The Great Grid Upgrade

Eastern Green Link 3 (EGL 3) and
Eastern Green Link 4 (EGL 4)

Design Development Report

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1. Introduction

1.1 Overview

1.1.1 National Grid Electricity Transmission plc (NGET), owns, builds and maintains the electricity transmission network in England and Wales. Under Section 9 of the Electricity Act 1989, NGET as the transmission licence holder, is required to develop and maintain an efficient, coordinated and economical electricity transmission system, and in a way which considers people, places and the environment (the desirability of preserving amenity duty under Schedule 9).

1.1.2 NGET is working to build a cleaner, fairer, and more affordable energy system that serves everyone, powering the future of our homes, transport, and industry. Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) (collectively referred to as the 'Projects') form part of The Great Grid Upgrade and, along with a number of other projects, will support the UK's net zero target through the connection of new low carbon energy generation, and by reinforcing the electricity transmission network in the Humber, East Midlands, East of England and East Anglia regions.

1.1.3 The Projects are 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 is generated by offshore wind) that is expected to connect to the network over the next ten years and beyond. The need case for the Projects is set out in more detail in the Stage 2 Consultation Document. Delivery of the Projects, together with other new reinforcements across the country, will ensure this future energy transmission demand across the UK will be met.

1.1.4 EGL 3 would comprise a two Gigawatt (GW) High Voltage Direct Current (HVDC) link between Aberdeenshire in Scotland, and King's Lynn and West Norfolk in England. EGL 4 would comprise a 2 GW HVDC link between Fife in Scotland and King's Lynn and West Norfolk. Each of EGL 3 and EGL 4 would comprise over 600 km of subsea and underground HVDC cables between new converter stations at each end of the electricity transmission link. These in turn are connected to the existing National Electricity Transmission System (NETS) via High Voltage Alternating Current (HVAC) cables. To connect the Projects into the NETS in England, a new 400 kV substation in the vicinity of the existing Walpole substation (referred to as the 'Walpole A substation') within King's Lynn and West Norfolk would be required. This new Walpole substation is referred to as the 'Walpole B Substation'.

1.1.5 EGL 3 is being jointly developed by NGET and Scottish Hydro Electric Transmission Ltd (SHE-Transmission), who are operating and known as Scottish and Southern Electricity Networks Transmission (SSEN Transmission). EGL 4 is being jointly developed by NGET with Scottish Power Transmission (SPT), who are operating and known as Scottish Power Energy Networks (SPEN). SSEN Transmission and SPEN respectively are responsible for securing any consents required in Scotland and Scottish waters.

1.1.6 In England and English waters, the Projects will be subject to an application for a Development Consent Order (DCO, also referred to as development consent) under the Planning Act (2008).

1.1.7 This Design Development Report forms part of a suite of documents prepared to support the statutory consultation on the Projects, before NGET will prepare an application for development consent for submission to the Planning Inspectorate in 2026.

1.2 Purpose and Structure of this Report

1.2.1 The purpose of this Design Development Report is to:

- Explain NGET's approach to design development, and the rationale of each design stage that the Projects have gone through to date,
- Summarise the outcomes of each design development, and
- Explain how NGET has arrived at the preferred design and options taken to statutory consultation, and explain why NGET is consulting on four options for Converter Station siting at Walpole.

1.2.2 This Design Development Report aims to not repeat other consultation documents (as set out in section 1.3 below), but draws upon the conclusions of those documents to explain the design development from early project optioneering, and non-statutory consultation to the design presented at statutory consultation.

1.2.3 The structure of this Report is as follows:

- Chapter 1: Introduction – this provides an overview of NGET and a brief description of the Projects, the purpose and structure of this report and how this report relates to other design related documents.
- Chapter 2: Relevant Legislation and Policy Context – this chapter provides a brief overview of the relevant legislation related to the design context of the Projects, and highlights the relevant planning policy framework, which the Projects will be assessed against.
- Chapter 3: National Grid's Approach to Design Development – This chapter sets out how NGET approaches design development in the context of National Grid's approach to consenting.
- Chapter 4: Design Development of EGL 3 and EGL 4 – This chapter summarises the design development throughout each of the stages that have led to the current draft Order Limits.
- Chapter 5: Walpole – Given that the Walpole area will accommodate most of the above ground infrastructure, with multiple options being presented at statutory consultation, this chapter explains in more detail the design development within the Walpole area.
- Chapter 6: Next Steps – This chapter provides an overview of the next steps following statutory consultation and the work involved to finalise the design for the DCO application submission.

1.3 Relationship to Other Documents

1.3.1 The Design Development Report draws upon various other documents. These include:

- **Strategic Options Report (SOR)** (February 2024) and **Strategic Options Report Update** (May 2025)**:** The purpose of the SOR was to set out high level strategic options for EGL 3 and EGL 4 and highlight the initial seven options considered to meet NGETs needs case to increase overall capacity and provide resilience to the Grid capacity. The Strategic Options Report Update published at statutory consultation considers the revised need case, and the strategic options for meeting this.
- **Corridor and Preliminary Routeing and Siting Study (CPRSS)** (April 2024)**:** The purpose of this document was to undertake an options identification process to identify potential corridor routes and then undertake an option selection process to identify a preferred corridor route and preferred siting zones for the converter stations and substations. These preferred options would then be taken to non-statutory consultation for feedback from stakeholders.
- **Eastern Green Link 3 (EGL 3) Marine Route Options Appraisal** (September 2023) **and Eastern Green Link 4 (EGL 4) Marine Route Options Appraisal** (September 2023)**:** These two documents set out the process followed for the appraisal of route options for the marine elements of the Projects.
- **Non-Statutory Consultation Feedback Report** (May 2025)**:** This report details the consultation process for the 2024 non-statutory consultation that NGET undertook, provides an analysis of the feedback, and demonstrates how NGET has had regard to the feedback.
- **Preliminary Environmental Impact Assessment (PEIR) Volume 1, Part 1, Chapter 3: Reasonable Alternatives Considered** (May 2025)**:** This chapter of the PEIR presents a summary of the site selection process and consideration of the main alternatives undertaken to date for the Projects in line with the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations (2017).
- **Converter Station Design – Background to Potential Architectural Approaches** (May 2025)**:** This document provides a background to and summary of the potential architectural approaches, including information relating to the design process that has informed them.

2. Relevant Legislation and Policy Context

2.1 Introduction

2.1.1 This chapter provides a brief overview of the principal legislation and planning policy of relevance to the design development of the Projects. A more detailed summary of the wider regulatory and planning context of relevance to the Projects is set out in Volume 1, Part 1, Chapter 2 of the PEIR (May 2025).

2.1.2 NGET will prepare a Planning Statement which will accompany the DCO application. This will identify and consider relevant legislation and policies and provide a detailed assessment of how the Projects comply with relevant planning policies.

2.2 Planning Act 2008

2.2.1 The Planning Act 2008 requires that projects which are Nationally Significant Infrastructure Projects (NSIPs) obtain development consent. Whilst the Projects do not fall within the definition of an NSIP, NGET sought two Directions from the Secretary of State (SoS) under Section 35 for the converter stations at Walpole to be directed as "nationally significant", which means that they would require development consent regardless. These Directions were made by the SoS on 29 February 2024, confirming that the development of the converter stations at Walpole would be nationally significant, with the proposed underground HVDC and HVAC cabling and a substation to enable connection to the NETS being associated development.

2.2.2 NGET must therefore apply to the SoS for development consent for the Projects, and the Planning Act 2008 provides the legislative framework for the consenting of the Projects.

2.3 Electricity Act 1989

2.3.1 In addition to NGET's requirement to obtain development consent under the Planning Act 2008, NGET also has obligations under the Electricity Act (1989). Section 9(2) of the Electricity Act 1989 places general duties on National Grid as a license holder:

'to develop and maintain an efficient, co-ordinated and economical system of electricity transmission…'

2.3.2 In addition, Section 38 and Schedule 9 of the Electricity Act 1989 requires an electricity licence holder such as National Grid, when formulating proposals for new lines and other works, to:

'have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest'; and *'shall do what it reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.'*

2.4 Relevant Policy Framework

2.4.1 Section 104 of the Planning Act 2008 states that:

(2) In deciding the application the Secretary of State must have regard to—

(a) any national policy statement which has effect in relation to development of the description to which the application relates (a "relevant national policy statement"),

(3) The Secretary of State must decide the application in accordance with any relevant national policy statement….

2.4.2 The National Planning Policy Statements (NPS) relevant to the Projects are:

- National Policy Statement for Energy (EN-1) (2024); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (2024).

2.4.3 NPS EN-1 sets out the Government's overarching policy regarding the development of NSIPs in the energy sector. EN-1 emphasises the need for new energy projects and that there is a Critical National Priority (CNP) for the provision of nationally significant low carbon infrastructure.

2.4.4 NPS EN-5 relates to electricity networks, and Section 2 provides general assessment principles and technology-specific policies relating to matters including site selection and design, climate change adaptation, consideration of good design, biodiversity and geological conservation, landscape and visual and noise and vibration.

2.4.5 NPS EN-5 in Section 2.9 covers the considerations for design related assessment, requiring that the application should follow the Horlock Rules (National Grid, 2009) for the design and siting of substations, which is detailed in paragraph 2.9.18 of EN-5. Paragraph 2.9.20 also highlights policies relating the design of underground cabling.

2.4.6 NPS EN-1 and EN-5 provide the primary policy framework that the Projects need to comply with, and have guided NGET's decision making on routeing, siting and design of the Projects.

2.4.7 However, secondary planning policy documents are also being considered in the design process and will be an important and relevant matter in the SoS's consideration of the DCO application. These include the National Planning Policy Framework (NPPF) (2024), specific Local Plans adopted by the host Local Authorities in whose administrative boundaries the Projects will be located, as well as relevant Marine Plans.

2.4.8 NGET will prepare a Planning Statement and submit it as part of the DCO application which will provide a full assessment of the Projects' design against all relevant planning policies, including design-related policies.

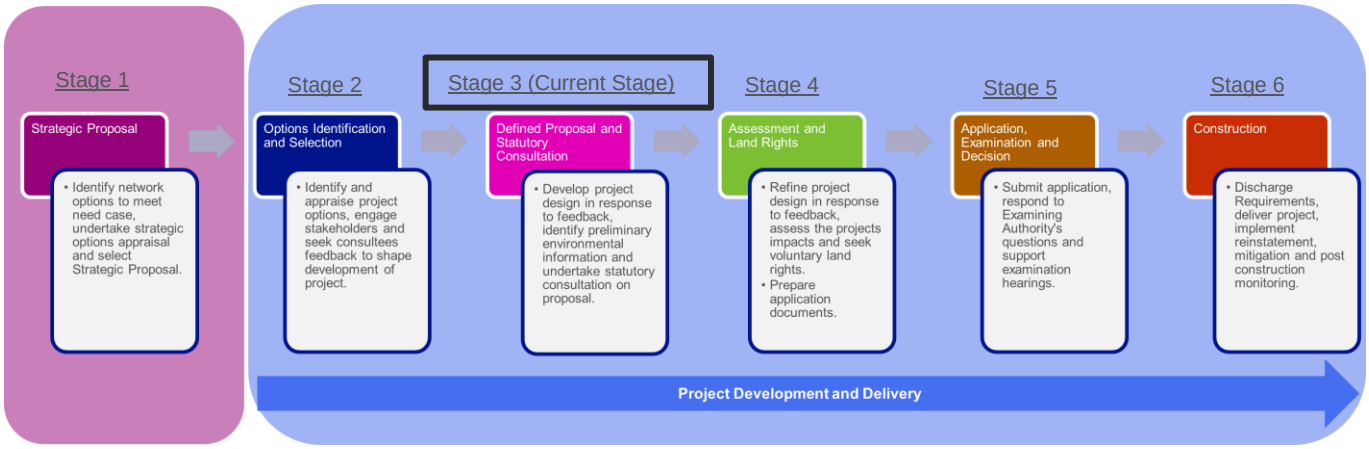
3. National Grid's Approach to Design Development

3.1 National Grid's Approach to Consenting

3.1.1 National Grid's approach to design development sits in the context of their Approach to Consenting (April 2022), from initial inception to consent and construction. The approach is divided into the following six stages, as detailed on Plate 3.1 National Grid's Approach to Consenting :

- Stage 1: Strategic Proposal;
- Stage 2: Options Identification and Selection;
- Stage 3: Defined Proposal and Statutory Consultation (current stage);
- Stage 4: Assessment and Land Rights;
- Stage 5: DCO Application, Examination and Decision; and
- Stage 6: Construction.

Plate 3.1 National Grid's Approach to Consenting



3.1.2 The following section summarises how design development fits into Stages 1 and 2, which have been completed for the Projects, and Stage 3, which is the stage the Projects are currently in. Chapters 4 and 5 of this report provide details on how the design of EGL 3 and EGL 4 has evolved through these stages.

3.2 Approach to Design Development

3.2.1 Within Stages 1 to 3 set out above, the Projects have gone through the following design development stages so far. Each of these stages have been informed by NGET's statutory duties, planning policy, and stakeholder feedback to arrive at the Preferred Corridor Route and Preferred Siting Areas.

