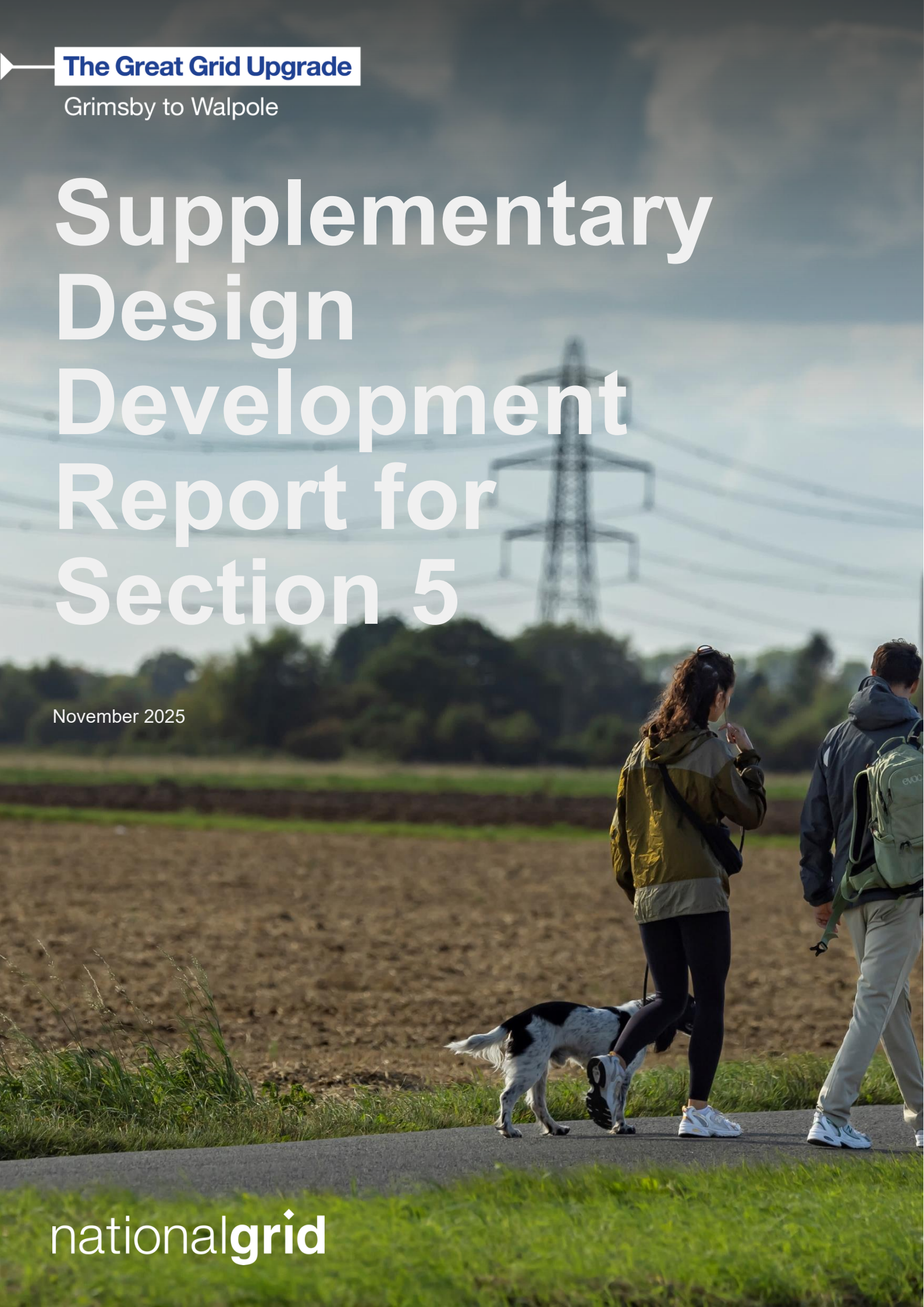
The Great Grid Upgrade

Grimsby to Walpole

Supplementary Design Development Report for Section 5

November 2025



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Executive summary

National Grid Electricity Transmission plc (NGET), referred to as National Grid in this report, owns, builds and maintains the high-voltage electricity transmission network in England and Wales. National Grid is responsible for making sure electricity is transported safely and efficiently from where it's produced to where it's needed. It is National Grid that is developing plans for the Project. The Project would support the UK's net zero target through a proposed network reinforcement located in the East Midlands, Humber and East Anglia regions.

The Project conducted a Stage 1 consultation between January and March 2024. This consultation introduced the Project, explained why new electricity transmission infrastructure is needed in these regions, how National Grid had developed its proposals, and sought the views of the public and stakeholders.

The feedback received during the Stage 1 consultation was carefully reviewed and considered, alongside the findings of environmental and engineering studies and emerging results from environmental surveys.

A review of our work to date, comprising the previous development stages of the Project, including the strategic proposal stage and options identification and selection stage was carried out following the Stage 1 consultation.

The **June 2025 Design Development Report** presented the changes that were made to the Project and its evolution since the Stage 1 consultation, including an explanation of how the proposed overhead line alignment and associated draft Order Limits for the proposed overhead line reinforcement and substation developments have been identified. This was included as part of the Stage 2 consultation held between June and August 2025.

At the Stage 2 consultation, Section 5 of the Project constituted a siting zone, however the location and extent of the proposed infrastructure within the siting zone was not confirmed at that point in time. The feedback received during the Stage 2 consultation, relevant to Section 5, has been considered alongside the findings of ongoing environmental and engineering studies in the development of the design in Section 5.

This report presents the changes that have been made to Section 5 of the Project and its evolution since the Stage 1 and Stage 2 consultations, including an explanation of how the proposed overhead line alignment and associated draft Order Limits for the proposed overhead line reinforcement and substation developments have been identified.

Following consideration of the feedback received in response to the Stage 2 consultation for the wider project, and the feedback received in response to the Weston Marsh Targeted Consultation, we will further develop and refine our proposals and continue to review our work to date throughout the process of developing the Project.

