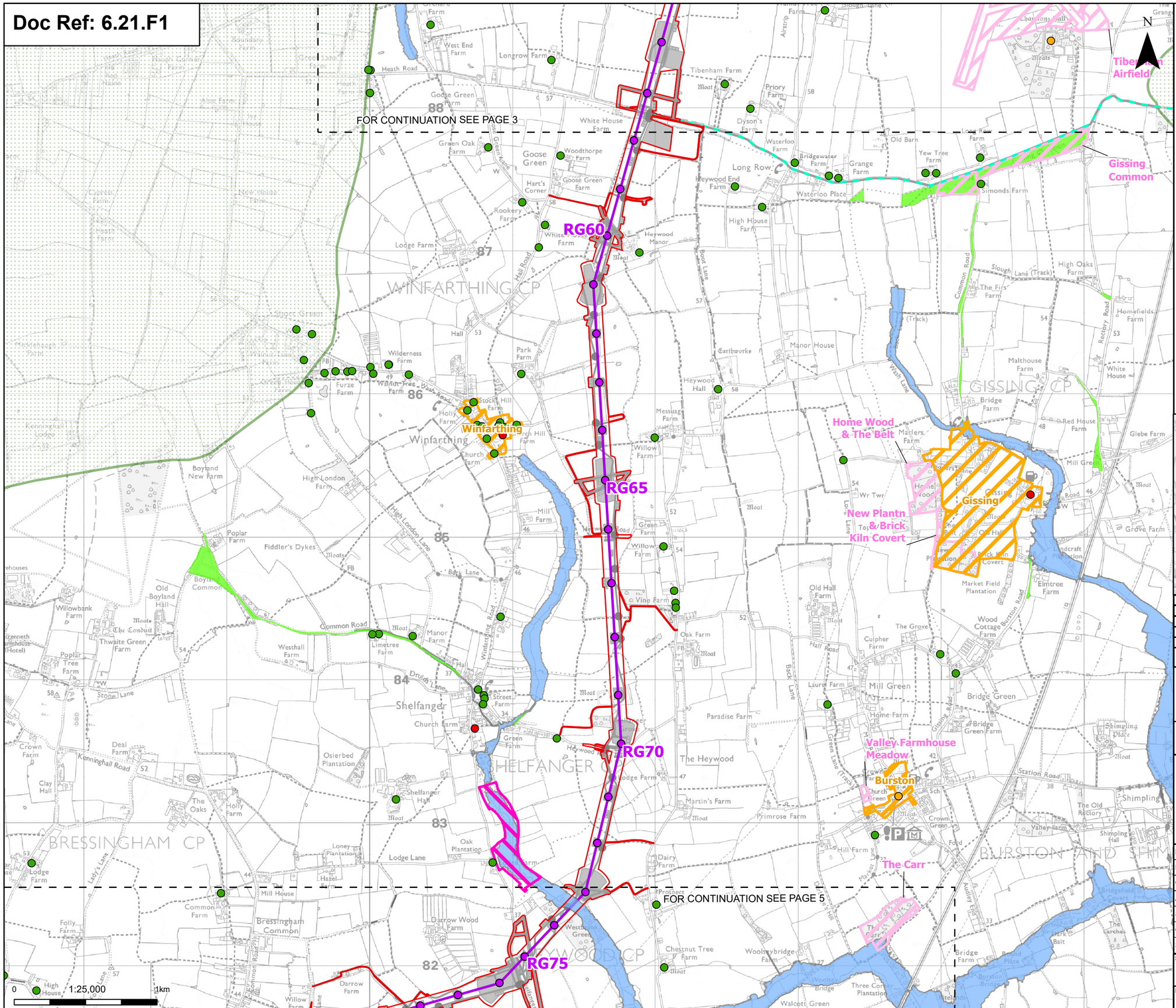

Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone II - outer protection zone

- Conservation Areas
- Sites of Special Scientific Interest
- Roadside Nature Reserves
- Countryside and Rights of Way Open Access Land
- County / Local Wildlife Sites
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 4 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
Scale:	1:25,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

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Revision: A

Print Date: 08-14-25 16:47:17

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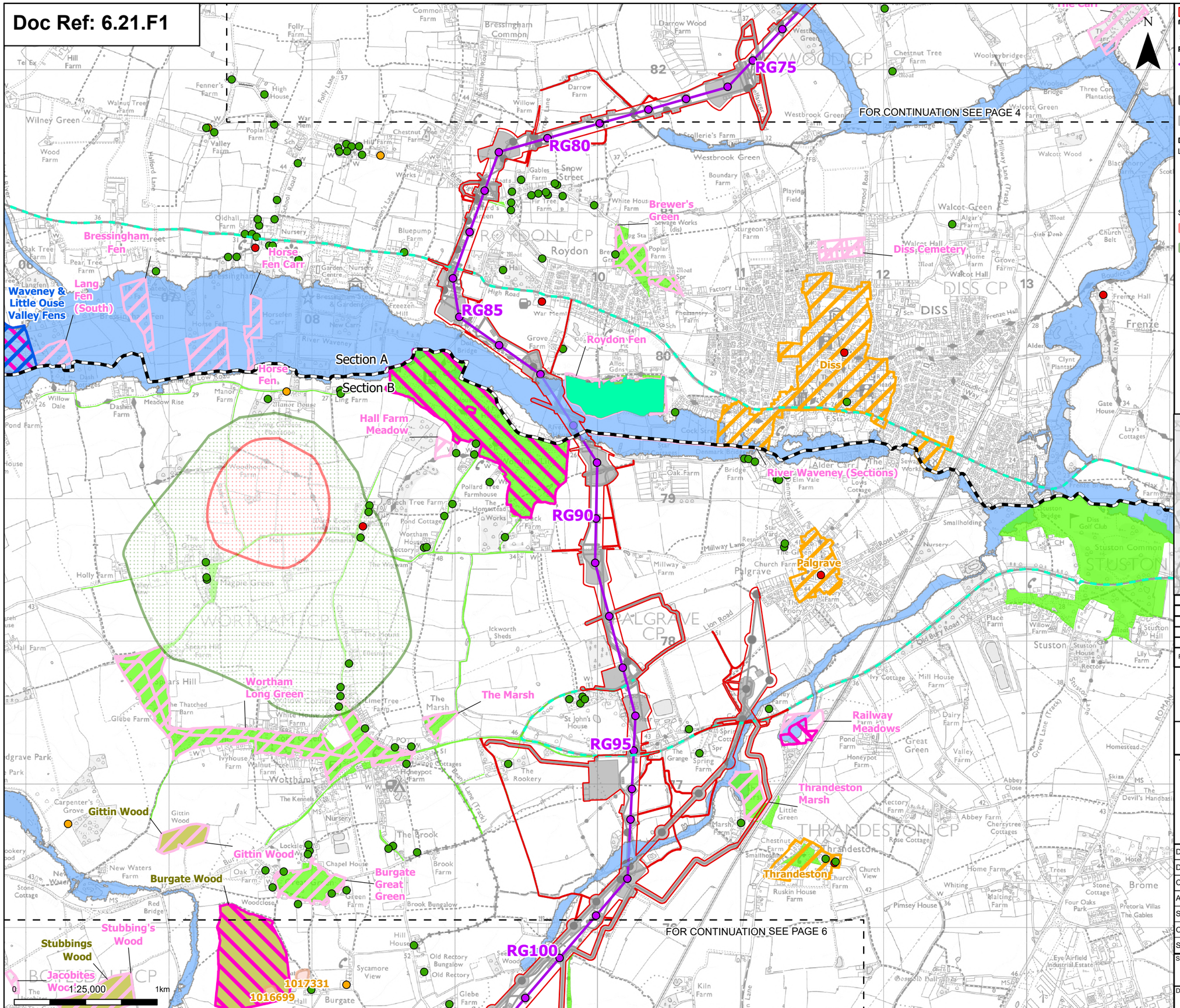

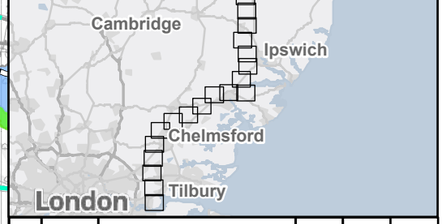

- Order limits
- Sheet index cutline
- Project sections

Proposed project design details

- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone I - inner protection zone
- Zone II - outer protection zone

- Special Areas of Conservation
- Conservation Areas
- Sites of Special Scientific Interest
- Roadside Nature Reserves
- Local Nature Reserves
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 5 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
Scale:	1:25,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

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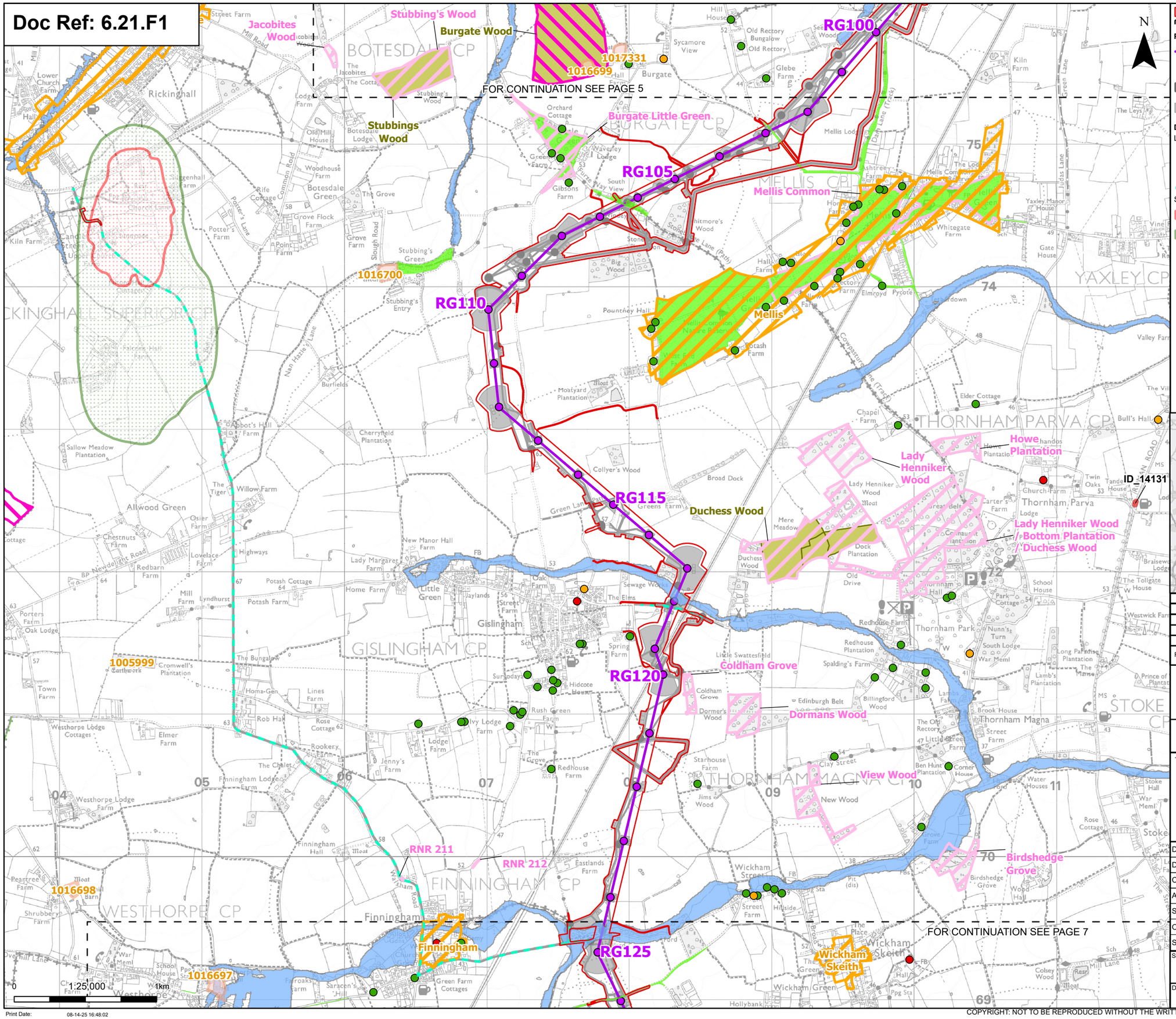


Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works

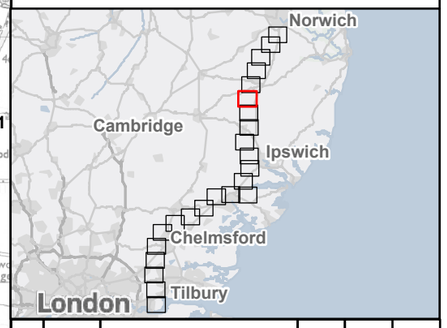
Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone I - inner protection zone
- Zone II - outer protection zone

- Conservation Areas
- Sites of Special Scientific Interest
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 6 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
Scale:	1:25,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

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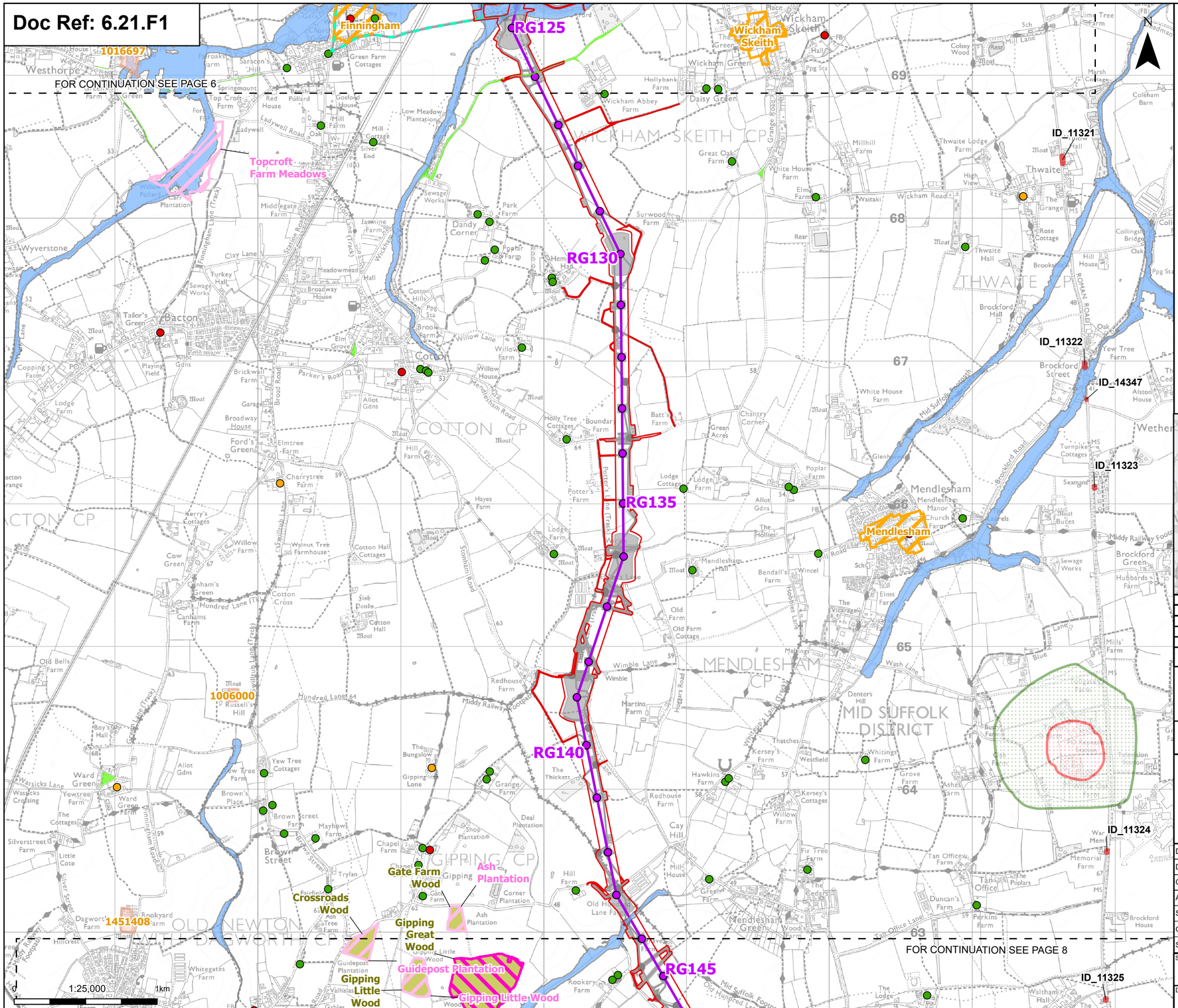
Print Date: 08-14-25 16:48:02

Doc Ref: 6.21.F1



Order limits
Sheet index cutline

Proposed project design details

Proposed overhead line alignment
Proposed standard lattice pylon location
Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
Grade I
Grade II
Grade II*
Primary access route

Source protection zones
Zone I - inner protection zone
Zone II - outer protection zone
Conservation Areas

Sites of Special Scientific Interest
Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
Ancient Woodland
Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan Page 7 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
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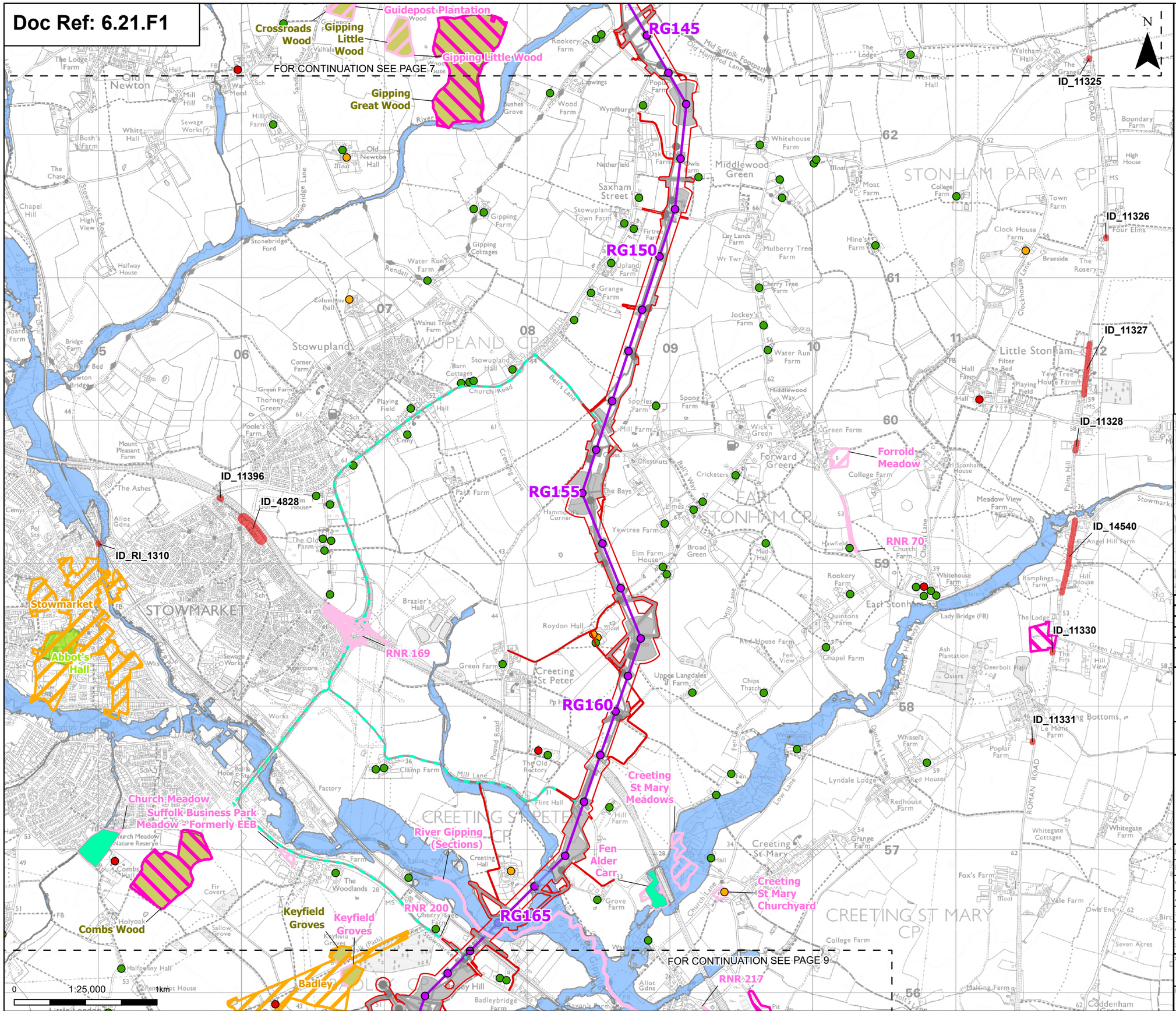


Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works

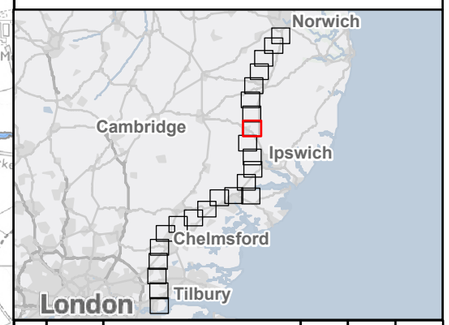
Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*

Primary access route
Conservation Areas

Sites of Special Scientific Interest
Local Nature Reserves
Noise important area (labelled using "ID_XXX")
Registered Parks and Gardens
County / Local Wildlife Sites
Ancient Woodland
Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



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A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
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Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
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Approved	K. Burrows	Date	21 Aug 25
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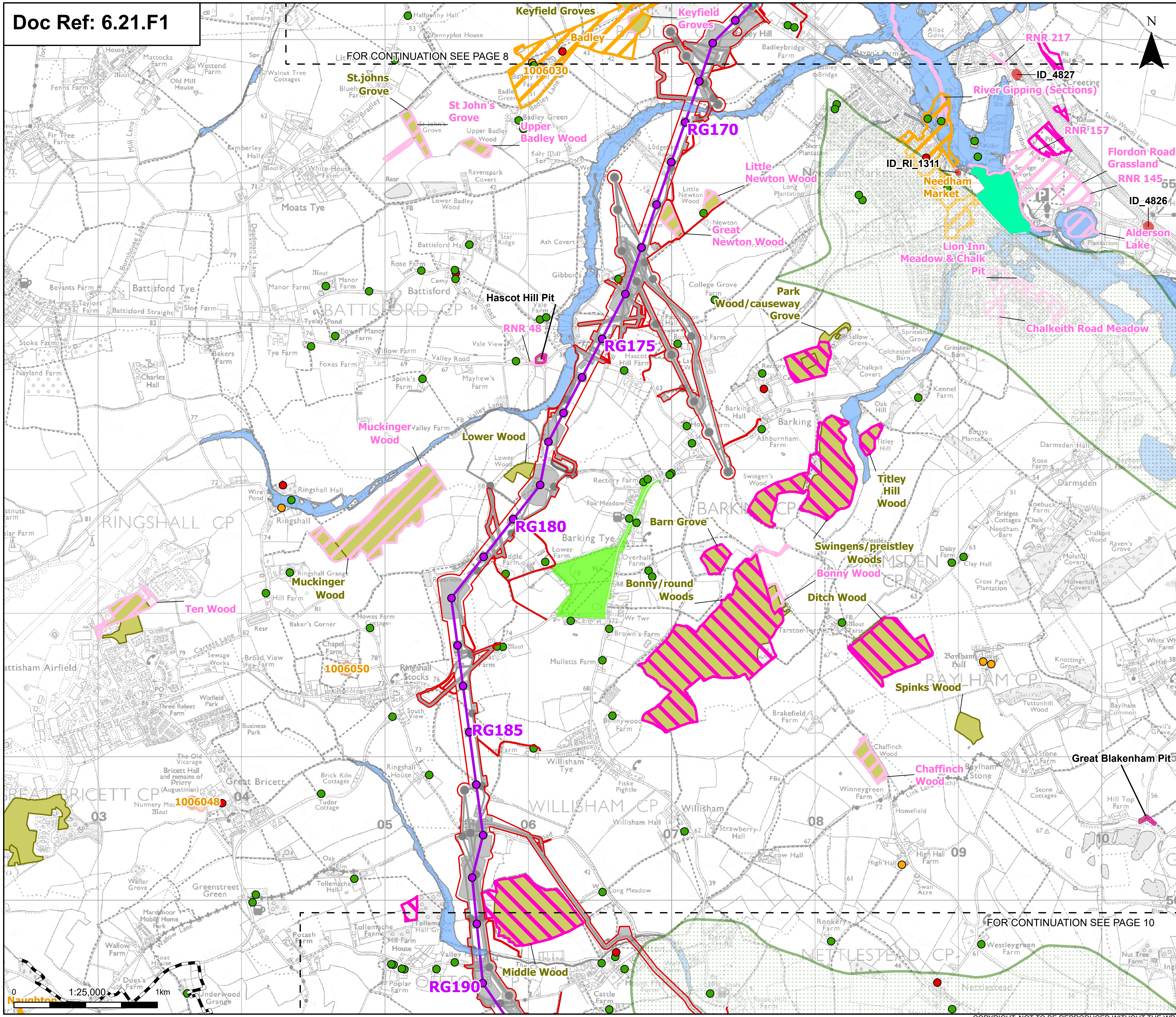
Revision: A

Doc Ref: 6.21.F1

FOR CONTINUATION SEE PAGE 8



FOR CONTINUATION SEE PAGE 10

- Order limits
- Sheet index cutline
- Project sections

Proposed project design details

- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

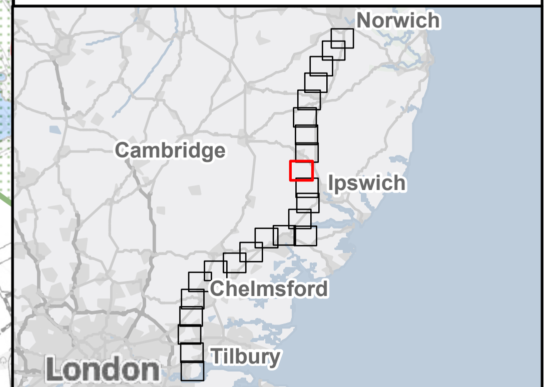
Listed Buildings

- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones

- Zone I - inner protection zone
- Zone II - outer protection zone
- Conservation Areas
- Geological Site of Special Scientific Interest (SSSI)
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan Page 9 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
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Suitability Description: Accepted as Concept Stage

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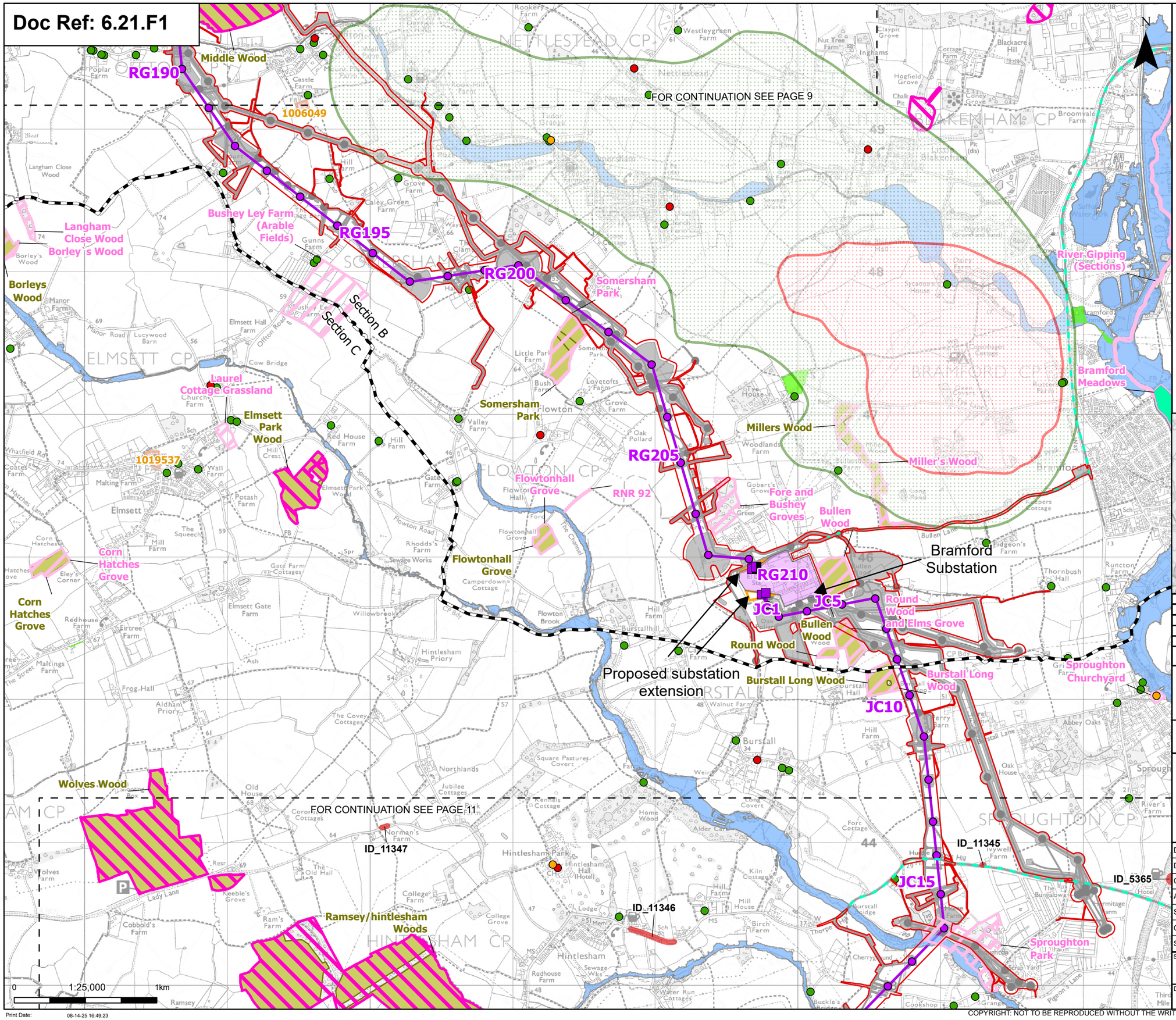

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Order limits
Sheet index cutline
Project sections