Strategic Proposal

3.2.2 National Grid's Approach to Consenting sets out the process of identifying where the existing network could be modified or enhanced to deliver a required connection or an increase in capacity. If there is a need identified, then the consideration of potential strategic options is considered. A technical filter is applied to this part of the assessment to ensure potential strategic options identified meet the needs case. NGET focuses on the strategic options that best meet their obligations as the electricity provider to consumers and to the environment. Each option presented has a comparable benefit over an alternative, which include: an environmental benefit, a technical benefit, or a capital and lifetime cost benefit.

Options Identification and Selection

3.2.3 With a strategic option selected, Stage 2 of National Grid's Approach to Consenting is the production of the CPRSS. The English Onshore Scheme CPRSS sets out a nine step methodology applied to identified potential route corridors. **Plate 4.2 EGL 3 & EGL 4 Graduated Swathe** below illustrates these.

3.2.4 Following the nine step methodology, a graduated swathe is produced which includes shaded areas within the emerging preferred corridor, siting zone and siting areas within which project infrastructure is considered more or less likely to be located, shown in various levels of shading. Feedback from early stakeholder engagement and non-statutory consultation informs the further development of the preferred corridor.

3.2.5 As explained above, through the Electricity Act 1989, NGET has statutory duties placed upon it to operate under the terms of its transmission licence. As part of these duties, the 'Holford Rules' (1959 (as amended)) and 'Horlock Rules' are used as two sets of guidelines for National Grid's routeing and siting approach. These set out the approach to overhead line routeing and substation design siting respectively. Whilst EGL 3 and EGL 4 predominantly involve underground cables, both the Holford and Horlock rules have been considered in the development of the preferred draft route corridors, alignment and subsequently the converter station and substation layouts.

Design Development and Evolution from Non-statutory Consultation - Design Change Control (DCC) Process and Reviews

3.2.6 The next stage of the design development further builds upon feedback and requests for design changes from stakeholders raised at non-statutory consultation to refine the design of the preferred corridor route and preferred siting zones. A Design Change Control (DCC) process ensures that each identified change request is considered and recorded throughout the design development. The DCC process allows for a multi-disciplinary approach to ensuring that all design related requests are thoroughly considered. Where new information emerges, reviews may be undertaken to ensure that design decisions are still robust.

3.2.7 Chapters 4 and 5 below set out how the DCC process has informed the design of the Projects that is presented at this statutory consultation.

4. Design Development of EGL 3 and EGL 4

4.1 Introduction

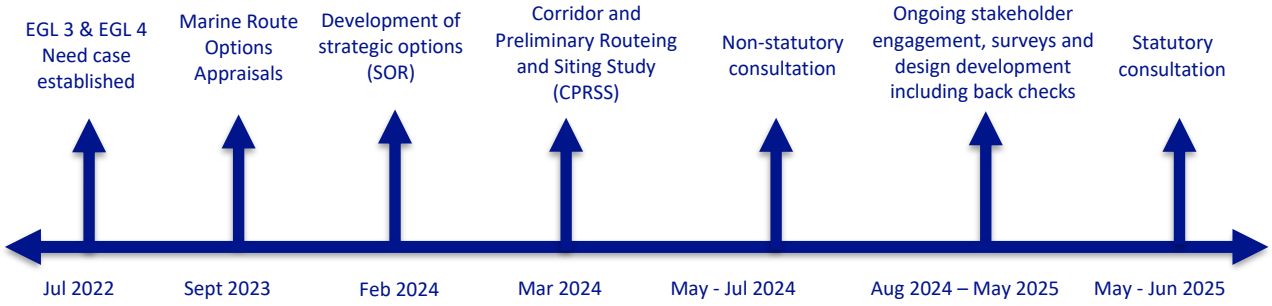
4.1.1 This chapter summarises the design development and evolution of the draft Order Limits from the initial Strategic Options through to the preferred Draft Order Limits and preferred route option presented at statutory consultation. This chapter does not discuss any discounted options in detail. For details on discounted options, please refer to PEIR Vol. 1, Part 1, Chapter 3 Reasonable Alternatives Considered.

4.2 Timeline from Need Case to Statutory Consultation

4.2.1 Throughout the Projects' lifetime to date, there have been stages in the design development which had informed the current preferred draft Order Limits and Project design.

4.2.2 Plate 4.1 Timeline of Design Development up to Statutory Consultation below shows the timeline from the Projects' inception, when their need case was established in the Holistic Network Design (HND) prepared by the National Grid Electricity System Operator (ESO), up to statutory consultation.

Plate 4.1 Timeline of Design Development up to Statutory Consultation



4.2.3 **Plate 4.2** and **Plate 4.3** below show how the Projects' design has evolved from establishing the graduated swathe to the draft Order Limits as presented at statutory consultation.

Plate 4.2 EGL 3 & EGL 4 Graduated Swathe of Preferred Locations for Infrastructure

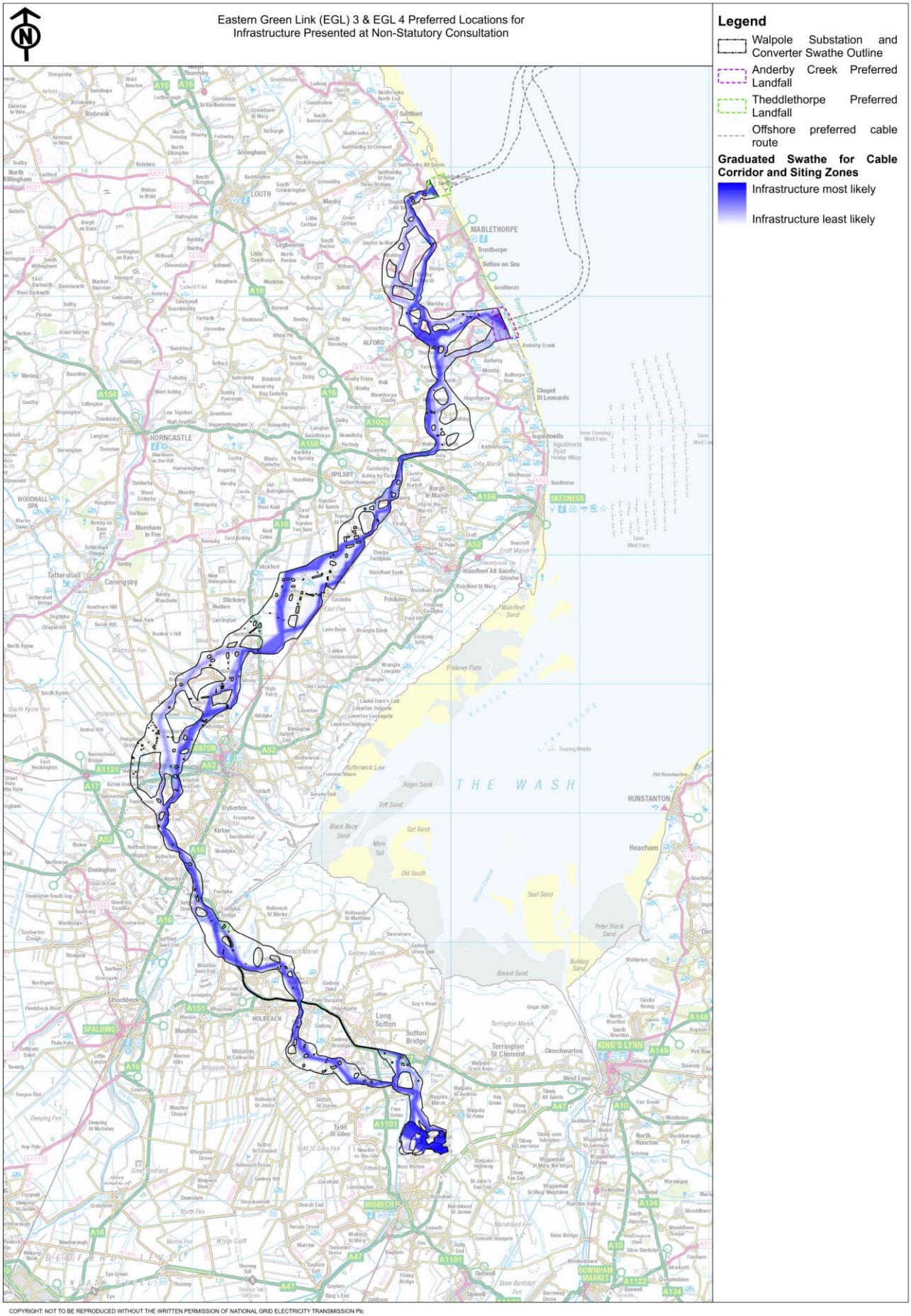
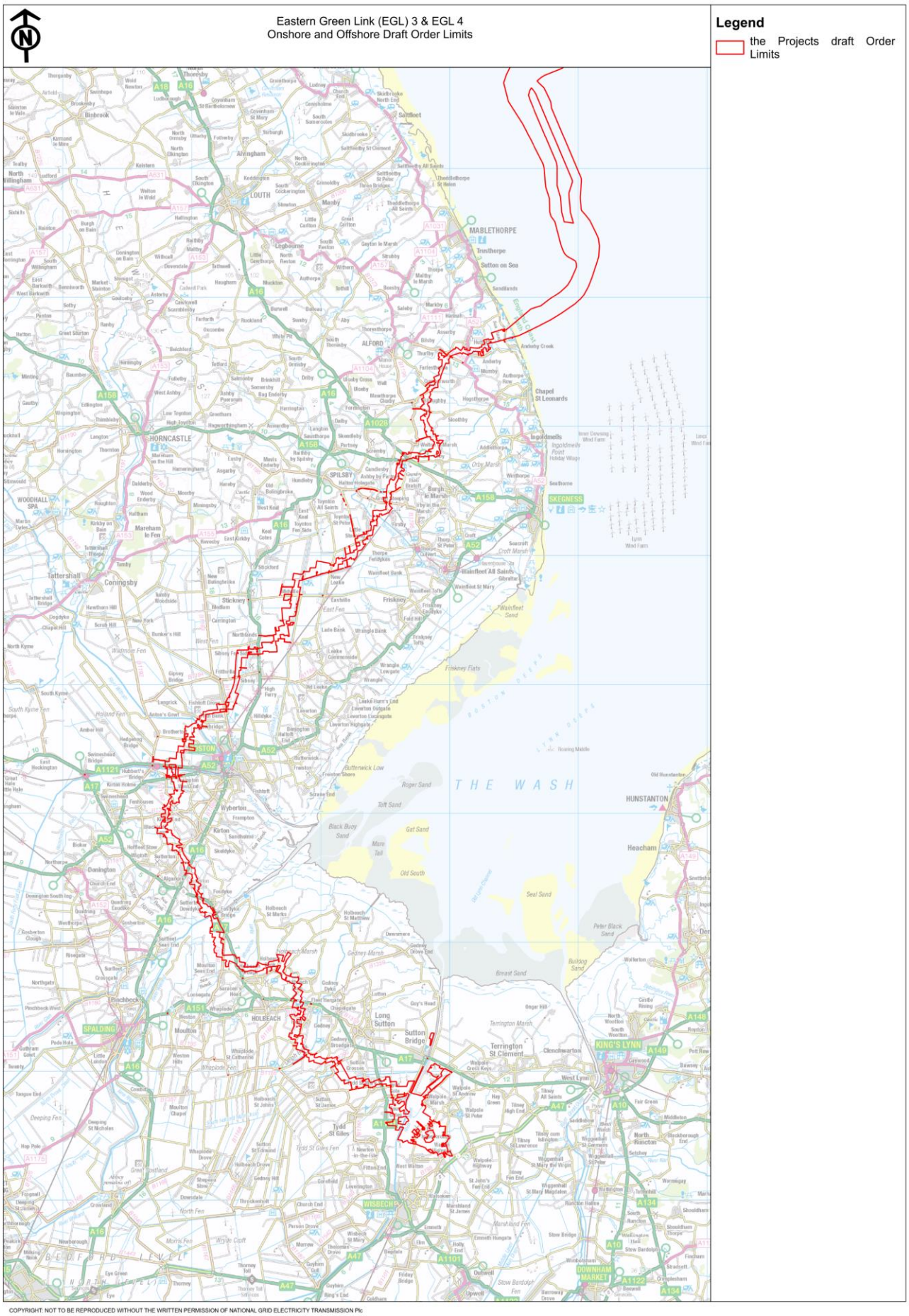


Plate 4.3 EGL 3 & EGL 4 Offshore and Onshore Draft Order Limits



4.3 Stages 1 and 2: Strategic Proposal to Options Identification, Selection and Non-Statutory Consultation

4.3.1 The following section provides an overview of the design evolution over the first two design stages: Stage 1: Strategic Options and Stage 2: Options Identification and Selection which includes preliminary routeing and siting, as well as non-statutory consultation.