Our current proposals for the Project are summarised below and Weston Marsh Substations A and B specifically are the subject of the Weston Marsh Targeted Consultation:

- Approximately 140 km of new 400 kV overhead transmission line (overhead line);
- a new 400 kV substation to be built in the vicinity of the existing Grimsby West 400 kV Substation and the existing 132 kV Northern Powergrid Substation in North East Lincolnshire (to be referred to as the new Grimsby West Substation).

The existing 400 kV substation would be decommissioned, in all, or part[1]. The extent of decommissioning will be determined and reported in the Environmental Statement;

- Two new 400 kV Lincolnshire Connection substations located south west of Mablethorpe in East Lindsey (to be referred to as Lincolnshire Connection Substation A and Lincolnshire Connection Substation B);
- Two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District (to be referred to as Weston Marsh Substation A and Weston Marsh Substation B), including a section of new 400 kV underground cable between Weston Marsh Substations A and B and changes to the existing overhead line layouts;
- A new 400 kV substation in proximity to the existing Walpole Substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District (to be referred to as Walpole B Substation); and
- Replacement of short sections of existing 400 kV overhead line and local changes to the lower voltage distribution networks to facilitate the construction of the new overhead line and substations.

The Project would include other required works, for example, temporary and permanent diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation and enhancement of the environment including biodiversity net gain (BNG).

The feedback from the Stage 1 consultation, together with further technical and environmental work informed the designs presented at the Stage 2 consultation. The feedback relevant to Section 5 from the Stage 1 and Stage 2 consultations has been considered alongside the findings of further technical and environmental work in the development of the design presented at the Weston Marsh Targeted Consultation. All feedback from the Stage 2 consultation relating to the wider Project, along with all feedback from the Weston Marsh Targeted Consultation, will be used to inform the final designs that will be put forward in the application for development consent. National Grid expects to submit an application for consent for the Project in 2027.

[1] The existing 400 kV Substation will be decommissioned, in all or in part, only. The existing 132 kV Northern Powergrid Substation will not be decommissioned.

1. Introduction

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1. Introduction

1.1 Purpose of this report

1.1.1 The purpose of this report is to describe how Section 5 (Weston Marsh) of the Grimsby to Walpole Project (referred to as the 'Project' in this report) has evolved since the Stage 1 (non-statutory) consultation (undertaken between January and March 2024) and the Stage 2 (statutory) consultation (undertaken between June and August 2025). In conjunction with the **June 2025 Stage 1 Consultation Feedback Report, Weston Marsh Siting Study Report** and the **Section 5 Consultation Feedback Report**, this report details the design evolution of Section 5 following the Stage 1 and Stage 2 consultations, feedback provided from those consultation periods and further detailed engineering work.

1.2 Overview

1.2.1 National Grid Electricity Transmission plc (National Grid), owns, builds and maintains the electricity transmission network in England and Wales, and operates the high voltage electricity network throughout Great Britain, transporting electricity from generators (such as wind farms, solar farms and power stations) to local distribution network operators. Under Section 9 of the Electricity Act 1989 (Ref 1), National Grid 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).

1.2.2 National Grid is working to build a cleaner, fairer, and more affordable energy system that serves everyone, powering the future of our homes, transport, and industry. The Project is 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.

1.2.3 The Project 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 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 Project is set out in the **June 2025 Stage 2 Consultation Document** and the **June 2025 North Humber to High Marnham and Grimsby to Walpole - Strategic Options Report Update** (hereafter referred to as the **June 2025 Strategic Options Report Update**). Completion of the Project, together with other new reinforcements across the country will meet this future energy transmission demand both within these regions and across the UK.

1.2.4 The Project proposes to build a new high-voltage electricity transmission line and associated works between a new substation at Grimsby West in North East Lincolnshire and a new substation in the Walpole area, in Norfolk. The Project also proposes two new connection substations near the Lincolnshire coast and two new substations at Weston Marsh in Lincolnshire.

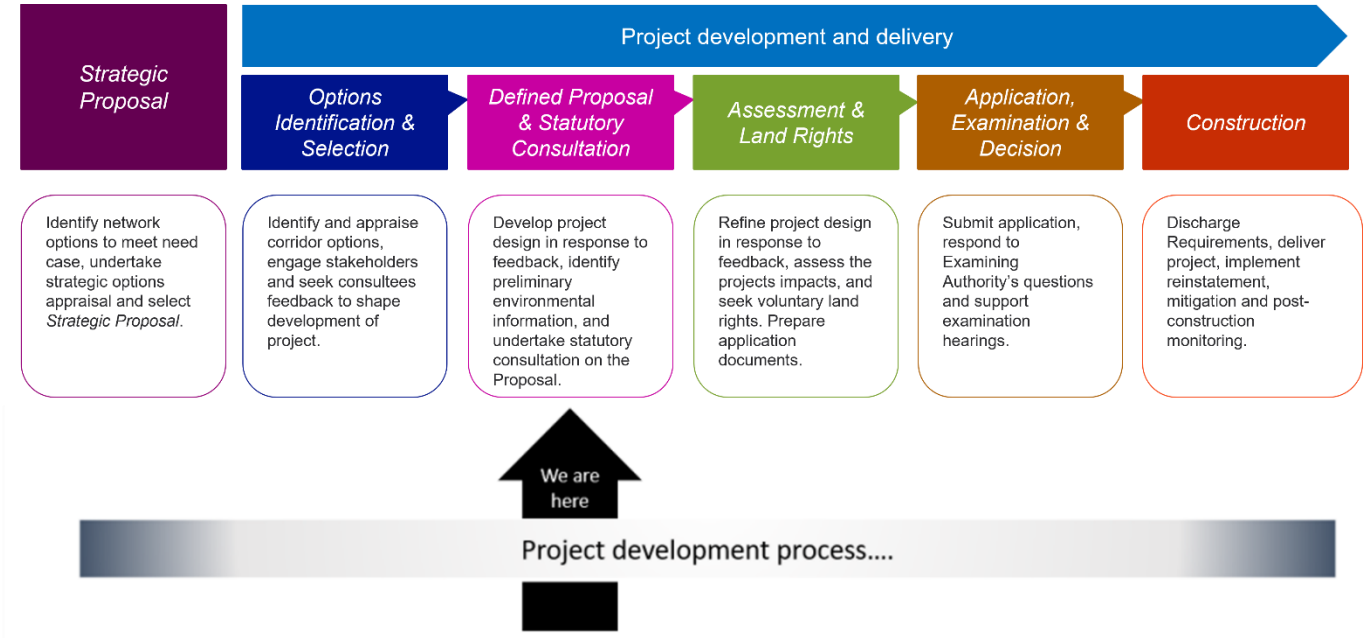
1.2.5 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under Section 16 of the Planning Act 2008 (PA 2008) (Ref 2) because it comprises a new electricity line above ground with a length of more than 2 kilometres (km), and with an operating voltage of above 132 kV. NSIPs 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 (SoS), in this case the Secretary of State for Energy Security and Net Zero.