Proposed project design details

- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed low duty gantry
- Proposed standard lattice pylon location
- Bramford Substation
- Bramford Substation Extension
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone I - inner protection zone
- Zone II - outer protection zone
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Figure A21.1.1 - Environmental Constraints Plan
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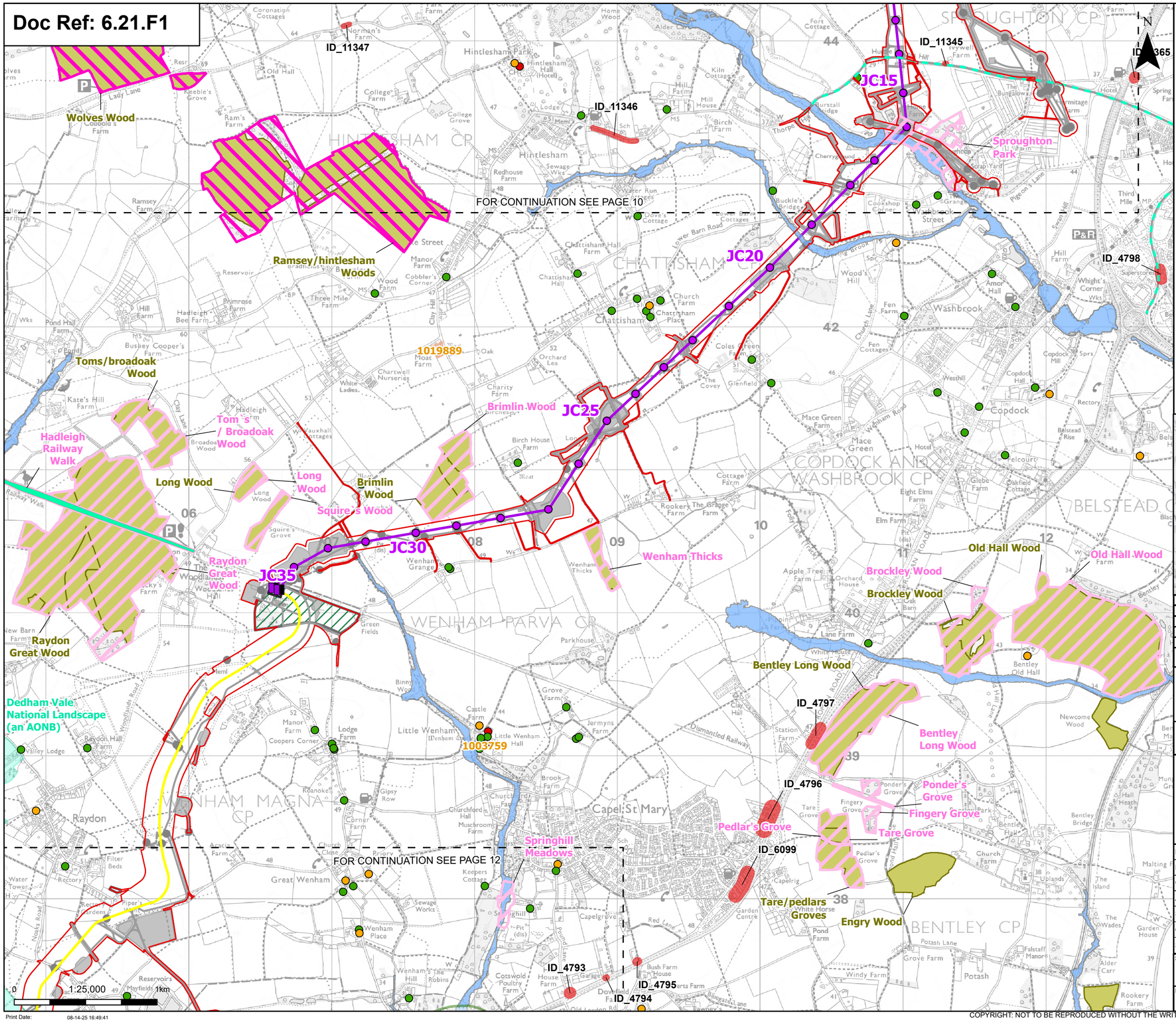

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Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed standard lattice pylon location
- Proposed underground cable alignment
- Proposed cable sealing end compound (CSEC)
- Environmental area
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone II - outer protection zone
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- National Landscape (an Area of Outstanding Natural Beauty)
- Ancient Woodland
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 11 of 24

Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
Scale:	1:25,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

Doc Ref: 6.21.F1

1019815

Parkland And Gardens Of Giffords Hall

Hazel Grove/long Wood

Rowley Grove

Higham Meadow

Rowley Grove

River Brett (Sections)

Dedham Vale National Landscape (an AONB)

Higham

Thorington Street

Thorington Street Pit & Reservoir

Wasses Marshes

Trenchless Crossing: Higham Road

ID_4788

ID_12056

Trenchless Crossing: River Stour (north part)

Trenchless Crossing: River Stour (south part)

ID_6098

Stratford St Mary

Langham Water Works

St Mary's Churchyard, Langham Hall

The Coombs

Cophedge Wood

Cophedge Farm Wood

Ash Wood

Ash Wood

Gun Hill Grassland

Langham SRV

Bridges Farm

Stratford St Mary

ID_4787

Gun Hill Place

Dalethorpe Park

Dedham

Dedham Churchyard

Dedham Old River Marshes

Judas Gap Marsh

1002135

1019078

Black Brook

ID_4786

ID_6097

FOR CONTINUATION SEE PAGE 14

FOR CONTINUATION SEE PAGE 13

Trenchless Crossing: A12 highway crossing

ID_12065

Section C

Section D

0 1:25,000 1km

FOR CONTINUATION SEE PAGE 11

ID_4791

ID_4790

ID_4792

ID_4794

ID_4793

ID_13961

Springhill Meadow

Suffolk Coast & Heaths National Landscape (an AONB)

East Bergholt

1002125

Lawford

Lawford Churchyard

Wignall Brook Grasslands

Shir

Burn Wood and Meadow

N

Order limits
Sheet index cutline
Project sections

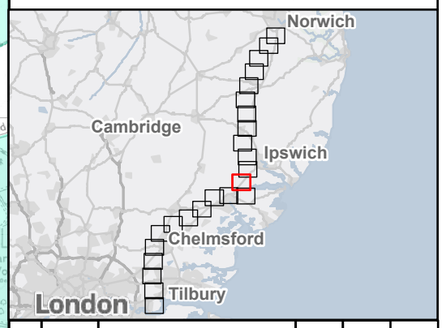
Proposed project design details
Proposed underground cable alignment
Environmental mitigation
Other temporary and permanent construction and operational works

Discipline specific constraints
Listed Buildings
Grade I
Grade II
Grade II*
Primary access route

Source protection zones
Zone I - inner protection zone
Zone II - outer protection zone
Conservation Areas
Sites of Special Scientific Interest

Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Registered Parks and Gardens
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
National Landscape (an Area of Outstanding Natural Beauty)
Ancient Woodland
Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



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nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
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Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
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Scale:	1:25,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

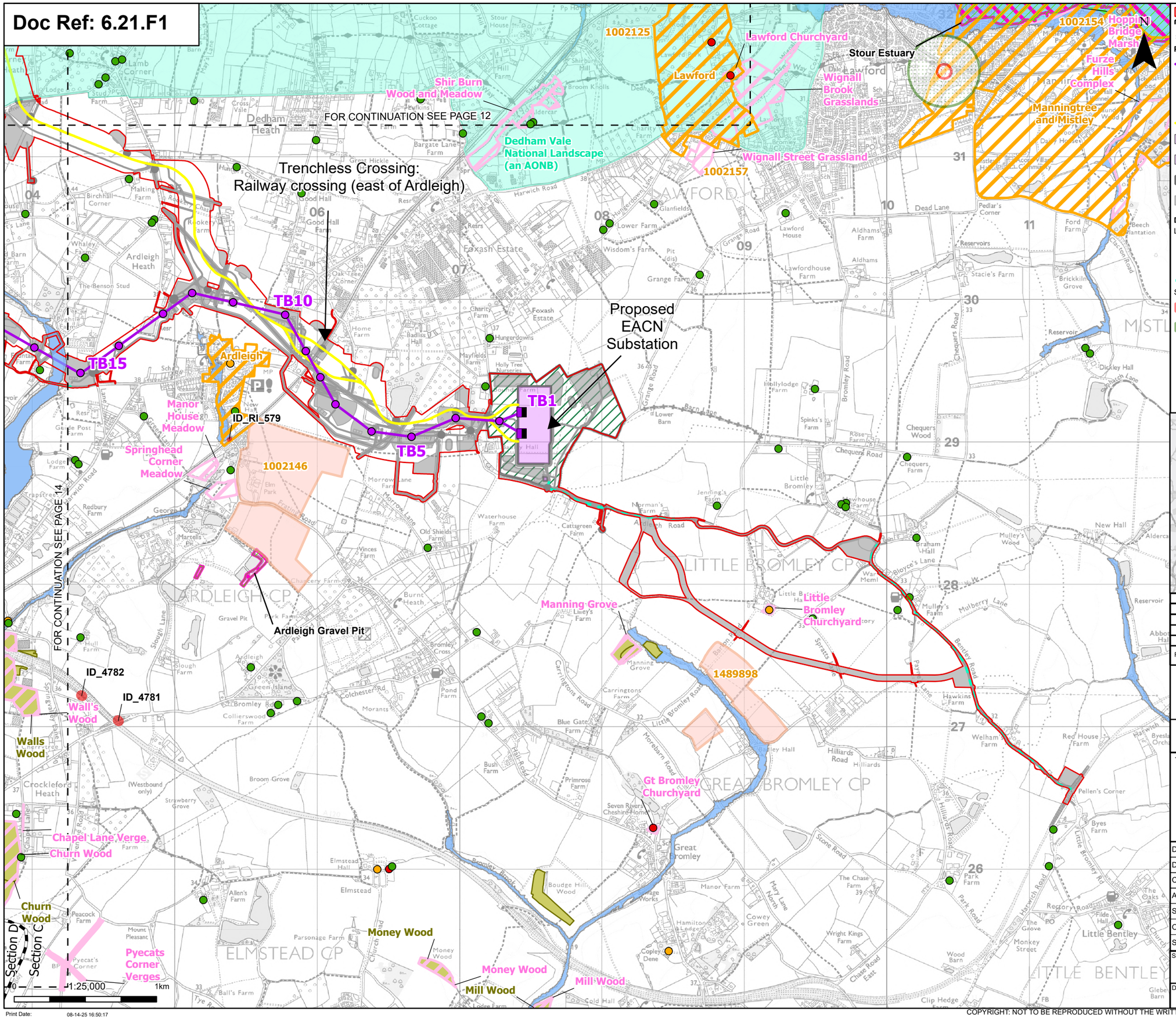
Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

Print Date: 08-14-25 16:49:57

Doc Ref: 6.21.F1



- Order limits
- Sheet index cutline
- Project sections

Proposed project design details

- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed standard lattice pylon location
- Proposed underground cable alignment
- Proposed DNO Substation
- Proposed East Anglia Connection Node Substation (EACN)
- Environmental area
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings

- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones

- Zone I - inner protection zone
- Zone II - outer protection zone
- Conservation Areas
- Geological Site of Special Scientific Interest (SSSI)
- Sites of Special Scientific Interest
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- National Landscape (an Area of Outstanding Natural Beauty)
- Ancient Woodland
- Flood Zone 3