Stage 1: Strategic Options

4.3.2 Several strategic options were identified and documented in the SOR which could meet the needs case for the Projects whilst enabling NGET to meet its statutory duties. Initially, a 'long list' of options was identified, connecting several potential 'start' and 'end' points. These included connection points at, or close to, existing or already planned substations. These options were then appraised and filtered to obtain a short list of options (referred to as EGL OPP1 to EGL OPP7). These options were subject to a detailed appraisal against technical (engineering), cost, environmental and socio-economic considerations, underpinned by planning policy considerations.

4.3.3 Balancing these considerations, EGL OPP6 was identified as the preferred option. This option included a landfall either on the Norfolk or the Lincolnshire coastline. The latter was the preferred option due to the potential impact on a number of statutory designated sites in the marine and terrestrial environments posed by the Norfolk option compared to the Lincolnshire landfall option. EGL OPP6 includes the construction of a new substation at Walpole (referred to as the Walpole B Substation). Notably, this substation was not only identified as a common connection point for both EGL 3 and EGL 4 under EGL OPP6 but also allowed the opportunity for the Grimsby to Walpole Project to connect into it.

4.3.4 One of the options, described as EGL OPP7 within the SOR, identified the potential for either EGL 3 or EGL 4 to form a three-ended HVDC link by connecting to a new Lincolnshire Connection Substation (LCS) proposed by the Grimsby to Walpole Project first, before continuing to Walpole B Substation. The SOR noted that the option of making one of either EGL 3 or EGL 4 a three-ended HVDC link in England would increase capacity from the LCS in the future without the need for additional circuits in the near term, subject to the successful delivery of the Grimsby to Walpole Project. It stated that to construct this three-ended HVDC Link additional infrastructure, comprising a switching station and a converter station, would be required in the vicinity of one of the LCS located southwest of Mablethorpe in East Lindsey.

4.3.5 The SOR noted that there was not a current requirement for this three-ended HVDC link in England to meet the need case for EGL 3 and EGL 4. However, NGET considered that the preferred option EGL OPP6 developed for EGL 3 and EGL 4 would have the ability to be changed to provide a three-ended HVDC link to the LCS in England, in the future should additional capacity be required.

4.3.6 The environmental and socio-economic appraisals of the potential strategic options highlighted that all options have the potential for environmental and socio-economic effects, particularly with respect to the marine and coastal environment where subsea cables are routed and come ashore. The appraisal also identified an opportunity for reduced environmental and socio-economic effects compared to other strategic options due to the proximity to the coast and opportunities for shorter, more direct routes. The preferred option, EGL OPP6, was recognized for its potential to mitigate impacts

through careful routeing and siting as well as specific measures such as landscape planting.

4.3.7 The Projects then moved to the second stage of NGET's project development process which defined the location of the Projects' infrastructure.

Stage 2: Options Identification and Selection for Non-Statutory Consultation

English Onshore Route Identification

4.3.8 The CPRSS was undertaken to further define the location of the infrastructure. The focus of the CPRSS was on the routeing of new underground cables and siting of the new landfall site on the Lincolnshire Coast (having been identified as the preferred landfall in the SOR), converter stations, substation and switching station infrastructure in the study area. Plate 4.4 CPRSS Methodology below shows the CPRSS Methodology.

Plate 4.4 CPRSS Methodology

4.3.9 For the purpose of this report, Steps 7 and 8 are of particular relevance as they involve the appraisal of corridors, siting zones and siting areas with the purpose of identifying emerging preferences, presented as a 'Graduated Swathe', for non-statutory consultation. The CPRSS Report and Chapter 3 of the PEIR provide a more detailed description to the above steps undertaken in the Option Identification and Selection process.

4.3.10 Similar to the SOR stage, the CPRSS options appraisal took into account environmental, planning policy, technical (engineering), socio-economic and cost considerations.

4.3.11 Following options appraisal of the landfalls, corridors, siting zones and siting areas (Chapter 6 to Chapter 9 in the CPRSS), a further review was undertaken between the landfall options and Walpole. This review considered the Preferred Corridor, Siting Zones and Siting Area in the context of the wider end-to-end solution to ensure that the emerging preferences for each individual element of the proposed infrastructure were robust in the context of the whole route.

4.3.12 The conclusion of the review was the selection of a Preferred Corridor for the underground cables and Preferred Siting Zones for the converter stations which achieved a balance of efficiency and economic factors, whilst having appropriate regard to environmental and socio-economic impacts.

English Onshore Route Selection

4.3.13 Following the selection of the Preferred Corridor and the Preferred Siting Zones for the converter stations, a preliminary routeing exercise was undertaken to identify where it might be more appropriate to locate the required permanent underground cabling, the converter stations and the substation. To indicate the more or less likely location of the proposed infrastructure, a graduated 'swathe' was produced which took into consideration environmental and socio-economic features, technical constraints, and other requirements including the NPS EN-1 and EN-5. The graduated swathe is shown in Plate 4.2 EGL 3 & EGL 4 Graduated Swathe above.

4.3.14 The onshore route selection was divided into the following components which were subject to a further comparative appraisal and option selection:

- Landfall;
- New HVDC underground cables for the Onshore Scheme between the landfall and Walpole;
- Two new Walpole converter stations and Walpole B Substation; and
- New Converter Station and Direct Current Switching Station (DCSS).

Landfall

4.3.15 The CPRSS involved a three-stage process for identifying potential preliminary landfall study areas. This included a Red-Amber-Green (RAG) review of the Lincolnshire coastline, taking account of immediate coastline constraints including coastal settlements, existing infrastructure and built environment, ecological designations and military practice areas. Five sections of coastline were identified as amber or green and were subject to further appraisal: Horseshoe Point (which includes the Donna Nook area), Saltfleetby to Mablethorpe (described in the CPRSS as Theddlethorpe), Sandilands to Anderby Creek, Anderby Creek to Chapel Point and Ingoldmells.

4.3.16 The appraisal identified preliminary landfall study areas at three locations (north to south): Horseshoe Point (including Donna Nook); Theddlethorpe; and Anderby Creek (a combination of both the Sandilands to Anderby Creek and Anderby Creek to Chapel Point sections). Land at Ingoldmells was identified as less preferred as a preliminary landfall study area due to existing development constraining the underground cable routeing. In addition, the subsea cable routeing would require a greater number of crossings, some of which would be within statutory ecological designations, when compared with the other preliminary landfall study areas.

4.3.17 The three landfall study areas were subject to an options appraisal considering environmental factors as well as Engineering and System Factors.

4.3.18 Horseshoe Point was identified as the least preferred option in the CPRSS and the Marine Route Options Reports. This was due to the likely disturbance to the statutory ecological designations and priority habitat of saltmarsh and mudflats as well as the potential impact on navigational safety, access to significant operational port facilities and the need to safeguard navigation depth. Therefore, Horseshoe Point was discounted as a viable option.

4.3.19 Anderby Creek Landfall was identified as the preferred landfall location over Theddlethorpe. Anderby Creek Landfall was identified for having fewer statutory ecological designations and would be more feasible for installing a shorter trenchless cable. The shorter trenchless cable would avoid direct disturbance to the statutory ecological designations, as well as tidal flood defences.

4.3.20 However, it was acknowledged that Anderby Creek could result in potential cumulative effects both to the environment and to nearby communities, as a result of multiple existing and proposed landfalls at Anderby Creek by other projects. In addition, it was considered that further engineering studies may identify a suitable design solution at Theddlethorpe that mitigated the potential impacts upon the statutory designated ecological sites and tidal flood defences. Recognising this, the decision was made to take both Anderby Creek and Theddlethorpe forward as emerging landfall preferences, to allow flexibility for the design to evolve and to allow for further technical studies to identify a preferred design solution.

Connection from Landfall to River Welland to Walpole

4.3.21 As described in Chapter 7 of the CPRSS, 26 underground cable corridors were reviewed from the landfall areas of Anderby Creek and Theddlethorpe Beach to the River Welland. Of these, seven corridors emerged as preferred for a landfall from Theddlethorpe, and eight emerged as a preferred corridor for a landfall from Anderby Creek.

4.3.22 The Preferred Corridors were those that offer shorter, more direct routes with fewer environmental and technical challenges. The CPRSS and Chapter 3 of the PEIR set out the assessment of these corridor options and why other corridor options were discounted.

4.3.23 Chapter 8 of the CPRSS identified four corridors as preferred for the HVDC underground cables from the River Welland to Walpole, as they offered a direct connection to the Siting Zones for the proposed location for the converter stations in Walpole. They were also shorter and were subject to fewer environmental and technical challenges. The CPRSS discusses the reasoning for discounting other corridor options in detail.

Walpole B Substation and Converter Stations

4.3.24 The siting zones at Walpole for the substation and the converter stations followed the same CPRSS methodology as shown on page 12 in Plate 4.4 CPRSS Methodology. The siting areas were identified to accommodate two converter stations, one for EGL 3 and one for EGL 4, and one substation.

4.3.25 The CPRSS sets out the preference for Siting Zones described as WLP4 and WLP5, given their closer proximity to an existing overhead line and better entries for the HVDC underground cables. It was further identified that both WLP4 and WLP5 offered the greatest opportunity to potentially minimise the extent of environmental effects by co-location of the new Walpole converter stations with the Walpole B Substation. The co-location of these would also reduce the technical complexity during construction and operation and limit the length of connections for the Projects and the proposed Grimsby to Walpole Project.

4.3.26 Given the above considerations and given that both Siting Zones WLP4 and WLP5 overlap with the emerging preferred corridors between the River Welland and Walpole, a combination of Siting Zones WLP4 and WLP5 (resulting in WLP4/5) was identified as a preferred option for the converter stations and substation, which was taken through to non-statutory consultation.

4.3.27 Once a preference for Siting Zones WLP4 and WLP5 was established, the preferred corridors and Walpole Siting Zones were reviewed again alongside each other. Following this exercise, one of the emerging preferred corridors (Corridor 33) was widened at the intersection with another corridor (Corridor 34), to the west of Sutton Bridge, offering a shorter and more direct route from the A17 and towards Walpole via Corridor 34.

4.3.28 The CPRSS details the discounted siting zone options in further detail and the reasons to why they were not taken forward for further review.

New LCS Converter Station and Direct Current Switching Station (DCSS)

4.3.29 The Converter Station and DCSS would form a ‘three-ended HVDC link’ for either EGL 3 or EGL 4. 13 siting zones were considered for the LCS and DCSS (referred to as DC1-DC13). DC5 was considered the most suitable zone, because it presented the best opportunity to limit potential landscape and visual effects by aiming to co-locate the infrastructure nearby to one of the proposed LCS substations. It would also help reduce the potential for other environmental and socio-economic effects whilst minimising the length of underground HVDC cable required, as well as technical complexity during construction and operation.

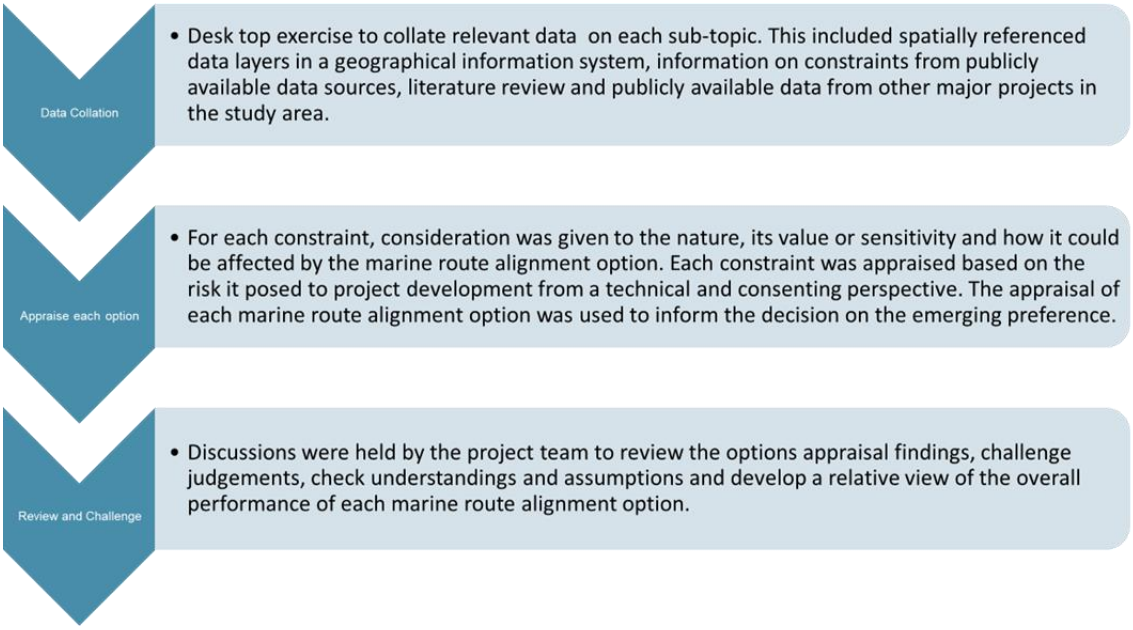
4.3.30 A comparative review of the other siting zones is set out in detail in the CPRSS and the reasoning to why the other zones were discounted.

English Offshore Route Identification

4.3.31 The CPRSS was developed in tandem with two Marine Route Options Appraisals, one for EGL 3 and one for EGL 4. This included consideration of four topic areas; environment, socio-economic, technical and cost. Within these topic areas, there was a list of sub-topics which align with best practice informed by the requirements of relevant regulations.