1.2.6 National Grid must apply to the SoS for development consent for the Project, via the Planning Inspectorate. If the application is accepted, an examining authority would be appointed (consisting of one or more examining inspectors) who, after a period of public examination, would make their recommendation to the SoS. The SoS would, in turn, decide on whether development consent, via a Development Consent Order (DCO) should be granted for the Project. The timescale between acceptance of the submission and a decision is approximately 18 months in most cases.

1.3 National Grid Approach to Options Identification and Selection

1.3.1 National Grid's Approach to Consenting outlines the development process for major infrastructure projects, from initial inception to consent and construction, as detailed on Image 1.1:

Image 1.1 National Grid's Consenting Process (Our Approach to Consenting, National Grid, 2022)



Strategic options considered

1.3.2 National Grid undertook a Strategic Options Review at the Strategic Proposal Stage which identified the most advantageous strategic solution to bring forward. The Strategic Options Review is reported in the **Strategic Options Report** which

describes the future network requirements and the options appraised to meet these requirements. This report addressed two projects, the North Humber to High Marnham and Grimsby to Walpole projects. The consideration of strategic options was part of an iterative process in response to the interaction of a range of emerging energy projects and customer requirements. This report also considered how the projects interact with other proposals, which would connect power flows from the north of England and Scotland, with strategic options for the projects.

1.3.3 The strategic options review process responds to the need case described in the **Strategic Options Report**. The **Strategic Options Report** identified a long-list of options which were capable of meeting the need case.

1.3.4 A focused list of strategic options was then taken forward for appraisal and evaluated across a range of environmental, socio-economic, and technical factors. Capital costs were identified for each option based on NGET's recent market knowledge.

1.3.5 Strategic options that were considered included onshore options (overhead and underground) as well as offshore options. Technical, environmental and socio-economic factors were not considered to differentiate between offshore and onshore options. However, the offshore options were substantially more expensive than any of the onshore options and onshore options were therefore preferred.

1.3.6 The **Strategic Options Report** identified a new, primarily overhead line connection between a new Grimsby West Substation to a new substation at Walpole via two proposed Lincolnshire Connection Substation(s) (LCS) as the emerging preference.

1.3.7 Since the publication of the **Strategic Options Report**, further work was undertaken on developing and evolving the strategic option for the East Coast generation group. This concluded that establishment of a new substation at Weston Marsh was necessary. Further information on this can be found in the **June 2025 Strategic Options Report Update**.

1.3.8 In addition, further work was undertaken to consider potential electrical configuration options in the Walpole area, including looking at options for use of the existing Walpole Substation and potential areas where a new substation could be connected to the network to narrow down the area of search for the routeing and siting stage. This is summarised in the **New Walpole Substation Location Options Report**, which concluded that the preference for the new Walpole Substation (herein referred to as Walpole B Substation since the publication of the **Corridor and Preliminary Routeing and Siting Study**) was for it to be situated on the existing Burwell-Walpole 400 kV overhead line circuits.

1.3.9 Since publication of the **Strategic Options Report**, an exercise to review the conclusions of these reports has been undertaken and reported on in the **June 2025 Strategic Options Report Update**. This review exercise, which included an update to refer to the proposals for up to two 400kV substations at Weston Marsh, is discussed in Chapter 4 of this report.

Options identification and selection

1.3.10 Following identification of the Strategic Proposal, National Grid undertook a **Corridor and Preliminary Routeing and Siting Study (CPRSS)**.

1.3.11 This presents the findings of the Option Identification and Selection Stage which identified and assessed preliminary route corridors, siting zones and siting areas, and concluded with the identification of an emerging preferred corridor, preferred siting

zones and siting areas, forming an end to end solution. The National Grid options appraisal process promotes good design to be considered at an early conceptual stage by avoiding environmental impacts at the outset, where practicable. This includes using the mitigation hierarchy (i.e. to avoid, then reduce and then compensate) to avoid impacts in the first instance by locating project features away from sensitive receptors where practicable and considering measures that can be embedded into the design where sensitive receptors cannot be avoided.

1.3.12 The emerging preferred corridor was subject to Stage 1 consultation undertaken between January and March 2024.

1.3.13 Further details on National Grid's approach to consenting and the routeing and siting options considered is provided in the **CPRSS**, published in January 2024 to inform the initial Stage 1 consultation.

1.3.14 As detailed in the **June 2025 Design Development Report**, the Project has evolved since the Stage 1 consultation in response to feedback from that consultation and further environmental and engineering studies.

1.3.15 Review of previous design decisions is undertaken to respond to new information and in order to ensure that the outcome of each stage remains valid and National Grid continues to review its proposals. Since publication of the **CPRSS**, a review of parts of the emerging preferred corridor in proximity to the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty) has been undertaken and is reported on in the **June 2025 PEI Report Volume 2 Part A Appendix 3A Western Corridor Review**. This review exercise is discussed in Chapter 4 of this report.

1.3.16 Options will continue to be reviewed throughout the process having regard to consultation responses and other relevant information, and as such no final decision has been made and none of the conclusions in this report should be seen as final.