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 -
Environmental Constraints Plan
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Designed	N. Lear	Date	21 Aug 25
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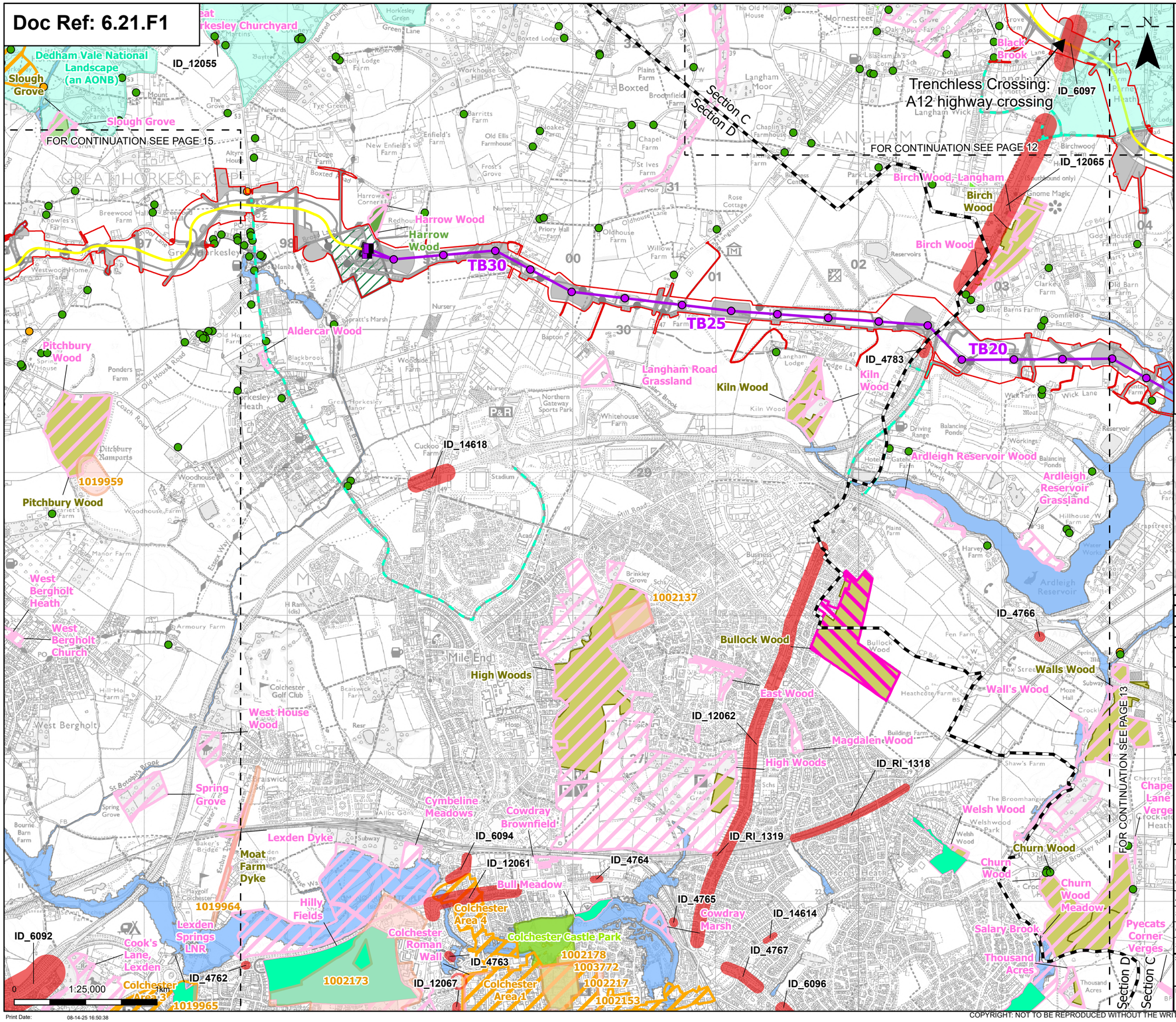
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description:
Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299
Revision: A

Print Date: 08-14-25 16:50:17

Doc Ref: 6.21.F1



Order limits
Sheet index cutline
Project sections

Proposed project design details

- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed standard lattice pylon location
- Proposed underground cable alignment
- Proposed cable sealing end compound (CSEC)
- Environmental area
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone I - inner protection zone
- Conservation Areas
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Registered Parks and Gardens
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- National Landscape (an Area of Outstanding Natural Beauty)
- Ancient Woodland
- Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
- Flood Zone 3

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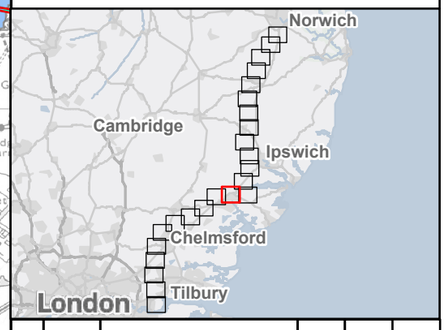

Rev	Date	Description	Drawn	Check	Approv
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nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 14 of 24

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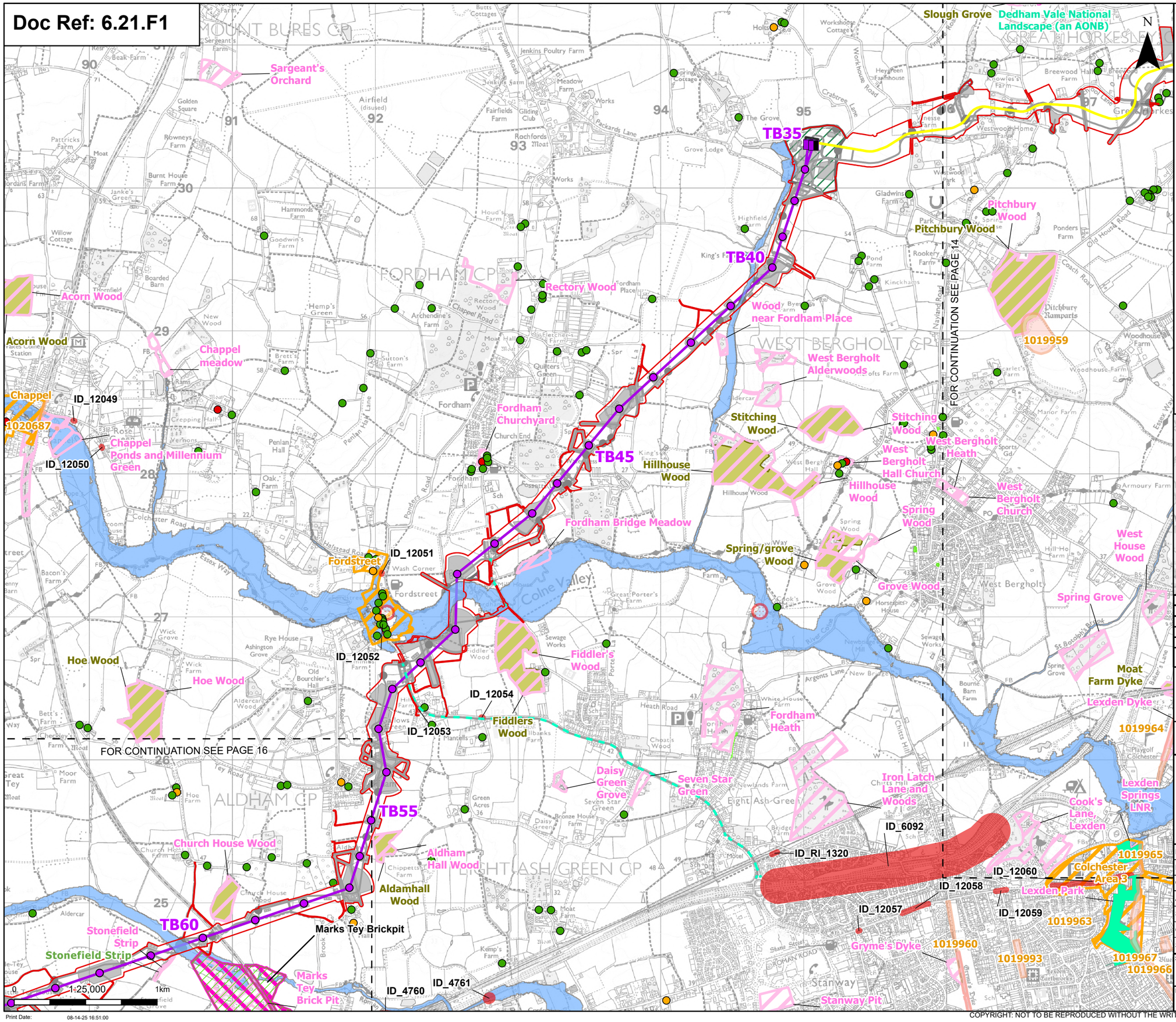
Revision: A

Doc Ref: 6.21.F1



- Order limits
- Sheet index cutline

Proposed project design details

- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed standard lattice pylon location
- Proposed underground cable alignment
- Proposed cable sealing end compound (CSEC)
- Environmental area
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings

- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones

- Zone I - inner protection zone
- Conservation Areas
- Geological Site of Special Scientific Interest (SSSI)
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- National Landscape (an Area of Outstanding Natural Beauty)
- Ancient Woodland
- Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
- Flood Zone 3

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

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Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