4.3.32 Plate 4.5 Marine Route Options Appraisal below illustrates the appraisal process stages.

Plate 4.5 Marine Route Options Appraisal



4.3.33 An iterative, phased process was used to assess the marine route alignments. This consisted of workshops with the Projects team, key marine statutory stakeholders and industry (e.g. other marine users) before a decision workshop on which options should be taken forward. This process resulted in two phases of marine route alignments before a preferred route was selected for each of EGL 3 and EGL 4. Both EGL 3 and EGL 4 were appraised independently, however at that stage, it was known that both Projects would be progressed along similar timescales.

4.3.34 The objective of the options appraisal was to identify the shortest marine cable routes possible to ensure the cables can be buried beneath the seabed for the entire route. This approach would:

- minimise the length of cable needed,
- reduce the manufacturing and construction costs, and
- minimise the environmental footprint of the marine elements of the Projects.

4.3.35 The options appraisal was also designed to avoid statutory environmentally sensitive areas and areas of archaeological importance, avoid areas which would represent restrictions to vessel movement e.g. anchorages, and avoid existing offshore infrastructure. A comparative appraisal was carried out to review potential landfall locations at Theddlethorpe and Anderby Creek, and the marine route alignments. This led to two offshore marine route alignments being developed (Offshore Route A and Offshore Route B) and six marine route alignments to landfall from each offshore route.

4.3.36 The marine route alignments were each similarly appraised based on its own merits, on technical, environmental and socio-economic factors. They were also appraised in combination with the merits of the associated landfall (in Scotland and England) and co-joining marine route alignments, to demonstrate that the end-to-end solution would meet the objectives of the Projects.

English Offshore Route Selection

4.3.37 The marine route alignments appraisal concluded with a preferred option being identified and taken forward for surveys as shown in **Plate 4.6** and **4.7**.

Plate 4.6 EGL 3 Emerging Preference following Marine Route Options Appraisal

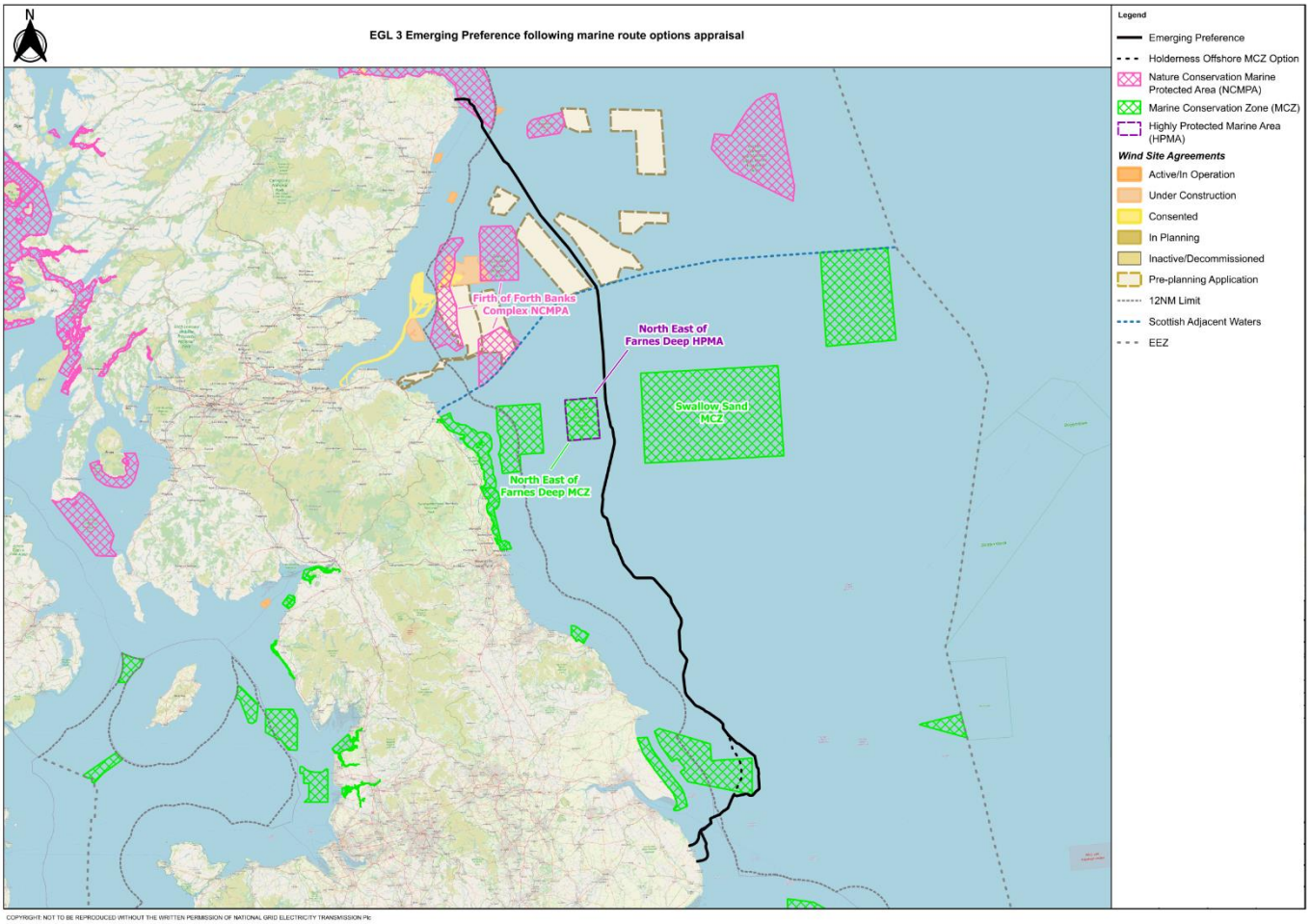
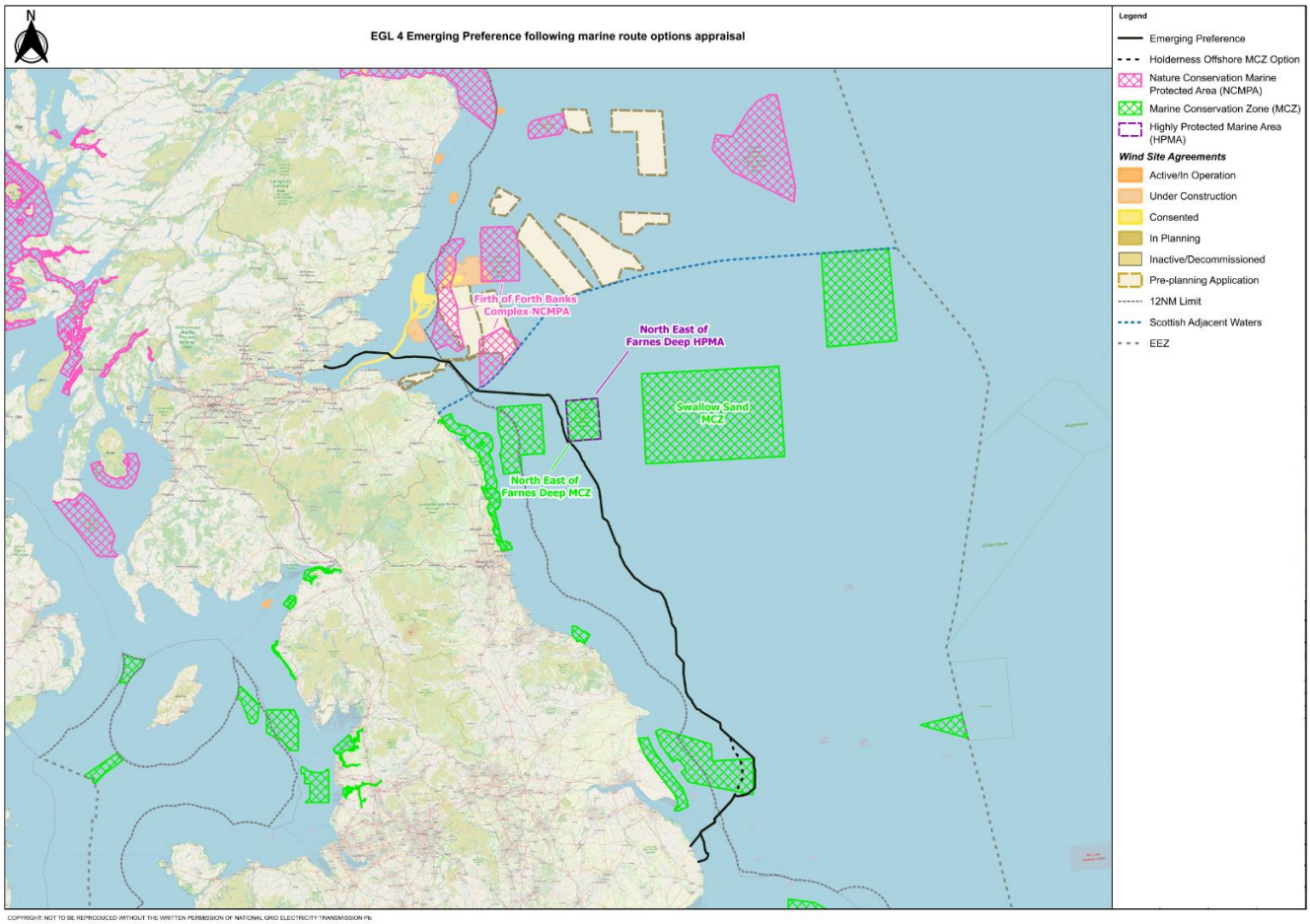


Plate 4.7 EGL 4 Emerging Preference following Marine Route Options Appraisal



Non-Statutory Consultation

4.3.38 Following the CPRSS process, the Preferred Corridor, Preferred Siting Zones and associated graduated swathe were presented at the non-statutory consultation held from 23 April 2024 to 15 July 2024. The feedback received during consultation was then carefully reviewed and considered to inform the evolving design of the Projects through the next stage up to statutory consultation.

4.3.39 As part of the non-statutory consultation, the onshore Preferred Corridor was split into eight sections to make it easier for stakeholders to give feedback about specific areas. The eight sections of HVDC underground cable, routeing between the landfalls and Walpole, are listed below.

- Section 1: Landfall – Bilsby.
- Section 2: Bilsby – Welton le Marsh.
- Section 3: Welton le Marsh – Little Steeping.
- Section 4: Little Steeping – Sibsey Northlands.
- Section 5: Sibsey Northlands – Hubbert's Bridge.
- Section 6: Hubbert's Bridge – Moulton Seas End.
- Section 7: Moulton Seas End – Foul Anchor.
- Section 8: Foul Anchor – Walpole.

4.3.40 The Non-Statutory Consultation Feedback Report sets out how NGET has considered feedback received for each section and how the feedback has influenced the defined proposals for statutory consultation, as summarised in the following section.

4.4 Stage 3: Defined Proposals for Statutory Consultation

4.4.1 Following feedback received from the non-statutory consultation, the Projects underwent further design development leading up to statutory consultation. This section sets out how the design of the Projects during these stages has been developed through the DCC process, which is explained below. The DCC process takes a structured approach to considering feedback received from stakeholders at non-statutory consultation and EIA Scoping to build the design further and manage further design changes that may arise and to assess them fully. Where considered necessary, the DCC process allows for reviewing of design decisions made in Stages 1 and 2.

Approach to presenting the draft Order Limits

4.4.2 At this statutory consultation, NGET is presenting the draft Order Limits as an indicative corridor to allow for flexibility as the design of the Projects progress post statutory consultation and up to DCO submission. The draft Order Limits allow for flexibility, but has also sought to minimise land take as far as possible. The General Arrangement drawings forming part of the suite of consultation documents have an indicative corridor labelled as “Indicative Zone for Temporary Construction Works”, which is the area within the identified draft Order Limits.

4.4.3 The General Arrangement drawings also provide an indicative corridor route for the underground cabling. This area is labelled as “Indicative Zone for Underground Cable Assets”. This area shows where the underground cabling could be routed within the draft Order Limits. NGET has taken several cable route options and converter station options forward to statutory consultation (which are set out below), there are several indicative zones for where the underground cabling route and converter stations could be placed. Again, this is to allow flexibility at this stage and to allow for feedback from stakeholders during statutory consultation, which will then feed into the next stage of the design process.

4.4.4 For the purpose of this statutory consultation, NGET is not presenting exact locations of temporary works, as the Projects are subject to further design changes up to DCO submission. For DCO submission, these indicative areas for temporary works, the underground cabling and siting for the converter stations will progress to final Order Limits and ‘Limits of Deviation’ (LoD). LoD identify a maximum distance or measurement of variation within which the permanent works must be constructed. For example, previously unidentified poor ground conditions may require proposed infrastructure to be re-sited slightly for geotechnical reasons, therefore, to allow for this, LoD will be provided, allowing the permanent works to be constructed within these limits.

Design Change Control (DCC) Process

4.4.5 The DCC process was developed by NGET to ensure that each identified change request (termed as Design Change Request (DCR)) was robustly considered by NGET’s specialist teams covering environment, planning, technical (design and

construction) and land rights, and reasons for changes throughout the design development are recorded and evidenced.