1.3.17 The Project was the subject of a Stage 2 consultation in June 2025 under the PA 2008. A list of all the documents produced for the Stage 2 consultation is available on the Project website.

1.3.18 For the Stage 2 consultation, Section 5 constituted a siting zone referred to as the 'Refined Weston Marsh Substation Siting Zone'. However the location and extent of the proposed infrastructure within the siting zone was not confirmed at that point in time. Following the Stage 2 consultation and conclusion of further design work on Section 5, the need for two substations in the Weston Marsh area has now been confirmed. Further details are provided in the **Weston Marsh Siting Study Report** which builds on the previous siting work contained in the **CPRSS**.

1.3.19 Section 5 is now the subject of the Weston Marsh Targeted Consultation under the PA 2008. A list of all the documents produced for the Weston Marsh Targeted Consultation is available on the Project website.

1.4 Project Description

1.4.1 The Project would comprise a 400 Kilovolt (kV) overhead electricity transmission line over a distance of approximately 140 kilometres (km) and six new substations.

1.4.2 Our current draft proposals for the Project, referred to as the proposed alignment, comprise the following principal components:

- Approximately 140 km of new 400 kV overhead transmission line (overhead line);

- a new 400 kV substation to be built in the vicinity of the existing Grimsby West 400 kV Substation and the existing 132 kV Northern Powergrid Substation in North East Lincolnshire (to be referred to as the new Grimsby West Substation). The existing 400 kV substation would be decommissioned, in all, or part[1]. The extent of decommissioning will be determined and reported in the Environmental Statement.
- Two new 400 kV Lincolnshire Connection substations located south west of Mablethorpe in East Lindsey (to be referred to as Lincolnshire Connection Substation A and Lincolnshire Connection Substation B);
- Two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District (to be referred to as Weston Marsh Substation A and Weston Marsh Substation B), including a section of new 400 kV underground cable between Weston Marsh Substations A and B and changes to the existing overhead line layouts;
- A new 400 kV substation in proximity to the existing Walpole Substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District (to be referred to as Walpole B Substation); and
- Replacement of short sections of existing 400 kV overhead line and local changes to the lower voltage distribution networks to facilitate the construction of the new overhead line and substations.

1.4.3 The Project would include other required works, for example, temporary and permanent diversions for works on existing overhead line routes, temporary access roads, highway works, temporary works compounds, work sites and ancillary works. The Project would also include utility diversions and drainage works. There would also be land required for mitigation, compensation and enhancement of the environment including biodiversity net gain (BNG).

1.4.4 At the Stage 1 consultation, the emerging preferred corridor was split into 11 sections, defined by key geographic features or settlements and encompassed the proposed substation siting zones.

1.4.5 For the Stage 2 consultation, the preferred route was split into 7 sections to provide a clear distinction between substation locations and overhead line locations and to facilitate simpler and more consistent reporting across publications. These seven sections, as listed below, are based largely on the principal components and the naming of Sections 4, 5 and 6 has been modified for the Weston Marsh Targeted Consultation:

- Section 1: New Grimsby West Substation;
- Section 2: New Grimsby West Substation to New Lincolnshire Connection Substation A;
- Section 3: New Lincolnshire Connection Substations A and B;
- Section 4: New Lincolnshire Connection Substation B to New Weston Marsh Substations A and B;
- Section 5: New Weston Marsh Substations A and B;
- Section 6: New Weston Marsh Substations A and B to New Walpole B Substation; and

- Section 7: New Walpole B Substation.

1.4.6 The broad alignment between the previous 11 sections presented at Stage 1 consultation and the 7 sections presented at Stage 2 consultation is detailed within the **June 2025 Stage 1 Consultation Feedback Report**.

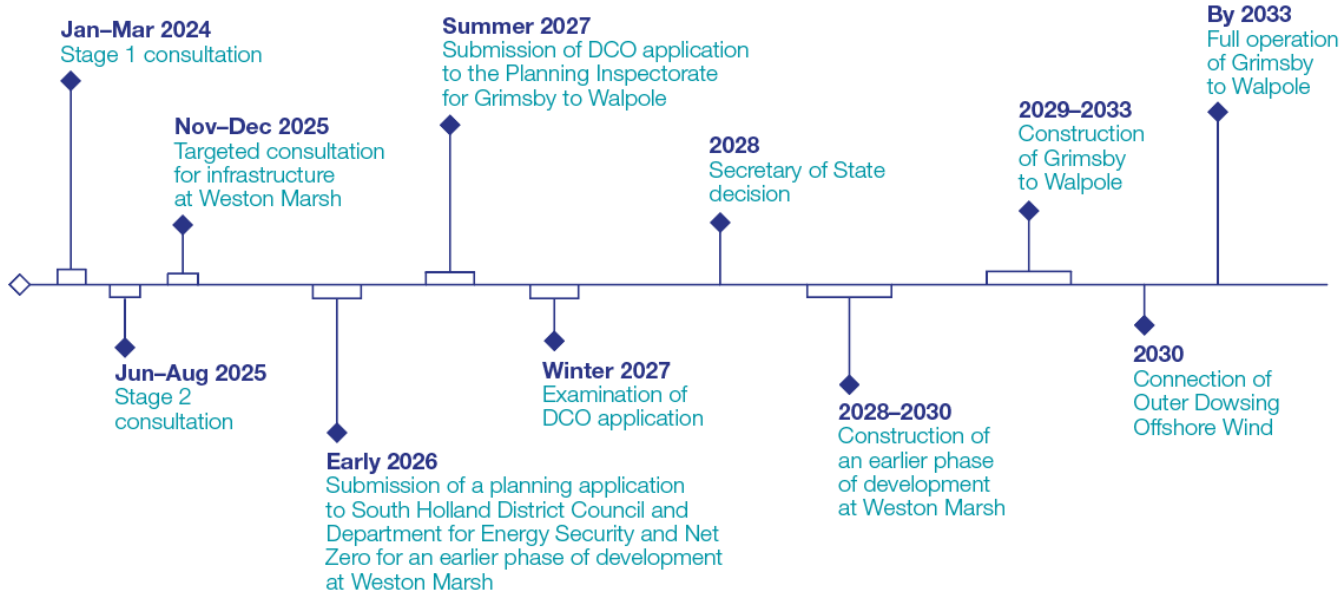
1.4.7 The Project would be designed, constructed, and operated in accordance with applicable health and safety legislation. The Project would also need to comply with design safety standards including the National Electricity Transmission System (NETS) Security and Quality of Supply Standard (SQSS), 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 proposed for the Project.