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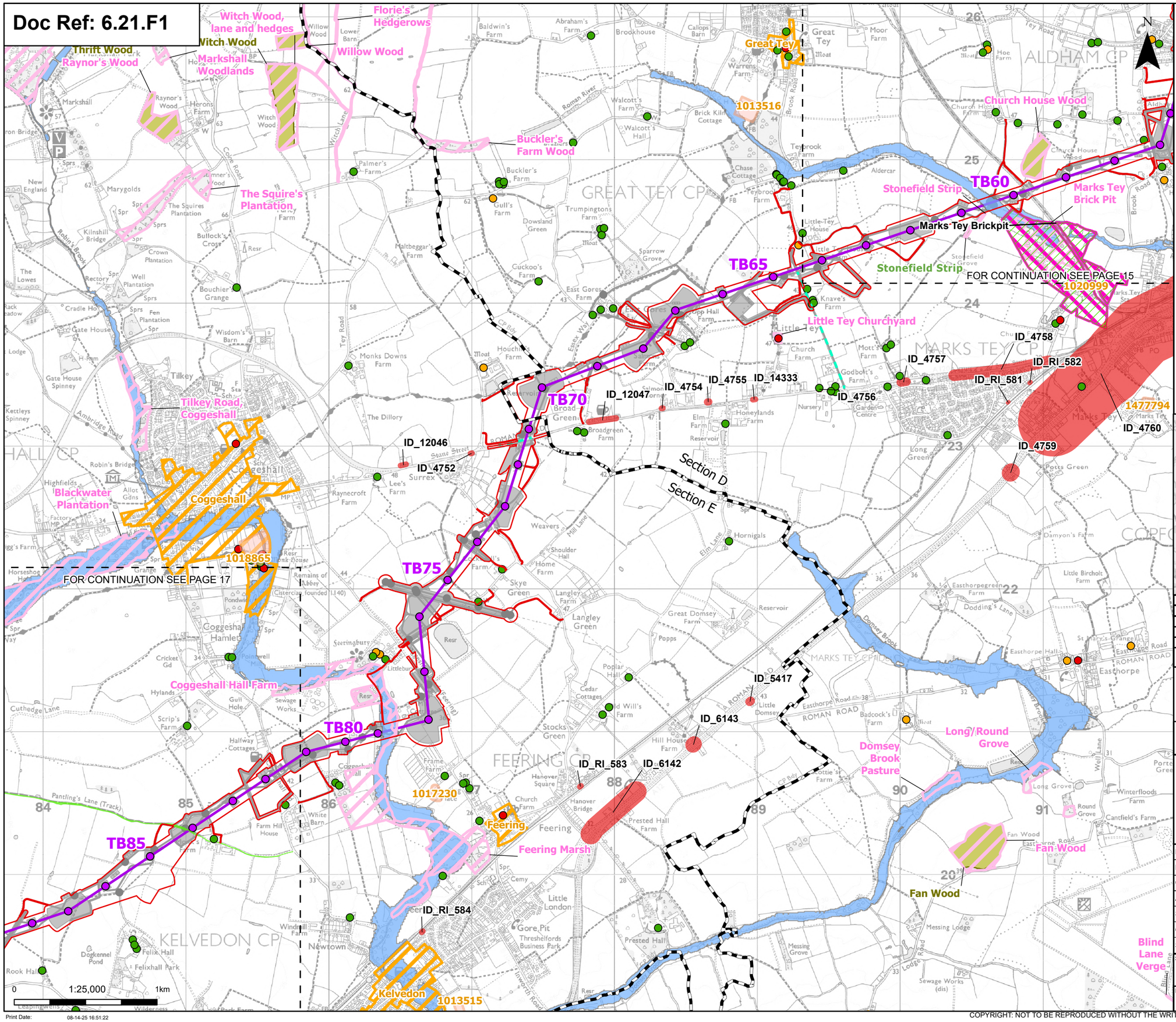

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Order limits
Sheet index cutline
Project sections

Proposed project design details

Proposed overhead line alignment
Proposed standard lattice pylon location
Environmental mitigation
Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
Grade I
Grade II
Grade II*
Primary access route
Conservation Areas
Geological Site of Special Scientific Interest (SSSI)
Sites of Special Scientific Interest
Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
Ancient Woodland
Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
Flood Zone 3

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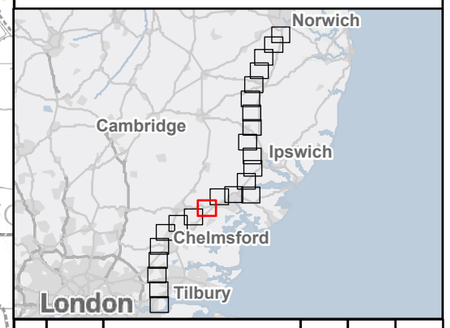

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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 16 of 24

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Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

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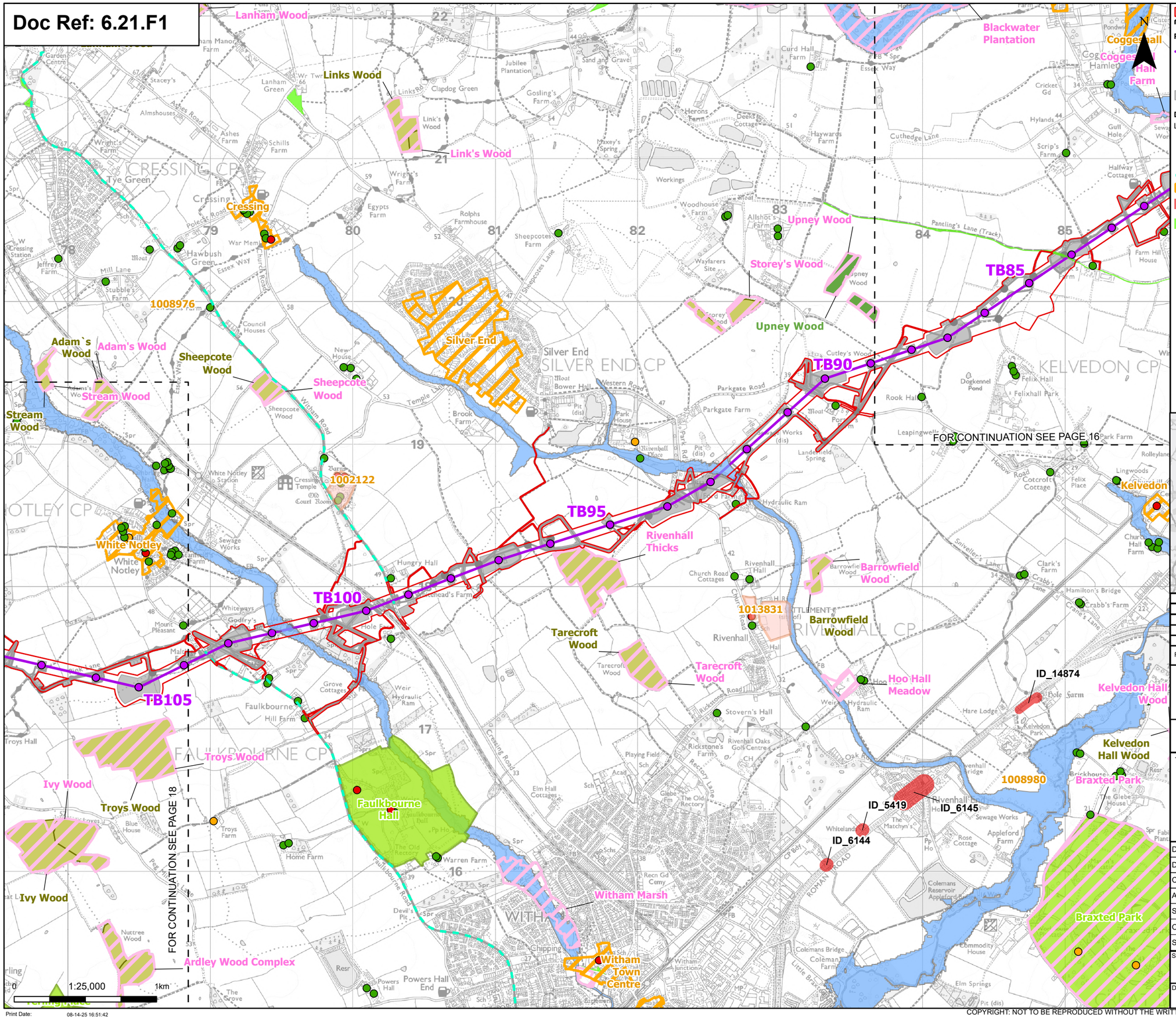

Order limits
Sheet index cutline

Proposed project design details

Proposed overhead line alignment
Proposed standard lattice pylon location
Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
Grade I
Grade II
Grade II*
Primary access route
Conservation Areas
Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Registered Parks and Gardens
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
Ancient Woodland
Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
Flood Zone 3

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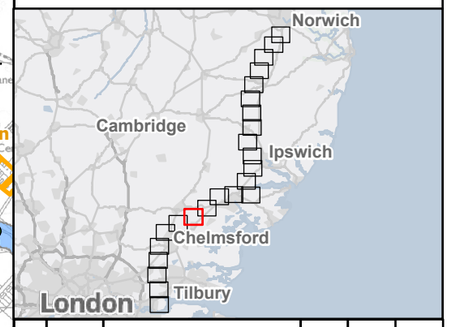

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nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
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Designed	N. Lear	Date	21 Aug 25
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Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

Revision: A

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Bushy/breams Woods
Fair Wood
ID_5330
Bushy Wood
Paul's Wood
Batemans Farm Green Lane
Hazelton Wood
Stream Wood
Adam's Wood
Phyllis Currie/Dumney Lane Woods
Lavenders Bridge Verge
Court Hill Road Verge
ID_5331
Mann/parsons Woods
1016802
Sandylay and Moat Woods
Hallhook Row
TB115
TB110
Galleycable Wood
Mann/Parson's Wood
Parson's and Queen's Wood
TB120
Brickhouse Wood
Fairsteadhall Wood
TB105
Troys Wood
St John the Evangelist Church, Little Leighs
Little Leighs Orchid Meadow
Great Hyde Wood
ID_5333
ID_5332
Straw Brook Plantation
Lowley's Farm Meadow
TB125
River Ter
Hookley Wood
Ivy Wood
Stockley Wood
1008979
Ardley Wood Complex
St Mary the Virgin, Great Leighs
ID_13893
TB130
Lyonshall Wood
Wade's Spring
Sandy Wood
Terling Churchyard and Green
Terling
Scarletts Wood
Scarlett's Wood (part of)
Scarlett's Wood
Craigments Spring
Terling Place
Chathamhall Spring
TB135
Lyonshall Wood
Stonage Wood
Langleys Deer Park
Choppings Wood
Sheepcotes Wood
Chopping's Wood
Ringers Wood
Ringer's Wood
Section E
Section F
Terling Hall Woods
Titbeech Wood
Toppinghoehall Wood
Lost Wood
Little Waltham
Little Waltham Village Meadows
St Martin's Church, Little Waltham
Broomfield
Little Waltham
Chelmer
WHITE NOTLEY CP
FAIRSTEAD CP
TERLING CP
LITTLE WALTHAM CP
FOR CONTINUATION SEE PAGE 19
FOR CONTINUATION SEE PAGE 17
0 1:25,000 1km

Order limits
Sheet index cutline
Project sections

Proposed project design details

Proposed overhead line alignment
Proposed low duty gantry
Proposed low height pylon location
Proposed standard lattice pylon location
Proposed underground cable alignment
Proposed cable sealing end compound (CSEC)
Environmental area
Environmental mitigation
Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
Grade I
Grade II
Grade II*
Primary access route

Conservation Areas
Geological Site of Special Scientific Interest (SSSI)
Sites of Special Scientific Interest
Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Registered Parks and Gardens
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
Ancient Woodland
Flood Zone 3