4.4.6 The DCC process is a multi-stage assessment used to:

- robustly consider each proposed change to ensure all decisions are recorded; and
- provide an audit trail of the reasons for changes being made or rejected.

4.4.7 This report focuses on the DCC process followed during Stage 3 which considered DCRs raised during the non-statutory consultation period as well as DCRs raised by the Projects team itself as a result of information emerging from environmental surveys and other technical assessment work. At this stage, the DCRs typically related to the Preferred Corridor and Preferred Siting Zones and the associated graduated swathe and Siting Areas. The DCC process will continue during Stage 4 after statutory consultation, considering DCRs arising from feedback received at the statutory consultation for specific elements of the design or mitigation approaches.

4.4.8 The DCC process is a multi-disciplinary, holistic approach to design decision making, seeking to achieve good design as required by planning policy, and avoid technical and environmental impacts, where practicable. The DCC process enables the Projects to demonstrate how NGET has had regard to external feedback, received through the non-statutory consultation, technical stakeholder engagement with statutory bodies, and landowner engagement.

4.4.9 The DCC process is a four-stage process consisting of the following appraisal stages:

- **Stage A (Initiation of DCR)** – Proposed DCRs are formally initiated in the DCC Process following reviews and formally acceptance by the Projects.
- **Stage B (Preliminary Assessment)** – A multi-disciplinary workshop is held to carry out a preliminary review of the DCR. Discipline representatives for engineering, environment, land and planning discuss the DCR to agree whether it should be rejected at this stage or progressed for further appraisal at Stages C and D. Each discipline representative brings insights from their respective stakeholders which feed into the Stage B review.
- **Stage C (Design Appraisal)** – A detailed appraisal of the DCR is carried out by the engineering team, considering technical complexity, construction issues, technology issues, capacity issues, network efficiencies and cost.
- **Stage D (Full Impact Review)** – A detailed appraisal of the DCR is then carried out by environment, planning and land specialists. Once the Stage C and D appraisals have both been completed, a multi-disciplinary workshop is held to carry out full impact review of the DCR and agree whether it should be rejected or accepted for implementation. A DCR that is accepted at Stage D is then carried through into the design.

4.4.10 DCRs need to be specific and locatable. They constitute a request to alter a specific element of the design or avoid a specific environmental feature. A vague statement, a request that relates to the whole route, or a general request for alternatives to be shown were not considered a DCR.

4.4.11 As part of the DCC process, the following design selection principles, underpinned by relevant planning policies, were considered and applied, drawn from NGET's experience and the Projects' specialists supporting the process:

- Avoidance of key sensitive features and environmental and human receptors, where practical. This included minimising or re-orientating construction working areas to avoid effects on potential receptors where practical or refining the Indicative Zone for underground cable assets and Indicative zone of the converter stations to avoid and minimise harmful impacts on specific receptors.
- Consideration of the space technical constraints such as existing third-party utilities, space available, future restrictions etc.
- Shortest route preference to reduce impacts by minimising the amount of infrastructure and overall construction areas. Subsequently, this approach would also reduce the costs of the Projects which ultimately reduces the cost to the consumer.
- Ensuring safe access opportunities and inclusion of permanent and temporary access routes.

4.4.12 Each step of the process involved gathering data from several different sources such as survey data, publicly available data from Government bodies etc. to define and assess the potential alternatives. This information was then collated, reviewed and appraised to reach cross-discipline decisions about each DCR. The outcome, following balanced and informed consideration, was either that the change raised via a DCR was included in the Projects design, or that the proposed change was not preferred (for example it might create other environmental impacts that would outweigh the benefit the change might otherwise create) and therefore no change was made.

4.4.13 In several locations, the Preferred Corridor intersects with the emerging corridor for the Grimsby to Walpole Project. In particular, the new Walpole B Substation is proposed to be constructed as part of both the EGL 3 and EGL 4 Projects and the Grimsby to Walpole Project. Where DCRs affected shared infrastructure, overlapping corridors, or the same receptors, DCRs were assessed collaboratively with the Grimsby to Walpole team to ensure a coordinated approach.

Assessment of the Identified DCRs along the Preferred Corridor and Siting Zones

4.4.14 This section of this report summarises the design changes processed through the DCC process since non-statutory consultation with a focus on the onshore Preferred Corridor. Chapter 3 of the PEIR explains the assessment of DCRs within the Preferred Corridor sections in more detail, whilst the Non-statutory Consultation Feedback Report explains how specific changes raised by consultees at non-statutory consultation have been considered.

4.4.15 Reviews of previous design decisions since non-statutory consultation along each section of the Preferred Corridor are highlighted below in relation to DCRs that have been raised. When a DCR was requested that would change the alignment of the Preferred Corridor, this was reviewed and assessed. Where a DCR identified a better option than the Preferred Corridor, the DCR was approved and the Preferred Corridor revised.

Section 1: Landfall to Bilsby

4.4.16 Following non-statutory consultation, further design work was undertaken and the decision was taken that the preferred landfall site would be Anderby Creek. Further, the

three-ended link to Bilsby was removed as an option from the Projects. Within the Anderby Creek Landfall Study Area, the area identified as most suitable is situated north of Anderby Creek and partially overlapping with the southern border of the former Sandilands Golf Course.

4.4.17 The feedback received from non-statutory consultation reinforced a need to minimise the impact of the Projects on the local landscape, habitats, roads, and visual amenities. Feedback provided by the National Trust identified National Trust property at Sandilands, which is a former golf course planned to be transformed into a nature reserve. This feedback has been considered as part of the development of the Indicative Zone for underground cable assets from Anderby Creek Landfall.

4.4.18 Taking account of non-statutory consultation feedback, further environmental and technical studies, and the removal of the three-ended HVDC link from the Projects, the Preferred Corridor from Anderby Creek to Walpole was progressed through the DCC process focusing on two Preferred Corridor options. The DCRs progressed for this Section considered the following factors:

- Avoiding potential impacts on the National Trust land.
- Reducing the overall HVDC underground cable length to reduce potential for temporary habitat loss and disruption on landscape and visual receptors during construction.
- Reducing the length of the HVDC underground cable would also reduce the cost and programme.
- Reducing potential disruption on Public Rights of Ways (PRoW).
- Reducing potential impacts on known archaeology along the cable route.

4.4.19 The DCC process concluded that the Preliminary Alignment should route directly southwest towards Bilsby routeing through the southern extent of the Anderby Creek Landfall Study Area.

Section 2: Bilsby to Welton le Marsh

4.4.20 From Bilsby, the underground cable route would continue south. At this point, two options were introduced allowing the cable to cross the B1449 either east of or west of Thurlby to seek to avoid impacts on Thurlby itself and associated non-designated heritage assets.

4.4.21 From Thurlby, the underground cable would continue to route south, avoiding scattered agricultural constraints in proximity to Farlesthorpe and Cumberworth. North of Bonthorpe, western and eastern optionality has been introduced to avoid a Scheduled Monument.

4.4.22 As identified above, changes were made following the removal of the infrastructure associated with the three-ended HVDC link and considering the DCRs progressed at Anderby Creek. The underground cable route is proposed within the southern option of the Preferred Corridor routeing directly southwest to Bilsby and Thurlby before continuing south towards Welton le Marsh.

4.4.23 A series of hedgerows were identified within the graduated swathe route to the south and east of Welton le Marsh that informed the main alternatives.

Section 3: Welton le Marsh to Little Steeping

4.4.24 This section runs from Welton le Marsh to a point immediately south of the village of Little Steeping. From Welton le Marsh, the underground cable route would continue west before turning south at Gunby Hall. From Gunby, it would continue south, before crossing the B1195 east of Great Steeping. From the B1195, optionality is introduced to cross the Steeping River and to avoid the village of Little Steeping.

4.4.25 Technical constraints were identified at Gunby Hall roundabout which required moving the underground cable alignment further north into the Lincolnshire Wolds National Landscape as a result of a lack of ground investigation information and to avoid risks crossing roads/gas mains.

4.4.26 No other DCRs within Section 3 of the Preferred Corridor were progressed and the Indicative Zone for underground cable assets follows the darker areas of the graduated swathe.

Section 4: Little Steeping to Sibsey Northlands

4.4.27 Section 4 of the Preferred Corridor runs from Little Steeping to south of the village of Sibsey Northland.

4.4.28 Since the non-statutory consultation, several DCRs have been progressed in collaboration with the Grimsby to Walpole Project. The DCRs raised in response to landowner feedback identified potential changes to the location of infrastructure and opportunities to co-ordinate the development of infrastructure. The DCR changes allowed for the opportunity to reduce potential impacts on farmland and farm operations and provided the opportunity for co-ordinated construction, seeking to minimise disruption to neighbouring communities. Additional technical opportunities were also identified removing additional watercourse crossings and associated environmental effects.

Section 5: Sibsey Northlands to Hubbert's Bridge

4.4.29 This section of the Preferred Corridor runs from Sibsey Northlands to east of Hubbert's Bridge (west of Boston). From Sibsey Northlands and the A16 crossing, optionality was introduced for the cable route alignment to avoid multiple clusters of residential properties and multiple crossings of major and minor watercourses. This can be seen on the Onshore General Arrangement Plans.

4.4.30 One option would continue routeing the underground cables west before turning southwest and continuing south to Hubbert's Bridge. The alternative route would turn south after crossing the A16 and split into two options to avoid a cluster of scattered residential properties, before continuing south and west of Boston. The route would then turn directly south seeking to cross South Forty Foot Drain and the A1121 west of the Boston Aeroclub.

4.4.31 An additional option within the Preferred Corridor but outside of the darker areas of the graduated swathe is proposed to the west of Boston. This could avoid an area of possible settlement remains. Both options to the west of Boston are included within the draft Order Limits for statutory consultation providing two alternative options to cross South Forty Foot Drain. The options will be investigated and refined as further information becomes available. Furthermore, at two crossing points within the graduated swathe, one where the English Onshore Scheme crosses the A16 north of

Sibsey, and one where the English Onshore Scheme crosses the West Fen Drain north of Cowbridge, options are included to retain crossing flexibility and will be investigated and refined as further information becomes available.

Section 6: Hubbert's Bridge to River Welland

4.4.32 This section of the Preferred Corridor runs from east of Hubbert's Bridge to north of the Moulton Seas End.

4.4.33 From the east of Hubbert's Bridge, optionality was introduced for the cable route alignment to retain a crossing of New Hammond Beck and the A52. The options are shown on the Onshore General Arrangement Plans. One option would cross to the west of the B1192 and the other would cross east of the B1192. In addition, two crossing options of the A52 were suggested. These two options are included in the draft Order Limits for statutory consultation and further work will be undertaken to refine the design to a singular option.

Section 7: River Welland to Foul Anchor

4.4.34 Section 7 of the Preferred Corridor runs north of Moulton Seas End to immediately east of Foul Anchor (east of the A1101).

4.4.35 Optionality was introduced for the cable route alignment to route the underground cables along approximately 6 km of the A17, north of the Saracen's Head to between Holbeach and Fleet Hargate. This option seeks to utilise a more direct route southeast towards the Walpole Converter Stations.

4.4.36 Stakeholders raised concerns that routeing alongside the A17 would not be acceptable to road users and the community, as the A17 is currently heavily constrained. As a result, the A17 alternative route has been discounted and is not taken forward. Therefore, the draft Order Limits follow the dark route in the graduated swathe that routes southwards between Holbeach and Fleet Hargate before turning east.

Section 8: Foul Anchor to Walpole

4.4.37 Section 8 of the Preferred Corridor runs from east of Foul Anchor to the Preferred Siting Zones for the Walpole converter stations. This section includes optionality for multiple entry points into the Preferred Walpole Converter Station Siting Zone, with multiple options for crossing the River Nene. The different options are shown on the Onshore General Arrangement Plans.

4.4.38 Two route options were proposed to the northwest of Ingleborough and two connection options to the north and south of the Rose and Crown Solar Farm.

4.4.39 Several DCRs were raised in response to non-statutory consultation feedback which identified potential interactions with other proposed developments in the Walpole area. Further reviews of planned and potential developments and other forms of constraints identified to the east of River Nene and within the surroundings of Walpole Marsh were also identified and progressed as part of the DCC process.

4.4.40 Therefore, an additional technical option is proposed between the A1101 Sutton Road and the River Nene to the west of the River Nene and outside of the graduated swathe and the Preferred Corridor for Sections 7 and 8. It is proposed that the underground cable route includes two potential options for routeing to Walpole and connecting to the

Indicative locations of the Converter Stations and Walpole B and both are included within the draft Order Limits for statutory consultation.

4.4.41 Since the non-statutory consultation, opportunities to use the River Nene to receive materials for the converter stations has been explored. This may include the use of existing ports. In addition, a potential option for a new temporary quay has been added, which is now being consulted on.