1.5 Project Timeline

1.5.1 A Stage 1 consultation took place between January and March 2024 and Stage 2 consultation took place between June and August 2025. This **Supplementary Design Development Report for Section 5** sets out how Section 5 of the Project has developed in response to feedback from the Stage 1 and Stage 2 consultations and further environmental and engineering studies. The Weston Marsh Targeted Consultation is taking place between November and December 2025 on the detailed proposals for substation locations and alignment routeing in Section 5.

1.5.2 An indication of the Project timelines through to operation is provided below.

Image 1.2 Project timeline



1.6 Structure of this report

1.6.1 The report is structured as follows:

- Chapter 2 – provides an overview of the legislation and national policy relevant to Section 5 of the Project;
- Chapter 3 – provides an overview of the Stage 1 and Stage 2 consultations and Design Change Control process relevant to Section 5 of the Project;
- Chapter 4 – outlines the reviews of the previous strategic options and the routeing and siting studies undertaken by National Grid relevant to Section 5 of the Project;
- Chapter 5 – provides a review of the proposals at Stage 1 and Stage 2 consultation relevant to Section 5 of the Project, and gives an overview of the design development that has taken place in Section 5 since the previous consultations;
- Chapter 6 – describes the design evolution relevant to Section 5 of the Project, including the design principles and technical considerations, pylon types, consultation responses, planning and environmental considerations, and approach to mitigation;
- Chapter 7 – describes the development of the proposed alignment and substation siting relevant to Section 5 of the Project;
- Chapter 8 – describes the temporary works that will be required and Draft Order Limits development relevant to Section 5 of the Project; and
- Chapter 9 – sets out the next steps that will be undertaken prior to the submission of an application for a DCO.

1.6.2 The report also includes the following appendices:

- Appendix A – Local Planning Policy of Relevance to Good Design (Section 5); and
- Appendix B – Chapter 7 (Development of the Proposed Alignment and Substation Sitings) Inset Images.

1.7 Relationship to other documents

1.7.1 This **Supplementary Design Development Report for Section 5** draws on information previously published at the Stage 1 consultation, including:

- **Grimsby to Walpole – Project Background Document 2024**;
- **Grimsby to Walpole – Strategic Options Report 2023**;
- **Grimsby to Walpole – Addendum to Strategic Options Report 2024**;
- **Grimsby to Walpole – New Walpole Substation Location Options Report 2024**; and
- **Grimsby to Walpole – Corridor and Preliminary Routeing and Siting Study; (CPRSS) 2024**.

1.7.2 This report details the design evolution between the Stage 1 and Stage 2 consultations and the Weston Marsh Targeted Consultation. It therefore also draws

on information published at the Stage 2 consultation and the Weston Marsh Targeted Consultation, including:

- **June 2025 North Humber to High Marnham and Grimsby to Walpole – Strategic Options Report Update**;
- **June 2025 Stage 1 Consultation Feedback Report**;
- **Weston Marsh Siting Study Report;** and
- **Section 5 Consultation Feedback Report**

2. Relevant Legislation and Planning Policy Context

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2. Relevant Legislation and Planning Policy Context

2.1 Context

2.1.1 This chapter provides an overview of the principal legislation and national, regional onshore and marine planning policy context of relevance to the design of the Project, providing any update to such legislation since publication of the **June 2025 Design Development Report**, as well as an overview of the local planning policy relevant to Section 5 only of the Project.

2.1.2 A summary of the wider regulatory and planning context of relevance to the Project is set out in the **June 2025 Preliminary Environmental Information (PEI) Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context** and supporting appendices. The local planning policy of relevance to Section 5 of the Project is set out in **Supplementary PEI Report Volume 3 Part A Appendix 2C Local Plan Policy**. A summary of the local planning policy that is relevant to Section 5 is set out in Appendix A of this document.

2.1.3 The Planning Statement which will accompany the DCO Application will identify and consider relevant legislation and policies and provide analysis on planning policy compliance.

2.2 Planning Act 2008

2.2.1 The PA 2008 (Ref 2) introduced a new consenting procedure for NSIPs. Under Section 14(1)(b) and Section 16 of the PA 2008 and the Planning Act (Electric Lines) Order 2013 a project that involves the installation of an electric line above ground of more than 2km, which will operate at 400kV in England is an NSIP.

2.2.2 For an NSIP the grant of development consent is required by the making of a DCO under the PA 2008 which includes associated development through Section 115 of the Act. As noted in Chapter 1, the Project is classed as an NSIP for which National Grid will need to obtain 'development consent' under statutory procedures set by Government. Further details of the PA 2008 regime are set out in the **June 2025 PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context**.

2.2.3 Section 10 and Section 183 of the PA 2008 place importance on good design:

'the Secretary of State must (in particular) have regard to the desirability of—

(a)mitigating, and adapting to, climate change;

(b)achieving good design.'

2.2.4 Section 104 of the PA 2008 states at (2)(a) that the SoS '*must have regard to any national policy statement which has effect in relation to development of the description to which the application relates' and 'must decide the application in*

accordance with any relevant national policy statement', except in a limited number of circumstances listed in subsections 4 to 8 of Section 104.

2.2.5 The National Policy Statements (NPS) contain specific references to the design of projects. This is covered in section 2.5 of this **Supplementary Design Development Report for Section 5.**

2.3 Electricity Act 1989

2.3.1 Section 9(2) of the Electricity Act 1989 (Ref 1) 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:

> *"(a)… 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*
>
> *(b) 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."*

2.3.3 National Grid's Stakeholder, Community and Amenity Policy (Ref 3), published December 2016, sets out how the company will meet the Schedule 9 duty placed upon it by the legislation.