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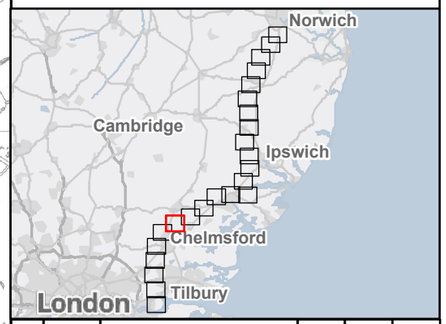

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A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Title:

Figure A21.1.1 - Environmental Constraints Plan
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Designed	N. Lear	Date	21 Aug 25
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Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299
Revision: A

Print Date: 08-14-25 16:52:02

Doc Ref: 6.21.F1

Pleshey
1002191
1002159
Pleshey Road
Pleshey Castle
1011808
Oxney Spring
Fitzjohns Wood
Fitzjohn's Wood
Blatche's Wood
Penden Hill Verges
Langleys Deer Park
Green Road Verges
Great Waltham
Langleys
TB140
1002140
Little Waltham
Little Waltham Village Meadows
St Martin's Church, Little Waltham
TB135
Chatham Hall Spring
ID_13893
Lyonshall Wood
Stonage Wood
Sheepcotes Wood
Border Wood
Border Wood Lake
TB145
Sparrowhawk Wood
Puddings Wood
Broomfield - Little Waltham Chelmer
ID_6174
Nightingale Wood
1011809
Bushy Wood
TB150
TB155
TB160
St Mary's Church, Broomfield
Broomfield
Daffy Wood
Newland's Spring
College Wood
ID_5337
ID_5338
ID_5336
ID_5339
Chelmer Valley Riverside
ID_RI_587
Springfield Green

FOR CONTINUATION SEE PAGE 18

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0 1:25,000 1km

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N

Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed low height pylon location
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*

- Primary access route
- Conservation Areas
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Registered Parks and Gardens
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
- Flood Zone 3

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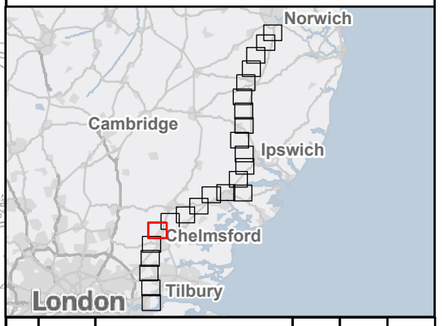

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nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
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Figure A21.1.1 - Environmental Constraints Plan
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TB160
TB165
TB170
TB175
TB180

Roxwell
Hopgarden Spring
Engine Spring/Ring Grove
Sandpit Wood
Sandpit Wood
The Moors
Lady Grove
Lady Grove
ID_13440
Lee Wood
Lee Wood
St Paul Highwood Churchyard
1017002
Great/Little Edney Woods
South Wood
Writtlepark Woods
Writtle-writtlepark Wood
Writtle High Woods
Barrow Wood/Birch Spring
Writtle-barrow Wood
Parson's Spring
Stoneymore Woods
Ellis Wood and Lane
Writtle-james Spring
James's Spring
Chapel Wood
King Wood
Chapel Wood
Oak Stables Meadow
Bell Grove and Mapletree Lane
College Wood
Mill Green Woodland 1008895
Well Wood
Box Wood
Box Wood
Cow Watering Lane Verge
1002166
All Saints Church, Writtle
Writtle
Writtle Bridge Meadows
Marconi Ponds Nature Reserve
Writtle Road Cemetery
ID_14313
ID_14741
Chelmsford West End
ID_5350
ID_5351
ID_RI_589
ID_RI_590
Chelmsford New London Road
ID_5353
ID_5352
Chelmsford St John's Hospital
Moulsham Thrift Wood
Moulsham Thrift Wood
Widford Meadow
ID_5354
ID_6172
1016798
Galleywood Common
Hylands Park
Hylands Park
ID_5355
Margaretting
Margaretting
Lee Section F
Lee Section G

0 1:25,000 1km

Print Date: 08-14-25 16:52:40

N

Order limits
Sheet index cutline
Project sections

Proposed project design details

Proposed overhead line alignment
Proposed standard lattice pylon location
Environmental mitigation
Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
Grade II
Grade II*
Primary access route
Conservation Areas
Sites of Special Scientific Interest
Local Nature Reserves
Noise important area (labelled using "ID_XXX")
Countryside and Rights of Way Open Access Land
Registered Parks and Gardens
Scheduled Monument (with accompanying list entry number)
County / Local Wildlife Sites
Ancient Woodland
Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).

Rev	Date	Description	Drawn	Check	Approv
A	Aug 2025	FOR DCO APPLICATION	KF	AF	KB

nationalgrid

PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan
Page 20 of 24

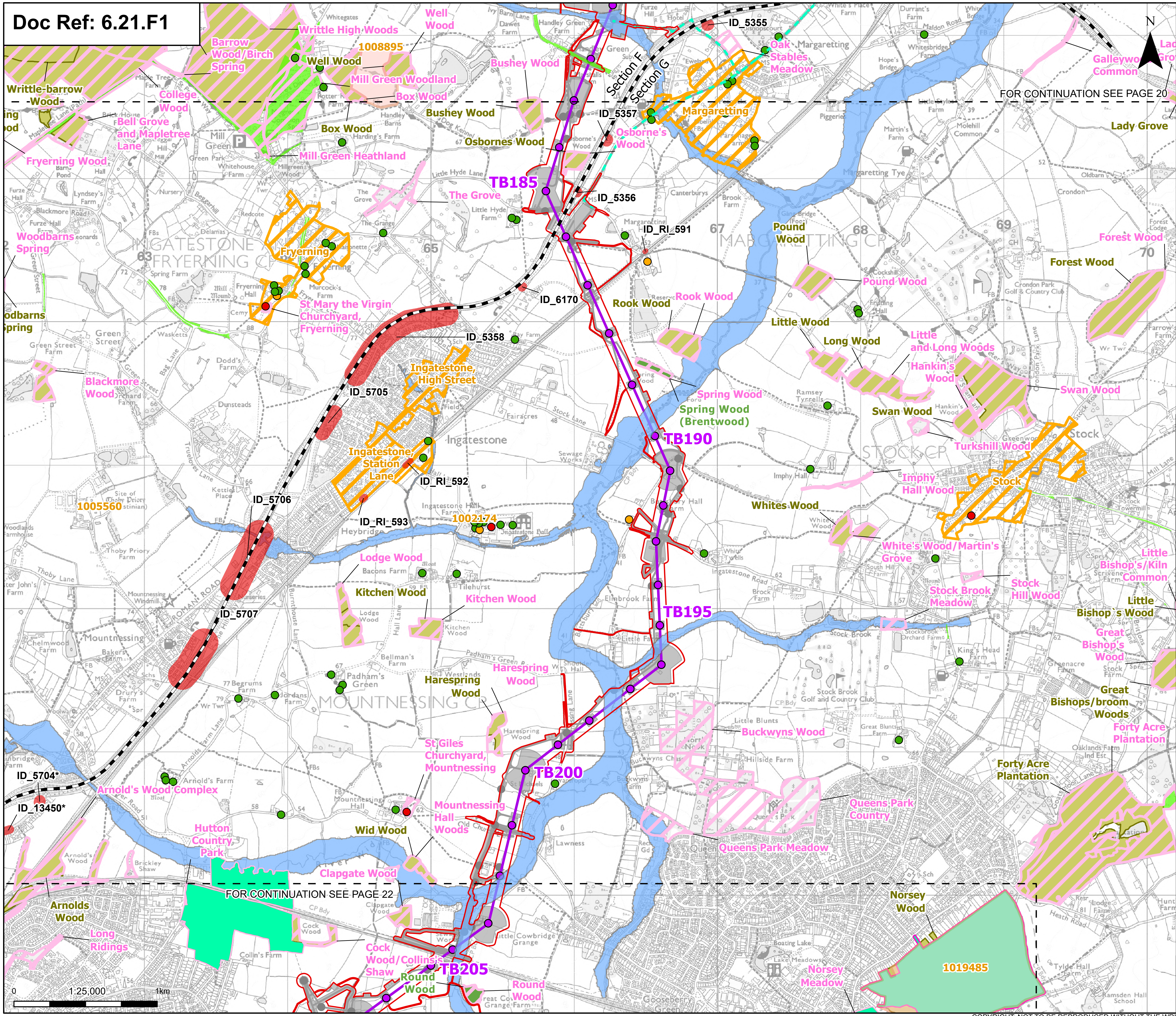
Designed	N. Lear	Date	21 Aug 25
Drawn	K. Fischer	Date	21 Aug 25
Checked	A. Fell	Date	21 Aug 25
Approved	K. Burrows	Date	21 Aug 25
Scale:	1:25,000	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	A2	Project Number:	10059280

Suitability Description: Accepted as Concept Stage

Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299

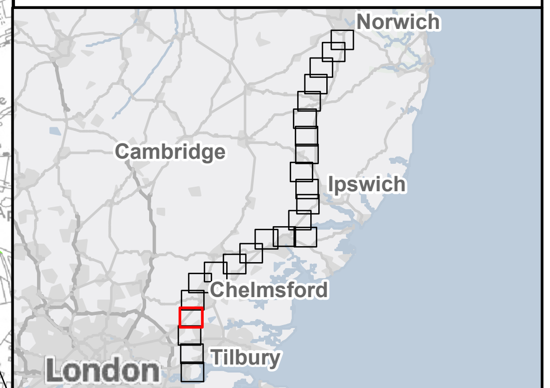
Revision: A

Doc Ref: 6.21.F1



- Order limits
- Sheet index cutline
- Project sections
- **Proposed project design details**
- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Environmental mitigation
- Other temporary and permanent construction and operational works
- **Discipline specific constraints**
- Listed Buildings
  - Grade I
  - Grade II
  - Grade II*
- Primary access route
- Conservation Areas
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
- Flood Zone 3

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



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PROJECT: Norwich to Tilbury

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Figure A21.1.1 - Environmental Constraints Plan Page 21 of 24

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Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299
Revision: A