4.4.42 Further detail on optionality and siting at Walpole is set out in section 5 below.

4.5 Approach to Temporary Works

4.5.1 This section briefly explains how the siting of temporary works has been considered during the DCC process. Temporary construction areas, including temporary construction compounds, storage and laydown areas, proposed temporary access tracks and points (and bellmouths and visibility splays) have been considered as part of the DCC process and the selection of the preferred cable route. These were reviewed, appraised and refined as needed to seek to avoid potential environmental, socio-economic and land ownership impacts as well as technical constraints.

Design Changes associated with Temporary / Other Infrastructure

4.5.2 Changes relating to other temporary works and infrastructure were progressed as part of the DCC process. These changes resulted in additional areas being included in the draft Order Limits for statutory consultation. These are:

- Sutton Bridge to the North of Walpole Marsh:
  - These areas were added to the draft Order Limits as a result of technical studies identifying the need for additional storage and laydown areas in the proximity of the construction works in Walpole.
- Area to the east of West Drove North and east of the preferred siting areas for the converter stations:
  - This area was included in the draft Order Limits to accommodate the construction compounds required for the converter stations.
- Area to the south of West Drove North:
  - This area was included in the draft Order Limits to accommodate the potential access and junction improvements along Lynn Road/West Drove junction.

Siting of Construction Compounds

4.5.3 Temporary construction compounds and laydown areas would be set up at strategic locations along the alignment, with associated access points from the existing road network where practical. They are needed to support the construction of the Projects. The compounds will have a variety of uses which may include material loading/unloading, material storage, vehicle parking, siting of welfare facilities, siting of construction cabins/modular offices and to complete construction activity.

4.5.4 For the English Onshore Scheme, as a minimum, it is assumed for the purposes of the PEIR that construction compounds would be required along the HVDC / HVAC cables route; Landfall; Walpole converter stations; and Walpole B Substation.

4.5.5 The exact location where the construction compounds may be located within these fields is not known at this stage; this decision will be subject to further environmental and engineering studies and would be decided at the detailed design stage. To allow for a reasonable worst-case assessment to be undertaken, the PEIR assumes that the location of the construction compound would be within an area of the field that has the potential to cause the comparatively most adverse impact on a particular receptor, when compared to alternative locations within the same field. In most instances, the assumption is that the construction compound would be located at the field boundary, closest to the sensitive receptor being assessed.

4.5.6 The siting is factoring in a number of constraints and opportunities. These include the existing environmental sensitive features and receptors, and technical opportunities such as accessibility for Heavy Goods Vehicles (HGVs) and access to existing services.

Haul Roads and Bell Mouths

4.5.7 Primary access to the construction sites (including the cable working width) would be from the existing road network. However, existing accesses from public highways may need to be widened, due to the size of the construction vehicles. Where there is no opportunity to utilise existing access from public highways, temporary new access tracks (including culverts and bridges) from the existing road network may be required, given the nature of works required and plant to be used. These would be connected to the haul roads that are located adjacent to the construction areas.

4.5.8 Sizing of bell mouths would be in accordance with the relevant design guidance and the vehicles required to access/egress the Site. Visibility requirements would dictate where the bell mouths can be positioned. The installation of bell mouths may require realignment of existing overhead or underground services, and clearance works along visibility splays to create a line of sight for the safe use of the junction. Visibility splays would need to be maintained throughout the duration of construction.

4.5.9 Environmental and socio-economic considerations will influence the proposed alignment of any haul roads and bellmouths.

Temporary Culverts

4.5.10 Temporary culverts would be required where the construction haul road crosses existing watercourses, i.e., ditches, field drains, dykes and small rivers. Culverts would be in place for the duration of the works and removed upon completion. The type and size of culvert is dependent upon the size and the ecological and hydrological properties of the ditch. Typical culvert types include concrete pipes, plastic (twin wall) pipes and pre-cast concrete modular units (box or portal culverts). Each culvert type has slightly varying and specific methods of installation.

Temporary Bridges

4.5.11 At main rivers, bridges would be required, and also in locations where the watercourses are large and a culvert solution is not reasonably practicable, or where specified by the relevant stakeholder. These would be temporary or permanent depending on whether they would be on the temporary haul road network or along one of the permanent accesses. Access to both sides of the bridge location would be required using mobilisation accesses to undertake vegetation clearance and foundation and abutment

construction, the primary access would then be used to bring in elements of the bridge deck which would be lifted into place using a mobile crane.

Potential Temporary Quay

4.5.12 There is an opportunity to use the River Nene to receive the transformer unit needed for the converter stations and other construction materials. The transformer unit and construction materials would be delivered to an existing port (which would be identified at detailed design stage if this option is taken forward) along the River Nene and stockpiled within the draft Order Limits. From the port, there are two methods by which materials could be transported to the Walpole converter station siting area: by HGVs utilising existing highways and new access roads, or by barges to a newly developed temporary quay along the River Nene. From the temporary quay, materials would be transported to the Walpole converter station siting area by utilising the HVDC underground cables haul road which would already be established.

4.5.13 A temporary quay wall would be offset from the river channel to allow barge unloading and transit of coasters. Offsetting the quay wall from the channel would require the existing flood defence line to also be set-back. For the purpose of assessment within the PEIR, it is assumed that the temporary quay would be constructed and removed whilst maintaining the flood protection. The river bank and flood protection would be reinstated when the temporary quay is removed. Additionally, a temporary quay apron would be constructed and would accommodate a crane or long reach excavator to transfer materials between the barge and the temporary quay.

5. Walpole

5.1 Siting Process at Walpole

5.1.1 As mentioned in Section 3.4 above, strategic option EGL OPP6 which involves the construction of the new Walpole B Substation was identified as the preferred strategic option. The Walpole B Substation was identified as a common connection point for the EGL OPP6 and the Grimsby to Walpole Project. The need for the Walpole B Substation exists as a part of either the Projects and/or the Grimsby to Walpole Project. Therefore, the Walpole B substation will be included in the DCO submission for both projects, to provide assurances should one of the projects not be delivered.

5.1.2 The decision to site Walpole B Substation in this location was a result of a collaborative approach with the Grimsby to Walpole Project applying a common set of siting and appraisal principles suitable for locating the substation for either or both projects. The below sections set out the Preferred Siting Zone and siting area for the Walpole B Substation, which were assessed as part of the CPRSS process.

5.1.3 This section will set out the Preferred Siting Zone and siting areas for the Walpole converter stations. The Preferred Siting Zone and siting areas were largely influenced by the siting of the Walpole B Substation with the intention of locating the infrastructure in proximity to reduce the overall footprint of the Projects and the spread of environmental impacts.

5.1.4 The siting process at Walpole for the proposed siting of the Walpole converter stations and the Walpole B Substation has been subject to the same DCC process as the Preferred Corridor route since non-statutory consultation.

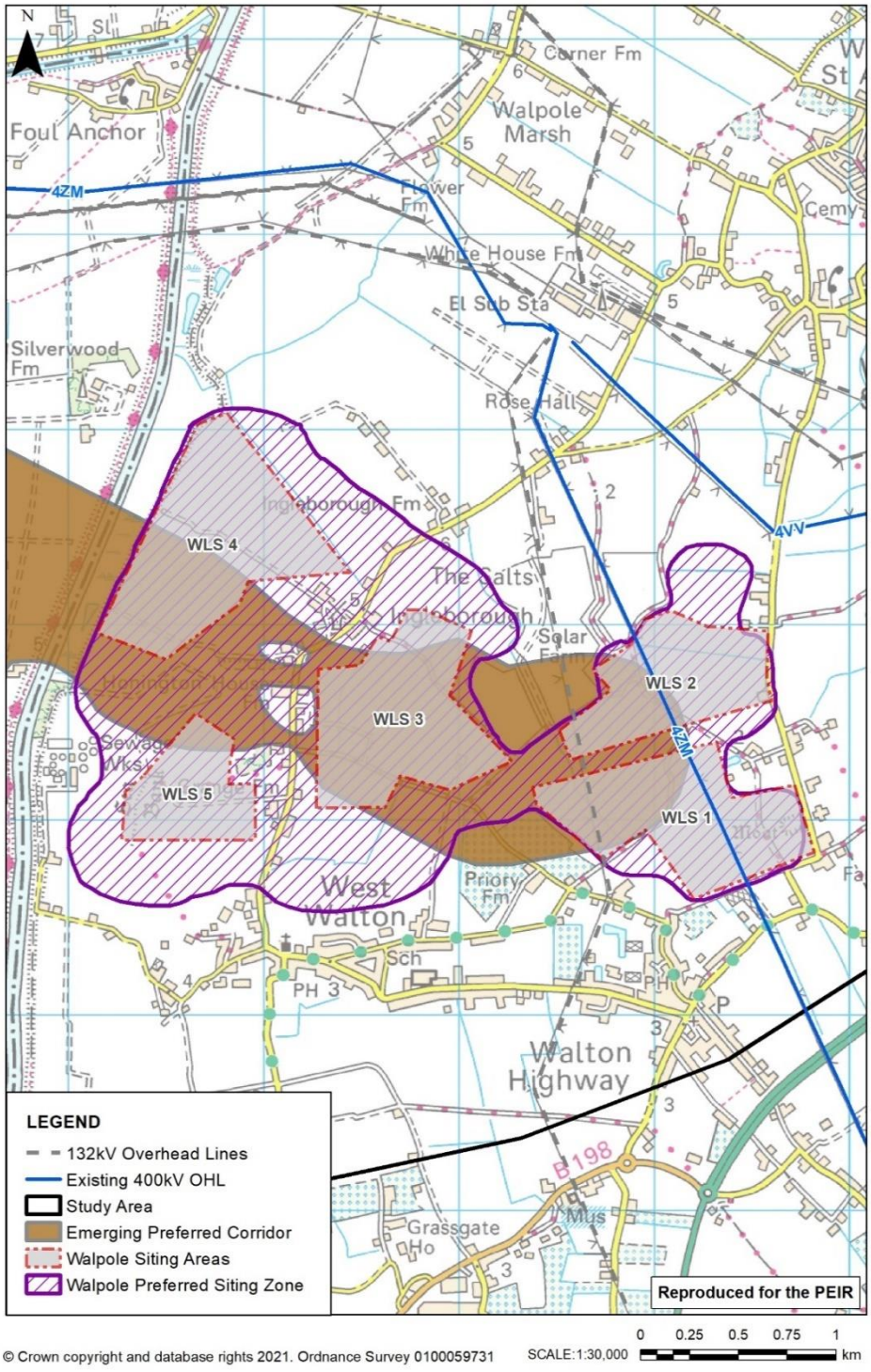
5.1.5 The Walpole Siting Zones were developed as part of the CPRSS process and followed the CPRSS methodology steps set out in **Plate 4.4** above. The Siting Zones were developed to accommodate both converter stations and the Walpole B Substation. Six Siting Zones were considered and assessed (referred to as WLP1 to WLP6).

Walpole B Substation

5.1.6 The Preferred Siting Zone for the Walpole B Substation is the hybrid WLP4 and WLP5 siting zone (WLP4/5) located north of West Walton and Walton Highway. Once the Preferred Siting Zone (WLP4/5) was established, further work was undertaken to investigate more specific siting areas for the proposed substation infrastructure. A total of five feasible siting areas were identified (WLS1, WLS2, WLS3, WLS4 and WLS5).

5.1.7 **Plate 5.1** below shows the five siting areas considered for both the Walpole B Substation and the proposed converter stations.

Plate 5.1 Siting Zone and Siting Areas for the Walpole B Substation



5.1.8 A comparative appraisal was carried out as part of the CPRSS to inform the graduated swathe, applying environmental, socio-economic and technical topics and sub-topics as set out in Step 2 (Section 4.3 of the CPRSS). The topics of ecology, water, socioeconomics, air quality and noise were not considered to be differentiating factors between the five siting areas, as all are free from designated ecological features, are within areas of Flood Zone 2 and 3 and have similar characteristics in respect of air quality, noise and socio-economic factors. For the remainder of factors, the comparative appraisal identified a landscape and visual preference for the WLS1 because of an assessed strong sense of enclosure across the siting area, specifically from the west

where views are well screened by vegetation. The location of WLS1 siting area also provides an advantage of siting directly beneath the 4ZM overhead line minimising potential wirescapes in the area. From a technical perspective, WLS1 was also preferred because of its size allowing for flexibility of siting within the siting area and is located directly under the 4ZM 400 kV overhead line.

5.1.9 Taking the above into consideration, an area primarily encompassing WLS1 was identified as the emerging preference for Walpole B Substation, which was visually depicted by a graduated swathe.

5.1.10 This Preferred Siting Zone, preferred siting area and graduated swathe were taken forward and presented at non-statutory consultation for both the Projects and the Grimsby to Walpole Project.