2.4 Marine and Coastal Access Act 2009

2.4.1 The Marine and Coastal Access Act 2009 (MCAA 2009) (Ref 20) sets out a spatial planning system for the management of the marine environment, which includes a requirement to obtain a marine licence for licensable marine activities from the appropriate marine licensing authority, the Marine Management Organisation (MMO). The MMO is responsible for determining applications in accordance with the Marine Policy Statement (MPS) (Ref 22) and any applicable marine plans, unless relevant considerations indicate otherwise.

2.4.2 Licensable marine activities are defined under Section 66 of the MCAA 2009, and include the construction of works over the sea. The MMO Marine Licensing Definitions guidance (Ref 21) provides a definition of the 'sea' which includes any area which is submerged at mean high water springs and the waters of every estuary, river or channel where the tide flows at mean high water spring tide up to the Normal Tidal Limit (NTL). The NTL is the extent to which a body of water is affected by the ebb and flow of the tides. This may encompass rivers and their estuaries, including those areas that are controlled by locks. The guidance also provides a definition of 'over' the sea includes a location directly above or overhanging the sea such as a bridge, open piled structure or cantilever.

2.4.3 Within Section 5 of the Project new overhead lines are proposed to cross over the sea at the River Welland and a Marine Licence is expected to be required for this aspect of the Project.

2.5 National planning policy

2.5.1 This section sets out the design considerations of relevance to the Project within the current national planning policy documents for which the SoS must have regard to when determining the DCO application for the Project.

2.5.2 As identified in paragraph 1.3.4 of the Overarching NPS for Energy EN-1 (Ref 4), for infrastructure projects providing above ground electric lines at or above 132 kV (meeting the thresholds set out in the PA 2008), the following NPSs will be the primary basis for SoS decision making:

- Overarching National Policy Statement for Energy (EN-1) (Adopted 2024) (Ref 4); and
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Adopted 2024) (Ref 5).

2.5.3 The National Policy Statement for Renewable Energy (EN-3) (Adopted 2024) (Ref 6) is also of relevance for the onshore infrastructure required to deliver new offshore wind developments. This is relevant given the purpose of the Project includes enabling such projects to connect to the transmission system.

2.5.4 As background to the recently adopted NPSs referred to above, it is noted that an Electricity Networks Commissioner was appointed in 2022 to work with and advise the Government on how to halve the build time for new transmission infrastructure from around 12-14 to 7 years. The Commissioner's report (Ref 7) and a companion report (Ref 8) including a set of 43 recommendations, referred to as the 'Winser Report', was published in August 2023. This Report acknowledged that the speeding up the delivery of strategic transmission is both vital and challenging, and the recommendations on how to accelerate the deployment of strategic electricity transmission infrastructure in Great Britain covered every part of the process and set out an integrated programme of reform.

2.5.5 The then Government's response to the Winser Report was set out in the Transmission Acceleration Action Plan (November 2023) (Ref 9). This Plan recognises that Great Britain's transmission network must undergo unprecedented expansion, as the economy electrifies to deliver energy security and Net Zero. It confirms that with the increasing shift towards electrification of transport, heating and industrial processes, a significant amount of additional grid capacity is required, and to deliver this expansion in time, there is a need to significantly reduce the current end-to-end build time for transmission infrastructure. The Action Plan accepted the 43 recommendations set out in the Winser Report, to accelerate the expansion of the transmission network. The new Government has continued to prioritise these issues.

2.5.6 The recently published updated versions of NPSs EN-1, EN-5 and EN-3 (17 January 2024) include policies to ensure the appropriate balance between the need to build vital infrastructure and the impacts this can have on the environment and communities and to ensure that the planning policy framework is suitably robust to support the infrastructure required for the transition to net zero carbon emissions. Low-carbon infrastructure, including large electricity grid infrastructure projects, are given 'Critical National Priority' (CNP) status to reflect the need for critical national

infrastructure. The NPSs reinforce the Government's ambitions for high quality energy infrastructure set out in the British Energy Security Strategy (April 2022) and the Growth Plan (September 2022). Further details are provided below.

2.5.7 New draft versions of the energy NPSs, including EN-1, EN-3 and EN-5 were published for consultation on 24 April 2025. At the time of writing this chapter, these draft NPSs are subject to consultation and may change and have not been reviewed in detail for this **Supplementary Design Development Report for Section 5.**

Overarching National Policy Statement for Energy (EN-1) (2024)

2.5.8 NPS EN-1 (Ref 4) sets out the Government's overarching policy regarding the development of Nationally Significant Infrastructure Projects (NSIPs) in the energy sector. EN-1 emphasises the need for new energy projects and that there is a CNP for the provision of nationally significant low carbon infrastructure. Paragraph 4.2.5 of NPS EN-1 confirms that this includes electricity grid infrastructure including all power lines in the scope of NPS EN-5 including network reinforcement and upgrade works, and associated infrastructure such as substations.

2.5.9 Section 4.7 of NPS EN-1 provides details on the criteria for good design for energy infrastructure. Paragraph 4.7.1 states:

> *"The visual appearance of a building, structure, or piece of infrastructure, and how it relates to the landscape it sits within, is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations. The functionality of an object – be it a building or other type of infrastructure – including fitness for purpose and sustainability, is equally important."*

2.5.10 Paragraphs 4.7.2 - 4.7.4 of NPS EN-1 acknowledge the role of good design in energy projects to produce sustainable infrastructure sensitive to place, and a means by which many policy objectives of the NPSs can be met, such as how good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts.

2.5.11 Paragraph 4.7.6 of NPS EN-1 notes the ability for the design and sensitive use of materials for development such as electricity substations to assist in ensuring that such development contributes to the quality of the area.