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Doc Ref: 6.21.F1

Arnold's Wood Complex
Hutton Country Park
Clapgate Wood
Ridings
Cock Wood/Collinsis Shaw
TB205
Round Wood
Forty Acre Plantation
1019485
FOR CONTINUATION SEE PAGE 21
ID_13451
Hutton Village
Round Wood
Norsey Meadow
Norsey Wood
ID_RI_594
All Saints Churchyard, Hutton
Billericay Town Centre
Jamess Wood
James's Wood
TB210
Thrift Wood
Mill Meadows LNR
Hall Wood, Ingrave
Bluntswall Wood
ID_5572
Hall Wood
Primstock
Bluntswall Shaws
Frith Wood
Primstock
Little Bladen's Wood
Laindon Common
Hare Hall Shaw
Sutton Shaw
Bluntshall Wood
Frith Wood
Bladen's Wood
Blind Lane
Thrift Wood
The Wilderness
Little Burstead Common
Birches Wood
Little Bladen's Wood
ID_13459
Highfield Wood
TB215
Heron Pond
Thorndon Park
St Margarets Wood and Lane
Botneyhill Wood
1016861
Little Burstead
Great Burstead
Little Burstead Wood
Parkhill Wood
Parkhill Wood
Botneyhill Wood
Thorndon Country Park North
ID_13460
Parkhill Wood Meadow
Spearshill Wood
ID_13461
St Margaret's Wood And Lane
Herongate
Thorndon Hall
TB220
River Crouch at Noak Bridge
Barn Wood
Thorndon Country Park South
Dog Wood
Gravelpit Wood
ID_13465
Barn Wood/Stonyhill Wood
Poles Wood
Noak Bridge
Childerditch Meadow
Friern Manor Wood
ID_5663
ID_13462
The Forest
Friern Manor Wood
ID_6228
ID_14781
All Saints Churchyard and Keepers Cottages Meadow
ID_5664
ID_13464
ID_5665
1021226
TB225
1021225
Mill Wood
Eastlands Spring
Southfields Washland
FOR CONTINUATION SEE PAGE 23
ID_5680
Straight Path Shaw
ID_5679
Thick/Hollow Bottom Shaws
Barrett's Shaw

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Order limits
Sheet index cutline

Proposed project design details
- Proposed overhead line alignment
- Proposed standard lattice pylon location
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*

- Primary access route
- Conservation Areas
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
- Countryside and Rights of Way Open Access Land
- Registered Parks and Gardens
- Scheduled Monument (with accompanying list entry number)
- County / Local Wildlife Sites
- Ancient Woodland
- Ancient Woodland Sites that are not shown on the Ancient Woodland Inventory
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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 - Environmental Constraints Plan Page 22 of 24

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Revision: A

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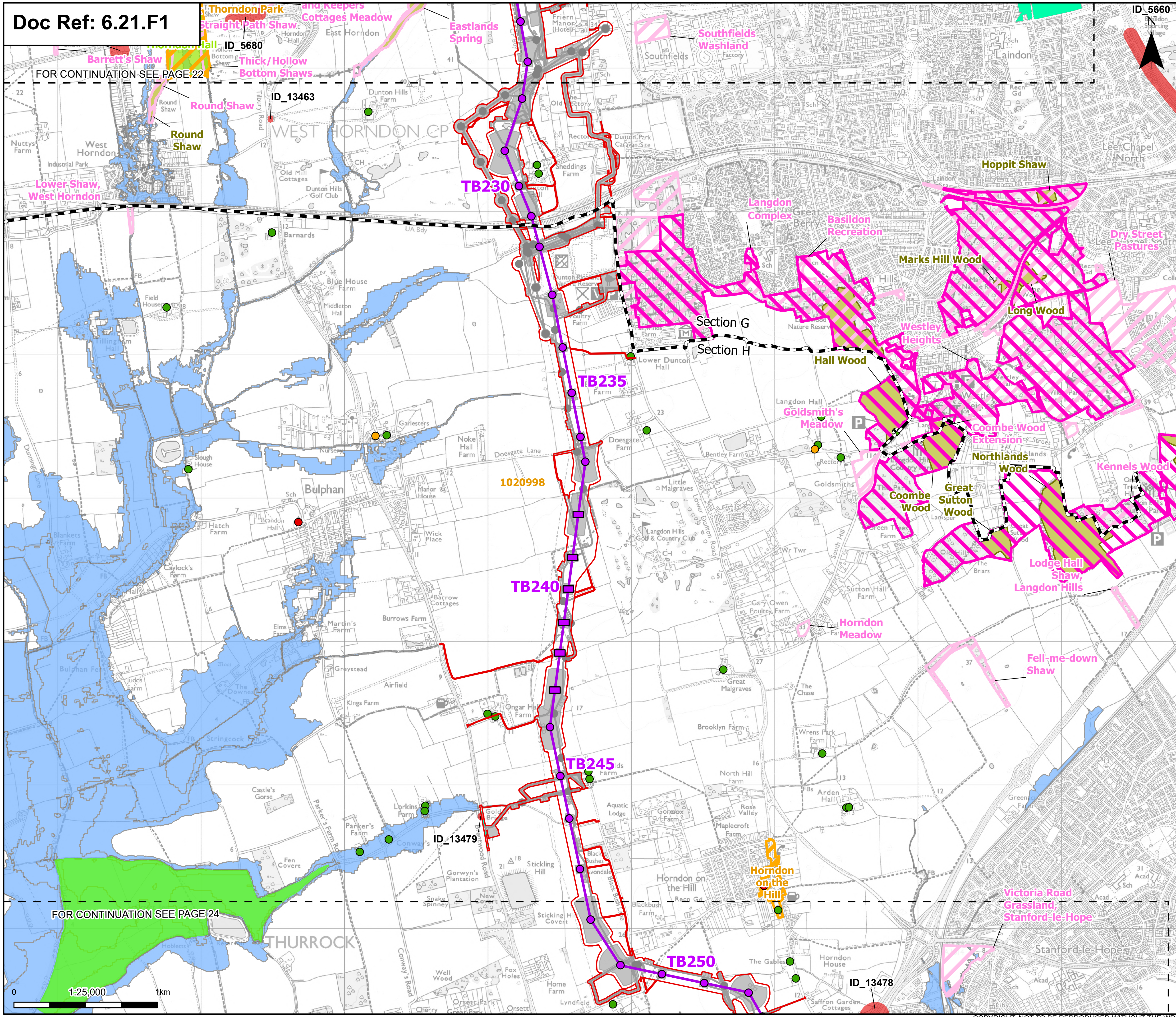
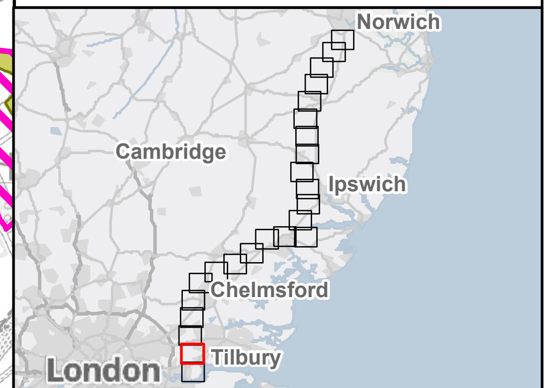


Legend	
Order limits	Local Nature Reserves
Sheet index outline	Noise important area (labelled using "ID_XXX")
Project sections	Countryside and Rights of Way Open Access Land
Proposed project design details	Registered Parks and Gardens
Proposed overhead line alignment	Scheduled Monument (with accompanying list entry number)
Proposed low height pylon location	County / Local Wildlife Sites
Proposed standard lattice pylon location	Ancient Woodland
Environmental mitigation	Flood Zone 3
Other temporary and permanent construction and operational works	
Discipline specific constraints	
Listed Buildings	
Grade I	
Grade II	
Grade II*	
Primary access route	
Conservation Areas	
Sites of Special Scientific Interest	

Note: The proposed overhead line alignment and proposed underground cable alignment together comprise the alignment. For further details regarding the design, please refer to Figures 4.1 (document reference 6.4.F1) and 4.2 (document reference 6.4.F2).



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PROJECT: Norwich to Tilbury

Planning Inspectorate App Number: EN020027
Regulation 5(2)(a)

Title:

Figure A21.1.1 -
Environmental Constraints Plan
Page 23 of 24

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Suitability Description:
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Drawing Number: 10059280-ARC-EGN-ZZ-DR-ZZ-00299
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Doc Ref: 6.21.F1

FOR CONTINUATION SEE PAGE 23

Proposed Tilbury North Substation

TB250 TB255 TB260 ZB20 ZB10 YYJ115 YYJ120 YYJ125R YYJ130 ZB15RA ZB15RB ZB15RC

ID_5692 ID_5693 ID_5694 ID_5695 ID_5696 ID_5697 ID_5698 ID_5699 ID_5700 ID_13478 ID_5562 ID_13480 ID_13482

1002196 1009287 1002134 1009286 1002156 1002199 1013880 1012185 1013943

Horndon on the Hill
Victoria Road Grassland, Stanford-le-Hope
Stifford Clays Copse
Blackshots Nature Area
Baker Street Brownfield, Chadwell St Mary
Mucking Heath Complex, Southfields
Mucking Creek Wetlands
Warren Lakes
Thurrock Thameside Nature Park, Mucking Buckingham Hill
Linford Pit
Linford Wood
Rainbow Wood & Ashen Shaw
Terrels Heath
Chadwell Wood
Hob Hill & Sandy Lane Pit, Chadwell St Mary
Broom Hill
West Tilbury
West Tilbury Hall
West Tilbury Church
East Tilbury
Low Street Pit
St Catherine's Churchyard, East Tilbury
Coalhouse Fort Marshes, East Tilbury
Titan Works, Grays
Little Thurrock Reedbeds
Little Thurrock Marshes, Grays
Tilbury Power Station
Tilbury Marshes

THURROCK
GRAYS
TILBURY
Chadwell St Mary
Little Thurrock
Orsett
Stanford-le-Hope

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N

Legend

- Order limits
- Sheet index cutline

Proposed project design details

- Proposed overhead line alignment
- Proposed full line tension gantry
- Proposed low duty gantry
- Existing pylon (modify)
- Proposed standard lattice pylon location
- Proposed underground cable alignment
- Proposed Tilbury North Substation
- Proposed cable sealing end compound (CSEC)
- Environmental area
- Environmental mitigation
- Other temporary and permanent construction and operational works

Discipline specific constraints

Listed Buildings
- Grade I
- Grade II
- Grade II*
- Primary access route

Source protection zones
- Zone I - inner protection zone
- Zone II - outer protection zone

- Thames Estuary Site of Special Scientific Interest Notification Project
- Conservation Areas
- Sites of Special Scientific Interest
- Local Nature Reserves
- Noise important area (labelled using "ID_XXX")
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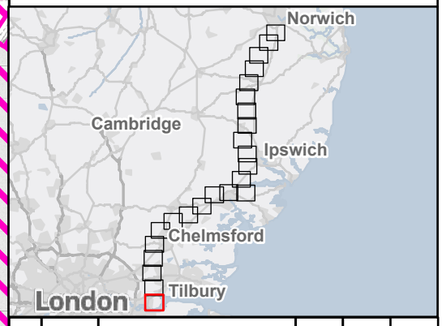

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Revision: A

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