5.1.11 Since non-statutory consultation and considering the ongoing environmental and technical studies and information for the Preferred Siting Zone (WLP4/5), the siting of the Walpole B Substation remains within the darker areas of the graduated swathe. This area is still preferred for the following reasons:

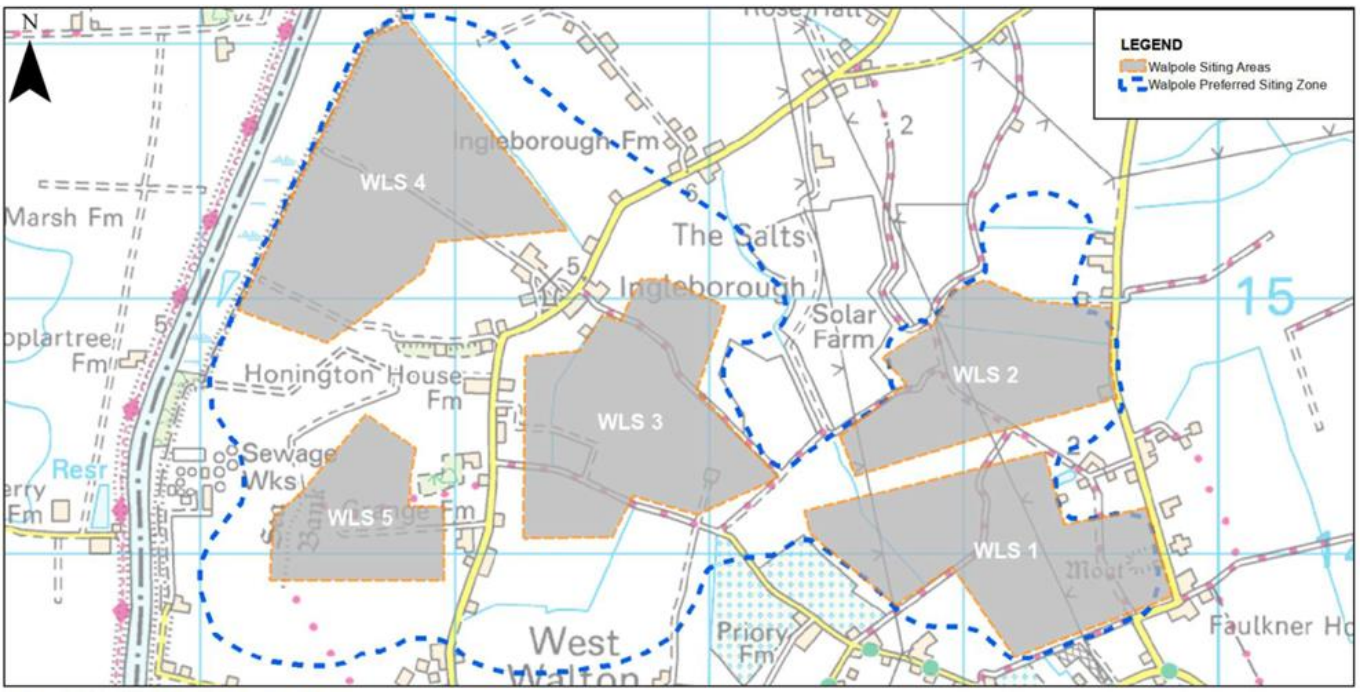
- It is within an area with existing landscape screening and provides additional opportunities for visual screening.
- It is in proximity to the existing 4ZM 400k V overhead lines reducing the complexity and need for significant diversions of the existing network.
- It offers reduced complexity in terms of the density and location of existing and proposed infrastructure, including pipelines and overhead lines. It avoids areas with existing technical constraints and the existing Rose and Crown Solar Farm.

Converter Stations

5.1.12 The Preferred Siting Zone for the Walpole converter stations is the hybrid WLP4 and WLP5 siting zone (WLP4/5) located north of West Walton and Walton Highway. Once the Preferred Siting Zone (WLP4/5) was established, further work was undertaken to investigate more specific siting areas for the proposed converter station infrastructure. A total of five feasible siting areas were identified (WLS1, WLS2, WLS3, WLS4 and WLS5) as appropriate areas to accommodate the proposed converter stations.

5.1.13 **Plate 5.2Error! Reference source not found.** below shows the Preferred Siting Zone a nd five siting areas considered for both the Walpole converter stations.

Plate 5.2 Siting Zone and Siting Areas for the Walpole Converter Stations



5.1.14 A comparative appraisal was carried out as part of the CPRSS to inform the graduated swathe for the siting for the converter stations. The appraisal identified areas WLS2, WLS3 and WLS4 as the preferred siting areas for the Walpole converter stations from an environmental perspective. From a technical perspective, the comparative appraisal also identified that the area most likely for the converter stations to be located was adjacent (where practicable) to areas where the Walpole B Substation would be most likely to be located. This was due to their position near the Walpole B Substation siting being preferred in area WLS1 shown in Plate 5.1. It was identified that the co-ordination of the siting of both the converter stations and the Walpole B substation would limit the spread of environmental effects across a wider area and allow the opportunity for efficiencies during construction.

5.1.15 This Preferred Siting Zone, preferred siting area and graduated swathe were taken forward and presented at non-statutory consultation.

5.1.16 Since the non-statutory consultation, a review of the Preferred Siting Areas for the converter stations was carried out, considering the ongoing environmental and technical studies, latest design information and any feedback raised as part of the non-statutory consultation. As part of this process, a decision was also made to consider siting areas which may only accommodate one converter station with the second converter station sited elsewhere within another siting area within the Walpole Converter Stations Preferred Siting Zone; this approach has the potential to reduce the impact during construction and operation.

5.1.17 The review identified that siting areas WLS2, WLS3 and WLS4 remain the preferred locations for the converter stations, and these are taken forward to statutory consultation. This is due to the Siting Area WLS5 being constrained by two existing gas mains and multiple ditches that would require diversions, as well as generally providing limited environmental opportunities and Siting Area WLS1 being selected for the Walpole B Substation as identified above.

5.2 Why Four Converter Station Options?

5.2.1 As set out in the above section, considering the ongoing environmental and technical studies, latest design information and feedback raised, the decision was made to review the preferred siting areas for the converter stations. As part of this process, a decision was also made to consider siting areas which may only accommodate one converter station with the second converter station sited elsewhere within another siting area within the Walpole Converter Stations Preferred Siting Zone. This enabled areas within the Walpole Converter Stations Preferred Siting Zone which had previously been discounted for being too small for two converters to be reconsidered.

5.2.2 The review identified several 'scenarios' in which the converter stations could be sited within the identified siting areas. These were reached by considering environmental, socio-economic and technical criteria, including the following:

- Siting Area location of the Walpole B Substation.
- Grimsby to Walpole Project connection – there needs to be space available for the Grimsby to Walpole Project to connect into the Walpole B substation.
- Existing infrastructure and environmental features in the Walpole area.
- Customer connections – there needs to be space available for projects being developed by third parties to connect into the Walpole B substation,
- Planning policy considerations (including NPS EN-1 and EN-5 as well as local policy).
- The need to make the case for compulsory acquisition powers which includes the consideration of alternatives available.

5.2.3 A comparative appraisal exercise was undertaken to appraise each of the scenarios for their technical, socio-economic, environmental, and cost implications and to seek identification of preferred siting scenarios. The objective of this options appraisal was to take full consideration of all known environmental factors to minimise the risk of significant adverse impacts on the environment and communities whilst also considering engineering and economic considerations. Following the appraisals a workshop was held to review environmental preferences and, in accordance with EN-1 and EN-5, balance these against technical and cost inputs to reach a conclusion on the emerging preference that provides the optimum balance of efficiency and economy, whilst having appropriate regard to environmental and socio-economic impacts.

5.2.4 The review concluded that overall four scenarios, defined as part of the statutory consultation as Options A, B, C and D (see **Plate** 5.3 **5.3** to **Plate 5.6**), were more preferred and therefore taken forward to statutory consultation, with the less preferred scenarios not progressed due to a combination of their potential environmental impacts alongside constraints provided by the existing infrastructure high-pressure gas mains, the presence of Internal Drainage Board drains, and a substantial increase in the complexity for routeing other projects to the Walpole B substation.

5.2.5 The conclusions of the review identified marginal differences between Options A to D and therefore it was decided to present all Options at statutory consultation. The options are presented to gain feedback from stakeholders alongside gathering further detailed environmental and engineering information to support a decision on the preference for the final location(s) for each converter station.

Plate 5.3 Converter Station Option A

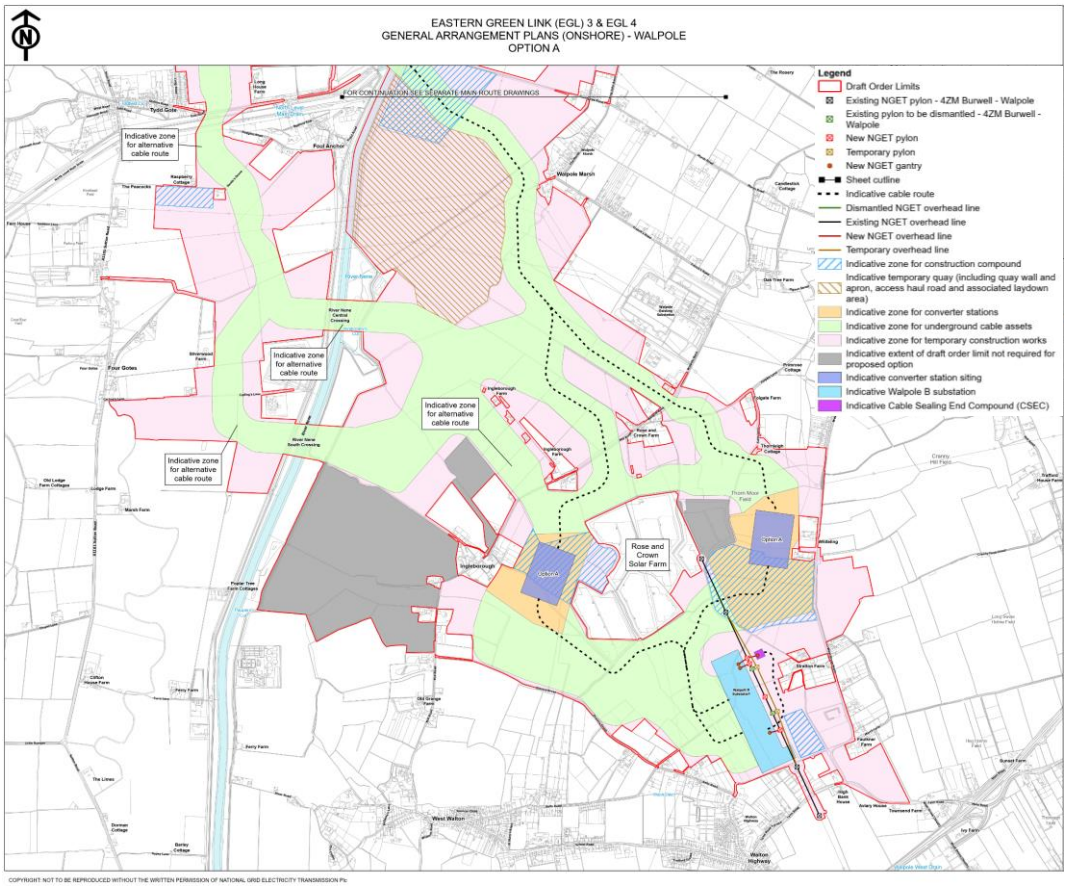


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Plate 5.4 Converter Station Option B

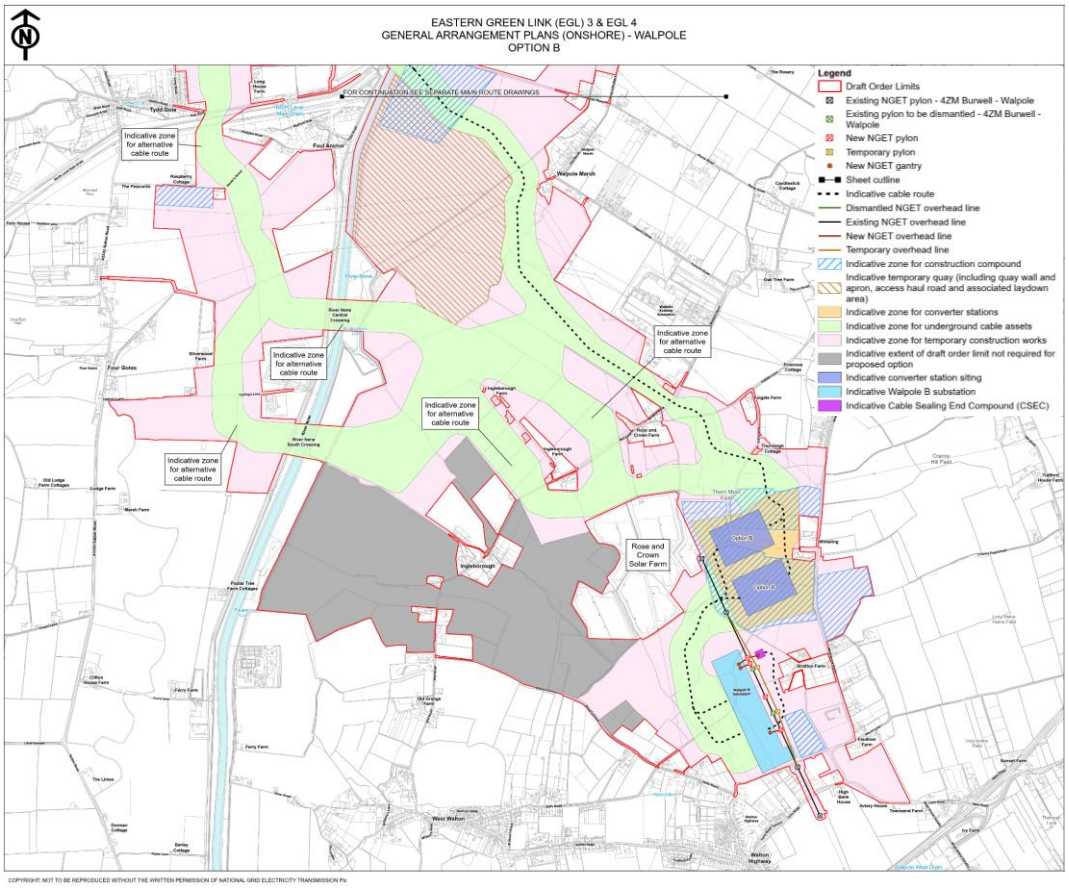

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Plate 5.5 Converter Station Option C