2.5.12 Paragraph 4.7.7 of NPS EN-1 is of particular reference to this Design Development Report and the need to demonstrate how the design process has been conducted and evolved over time:

> *"Applicants must demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected."*

2.5.13 The role of the SoS in decision making is outlined in Paragraphs 4.7.10 – 4.7.15 of NPS EN-1.

2.5.14 Paragraph 4.7.10 states:

> *"In the light of the above and given the importance which the Planning Act 2008 places on good design and sustainability, the Secretary of State needs to be*

satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable, and adaptable (including taking account of natural hazards such as flooding) as they can be."

2.5.15 Paragraph 4.7.12 states:

'In considering applications, the Secretary of State should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy. Many of the wider impacts of a development, such as landscape and environmental impacts, will be important factors in the design process."

2.5.16 Paragraph 4.7.11 states:

"In doing so, the Secretary of State should be satisfied that the applicant has considered both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located, any potential amenity benefits, and visual impacts on the landscape or seascape) as far as possible."

2.5.17 Section 4.6 of NPS EN-1 provides details of how environmental and biodiversity net gain should be considered and confirms that this approach to development aims to leave the natural environment in a measurably better state than beforehand. Projects should therefore not only avoid, mitigate and compensate harms, following the mitigation hierarchy, but also consider whether there are opportunities for enhancements. Applications for development consent should be accompanied by a statement demonstrating how opportunities for delivering wider environmental net gains have been considered, and where appropriate, incorporated into proposals as part of good design of the project.

2.5.18 Section 4.10 of NPS EN-1 details how the effects of climate change should be taken into account during the design stage to ensure new energy infrastructure is sufficiently resilient against the possible impacts of climate change. Specifically, as new energy infrastructure is typically likely to remain operational over many decades, the direct and indirect impacts of climate change when considering the Project location, design, build, operation and where appropriate decommissioning will need consideration.

2.5.19 Section 5.4 of NPS EN-1 also reiterates that the design process should embed opportunities for nature inclusive design, stating:

"energy infrastructure projects having the potential to deliver significant benefits and enhancements beyond Biodiversity Net Gain, which result in wider environmental gains…"

2.5.20 Provision for aerodrome safeguarding has been made within Section 5.5 of NPS EN-1; Civil and Military Aviation and Defence Interests, though the section mainly focuses on the impacts from wind turbines, other energy project types can also affect civil and military assets. Paragraph 5.5.2 of NPS EN-1 acknowledges that aviation, defence and the energy industry should be able to co-exist. Section 5 of NPS EN-1 details the impact new development can have on aviation infrastructure and acknowledges that each project has unique challenges depending on its type, location and scale. It details the various ways new development can impact aviation broadly falling into two categories, physical obstructions and through radar interference, and that applicants should consult the Ministry of Defence, the Met

Office, the Civil Aviation Authority, NATS and any aerodrome licenced or otherwise that is likely to be affected by the proposed development.

National Policy Statement for Electricity Networks Infrastructure (EN-5) (2024)

2.5.21 NPS EN-5 (Ref 5) relates to electricity networks, and Section 2 of NPS EN-5 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.

2.5.22 Section 2.2 of NPS EN-5 considers factors influencing site selection and design and states that the SoS should bear in mind that the:

"…development zone - of new electricity network infrastructure is not substantially within the control of the applicant:

Siting is determined by:

- *the location of new generating stations or other infrastructure requiring connection to the network, and/or*
- *system capacity and resilience requirements determined by the Electricity System Operator.*"

2.5.23 However, paragraphs 2.2.5 – 2.2.8 of NPS EN-5 acknowledge that applicants retain control in managing the identification of routeing and site selection within the development zone, and that this does not exempt applicants from their duty to consider and balance the site-selection considerations and policies on good design in section 2.4 of EN-5. There will usually be a degree of flexibility in the location of the associated substations which should be carefully considered, as well as their design.

2.5.24 Paragraph 2.2.9 of NPS EN-5 states:

"In particular, the applicant should consider such characteristics as the local topography, the possibilities for screening of the infrastructure and/or other options to mitigate any impacts…"

2.5.25 Paragraph 2.2.10 of NPS EN-5 reiterates the duties under Section 9 of the Electricity Act 1989, both in relation to developing and maintaining an economical and efficient network and, in formulating proposals for new electricity network infrastructure, to:

"have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiological features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and…do what [they] 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."

2.5.26 Section 2.3 of NPS EN-5 details how electricity network infrastructure should consider climate change adaptation and resilience within the design of new schemes. Paragraph 2.3.2 of NPS EN-5 details that applicants should set out to what extent the Project is expected to be vulnerable and how it has been designed to be resilient to: flooding, particularly for substations; the effect of wind and storms on overhead lines; higher than average temperatures leading to increased transmission losses; and

earth movement or subsidence caused by flooding or drought, for underground cables.

2.5.27 Section 2.4 of NPS EN-5 considers good design for energy infrastructure, reiterating that the PA 2008 requires the SoS to have regard to the desirability of good design in determining applications, and that applicants should consider the criteria for good design set out in NPS EN-1 Section 4.7 at an early stage in project development. Paragraph 2.4.3 states that:

> *"…the Secretary of State should bear in mind that electricity networks infrastructure must in the first instance be safe and secure, and that the functional design constraints of safety and security may limit an applicant's ability to influence the aesthetic appearance of that infrastructure."*

2.5.28 Paragraph 2.4.4 follows on to say that whilst the above principles govern the design of electricity networks, the functional performance of the infrastructure in respect of security of supply and safety must not be threatened in the avoidance of, or mitigation of potential adverse impacts.

2.5.29 Section 2.5 considers environmental and biodiversity net gain:

> *"When planning and evaluating the proposed development's contribution to environmental and biodiversity net gain, it will be important – for both the applicant and the Secretary of State – to supplement the generic guidance set out in EN-1 (Section 4.6) with recognition that the linear nature of electricity networks infrastructure can allow for excellent opportunities to…connect people to the environment, for instance via footpaths and cycleways constructed in tandem with environmental enhancements."*

2.5.30 Strategic network planning is covered in Section 2.8 of NPS EN-5 and reinforces that the SoS should take into account that Transmission Owners are required to bring forward efficient and economical proposals in network design under Section 9 of the Electricity Act 1989. This section also identifies the need to take account of environmental and community impacts, alongside deliverability and economic cost, from the outset, and that strategic network planning, such as through the Holistic Network Design helps reduce the overall impact of infrastructure by identifying opportunities for coordination, where appropriate.