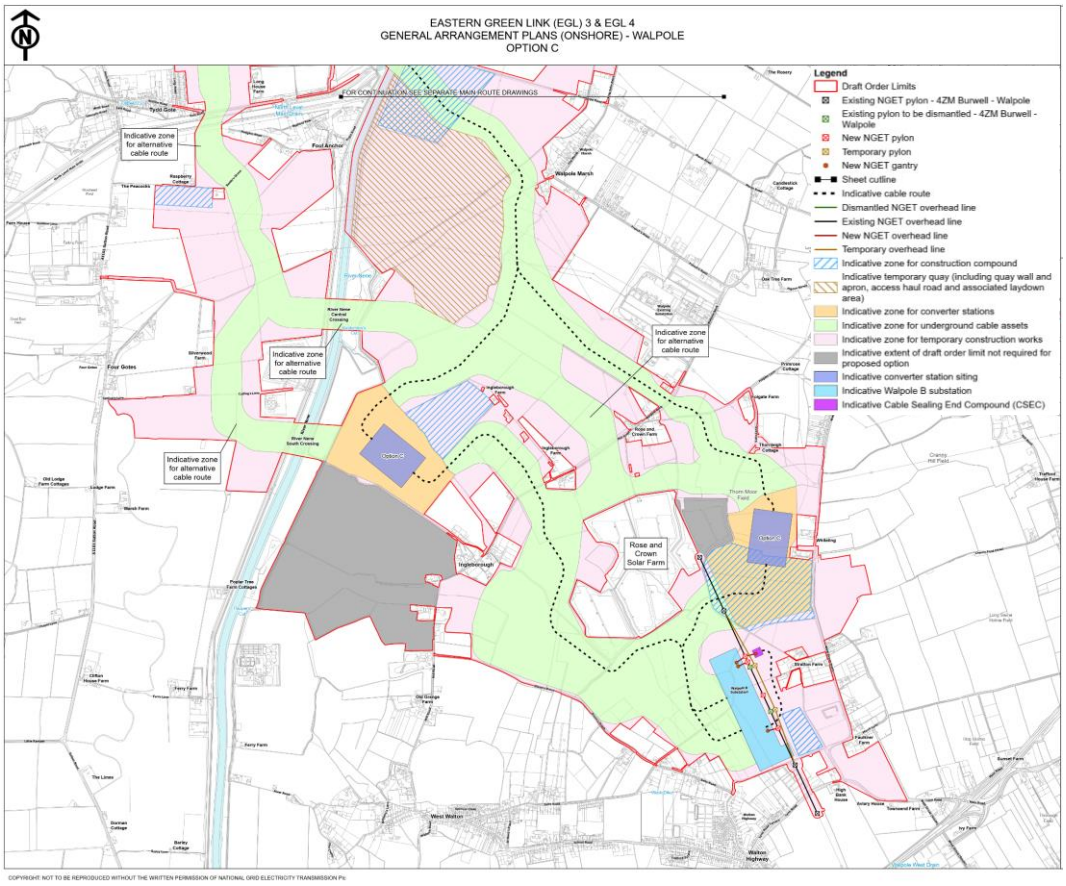
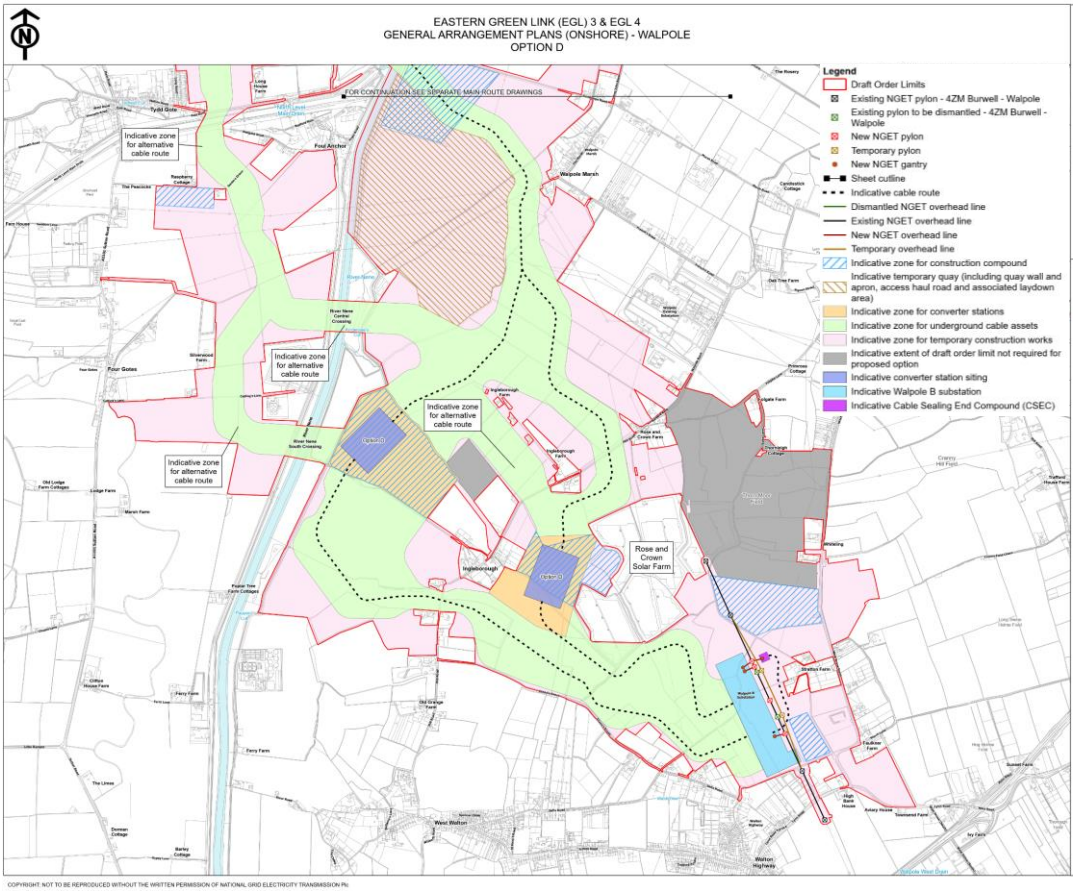


Plate 5.6 Converter Station Option D



Option D

5.2.6 Option D is the least preferred of the four Options from an environmental perspective. This is due to Option D being in proximity to properties and listed buildings at Ingleborough, its proximity to the River Nene, and as it utilises areas identified as Grade 1 Best Most Versatile (BMV)[1] agricultural land (as shown on publicly available mapping). However, Option D has some benefits with regards to its potential to limit noise, vibration and air quality impacts to nearby properties and would limit the impact upon the existing drainage network.

5.2.7 From an engineering perspective, Option D is also less preferred. Option D presents similar challenges to Option C by reason of the overall spread of infrastructure (converters and substation). A greater distance between the infrastructure could reduce efficiencies and coordination during construction, especially if a single contractor is involved. There is also the potential for delays during construction due to the proximity of one of the converter stations to the River Nene and potential for flooding. Option D would require increased lengths of HVAC cables and haul roads and would increase the technical complexity by requiring routeing of HVAC cables between properties along Mill Road. However, Option D would allow for flexibility for construction and micro-siting, and limits the impacts upon the existing drainage network and upon other projects connecting to the Walpole B substation.

Option C

5.2.8 From an environmental perspective, Option C was less preferred when compared to Options A and B, but more preferred than Option D. Option C would result in the spread of infrastructure across the Walpole area, would be in proximity to the River Nene, and utilises Grade 1 BMV agricultural land (as shown on publicly available mapping). However, the benefits are that it would be further separated from more settled areas and designated heritage assets and limit impacts upon the existing drainage network.

5.2.9 From an engineering perspective, Option C poses challenges as a result of the greater distance between the converter stations, therefore spreading the infrastructure. This could reduce the efficiency and coordination during construction, especially if a single contractor is involved. There is also the potential for delays during construction due to the proximity of one of the converter stations to the River Nene and potential for flooding. Option C would require the HVDC and HVAC cables from the Projects to be located either side of the Rose and Crown Solar Farm, therefore increasing the lengths of HVAC cables required. The HVAC cables would also require link boxes at every joint, which must be housed above ground and secured with fencing. This necessity adds to the permanent above ground infrastructure and increases the overall land requirements the further the two converters are located away from the proposed Walpole B substation. Option C would also increase potential restrictions on other projects (including the Grimsby to Walpole Project) connecting into the Walpole B substation.

Option B

5.2.10 Option B is the most preferred option from an environmental perspective due to its comparatively greater distance from the more settled areas of the Walpole area, and

[1] 'Best Most Versatile' land, which is defined as Agricultural Land Classification (ALC) Grades 1, 2 and 3a agricultural land and is recognised as the most productive and versatile land. The ALC system for grading agricultural land quality is provided in England & Wales (MAFF 1988).

designated heritage assets. It is also situated within an area identified as Grade 2 BMV agricultural land (as shown on publicly available mapping). However, Option B would bring the converter stations in proximity to properties along West Drove North and therefore is less preferred when considering noise, vibration, air quality and socioeconomics.

5.2.11 From an engineering perspective, Option B was the least preferred as it would increase technical complexity of construction due to the presence of properties, the Rose and Crown Solar Farm and existing drains. In addition, this Option would likely require acquisition of land currently forming part of the Rose and Crown Solar Farm. However, Option B would allow for co-location of the HVDC and HVAC cables and would potentially limit the length of haul roads required. In addition, Option B would be a better Option for the Grimsby to Walpole Project as it is unlikely to place substantial restrictions on the overhead line route into the Walpole B substation.

Option A

5.2.12 Option A is located outside of Grade 1 BMV agricultural land (as shown on publicly available mapping), away from the River Nene and is sufficient distance from designated heritage assets with the flexibility for micro-siting allowing further opportunities to limit impacts upon environmental features. Therefore, Option A is more preferred in that regard. However, given its proximity to residential properties it is less preferred when considering noise, vibration and air quality impacts (when compared to Option D) and landscape and visual impacts (when compared to Option B).

5.2.13 From an engineering perspective, Option A is the most preferred choice particularly when considering construction strategies and the need to mitigate risks during the build phase. Option A allows for streamlined coordination, if one contractor is engaged for both projects, while also maintaining sufficient spacing between the converters to enable independent operations if two separate contractors are appointed. Option A would require the HVDC and HVAC cables from the Projects to be located either side of the Rose and Crown Solar Farm which presents some increased technical complexity and may place some restrictions on other projects connecting into the Walpole B substation. Option A would also limit the length of haul roads needed, however, it is less flexible for construction and micro-siting, when compared to Option C.

Conclusion to the Four Converter Station Options

5.2.14 When considering and balancing all the factors, Option A is the emerging preference, subject to further work, decision workshops and governance. However, as stated above, given the advantages and disadvantages associated with each of Options A to D, it was decided to present all at the statutory consultation stage. This allows the opportunity for further environmental and engineering studies and survey work on each option, and for stakeholders to provide feedback which will inform the design process. A decision will then be taken on which option to take forward in the DCO.

5.2.15 As part of the statutory consultation, the Consultation Feedback Form contains questions relating to each converter station option.

6. Next Steps

6.1.1 The Walpole converter station options (Options A, B, C and D) will continue to be refined subject to further assessment of potential environmental effects and the results of ongoing field surveys, consultation feedback and engineering studies. This includes work to develop mitigation measures to mitigate impacts on environmental and human receptors.

6.1.2 Stakeholder feedback, environmental impacts (including agriculture, noise, landscape) and technical engineering constraints to the development of the Projects, all underpinned by the consideration of planning policy, will be key factors in determining a final siting option that will be presented in the DCO.

6.1.3 NGET is and will continue to take a holistic and coordinated approach to the siting and design of all infrastructure elements proposed in the Walpole area by the Projects (EGL 3 and EGL 4 and the Grimsby to Walpole Project).

6.1.4 Design principles will be developed to inform how the design of the converter stations (and any required environmental mitigation) responds to the immediate and wider area context. The document Converter Station Design – Background to Potential Architectural Approaches (May 2005) provides a background to and summary of the potential architectural approaches, including information relating to the design process that has informed them.

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