2.5.31 Section 2.9 of NPS EN-5 covers the considerations for applicant assessment, including the requirement to embody the Holford and Horlock Rules into applicants' proposals.

2.5.32 Paragraph 2.9.17 of NPS EN-5 sets out the Holford Rules, first published in 1959 and updated in the 1990's as guidelines for the routeing of new overhead lines. The Holford Rules state that applicants should:

- "*avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence;*
- *avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers, i.e. the bigger structures which are used when lines change direction;*
- *other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers;*

- *choose tree and hill backgrounds in preference to sky backgrounds wherever possible. When a line has to cross a ridge, secure this opaque background as long as possible, cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees;*
- *prefer moderately open valleys with medium or moderate levels of tree cover where the apparent height of towers will be reduced, and views of the line will be broken by trees;*
- *where country is flat and sparsely planted, and unless specifically preferred otherwise by relevant stakeholders, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or 'wirescape'; and*
- *approach urban areas through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, carefully assess the comparative costs of undergrounding.*"

2.5.33 Paragraph 2.9.18 of NPS EN-5 covers the requirements of the Horlock Rules which are the guidelines for the design and siting of substations established by National Grid in 2009 pursuant to its duties under Schedule 9 of the Electricity Act. The following principles should be embodied in applicants' proposals:

- "*consider environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum.*
- *seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.*
- *protect as far as reasonably practicable areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas.*
- *take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum.*
- *keep the visual, noise and other environmental effects to a reasonably practicable minimum.*
- *consider the land use effects of the proposal when planning the siting of substations or extensions.*
- *consider the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.*
- *use space effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation.*

- *make the design of access roads, perimeter fencing, earth-shaping, planting and ancillary development an integral part of the site layout and design, so as to fit in with the surroundings.*
- *in open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance.*
- *study the inter-relationship between towers and substation structures and background and foreground features so as to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers on prominent ridges should be minimised by siting towers against a background of trees rather than open skylines.*"

2.5.34 NPS EN-5 also includes policies on the design of electricity network infrastructure. Paragraph 2.9.20 covers undergrounding:

"Although it is the government's position that overhead lines should be the strong starting presumption for electricity networks developments in general, this presumption is reversed when proposed developments will cross part of a nationally designated landscape (i.e. National Park, The Broads, or Area of Outstanding Natural Beauty)."

2.5.35 Paragraph 2.9.23 goes on:

"However, undergrounding will not be required where it is infeasible in engineering terms, or where the harm that it causes (see section 2.11.4) is not outweighed by its corresponding landscape, visual amenity, and natural beauty benefits. Regardless of the option, the scheme through its design, delivery, and operation, should seek to further the statutory purposes of the designated landscape. These enhancements may go beyond the mitigation measures needed to minimise the adverse effects of the scheme' (paragraph 2.9.22) and 'Additionally, cases will arise where – though no part of the proposed development crosses a designated landscape high potential for widespread and significant adverse landscape and/or visual impacts along certain sections of its route may result in recommendations to use undergrounding for relevant segments of the line".

2.5.36 Other topic specific design considerations relating to impacts and mitigation within Section 2.9 and Section 2.10 of NPS EN-5 are covered in the **June 2025 PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context**.

2.5.37 Section 2.11 covers the SoS decision making considerations and sets out the requirement for the potential impact, siting and design alternatives to be fully considered as part of an application if a statutory consultee identifies a risk that Electric and Magnetic Fields (EMF) would compromise the effective and safe operation of the electricity network infrastructure.

National Policy Statement for Renewable Energy Infrastructure (EN-3) (2024)

2.5.38 NPS EN-3 (Ref 6) relates to nationally significant renewable energy projects including offshore wind, and contains relevant policies in relation to design including opportunities for co-location and coordination of onshore-offshore transmission.

2.5.39 Section 2.5 of NPS EN-3 covers the considerations for good design of energy infrastructure, noting Section 4.7 of NPS EN-1 sets out the criteria for good design that should be applied to all energy infrastructure.

2.5.40 Paragraph 2.5.2 states:

> *"Proposals for renewable energy infrastructure should demonstrate good design, particularly in respect of landscape and visual amenity, opportunities for co-existence/co-location with other marine and terrestrial uses, and in the design of the project to mitigate impacts such as noise and effects on ecology and heritage."*

2.5.41 Section 2.8 of NPS EN-3 deals with offshore wind. Paragraph 32.8.1 states that:

> *"As set out in the British Energy Security Strategy, the Government expects that offshore wind …. Will play a significant role in meeting demand and decarbonising the energy system. The ambition is to deploy up to 50GW of offshore wind capacity (including up to 5GW floating wind) by 2030, with an expectation that there will be a need for substantially more installed offshore capacity beyond this to achieve net zero carbon emissions by 2050."*

2.5.42 Paragraphs 2.8.34 to 2.8.43 (inclusive) reiterate the position set out in NPS EN-1 and NPS EN-5 that a co-ordinated approach to onshore-offshore transmission is required. Paragraph 2.8.35 states that:

> *"The previous standard approach to offshore-onshore connection involved a radial connection between single wind farm projects and the shore. A coordinated approach will involve the connection of multiple, spatially close, offshore wind farms and other offshore infrastructure, wherever possible, as relevant to onshore networks."*

2.5.43 The NPS also includes references to CNP Infrastructure outlining that the assessment principles outlined in Section 4 of NPS EN-1 continue to apply to this. Applicants must show how any likely significant negative effects would be avoided, reduced, mitigated, or compensated for, following the mitigation hierarchy. Early application of the mitigation hierarchy is strongly encouraged, as is engagement with key stakeholders including Statutory Nature Conservation Bodies (SNCB), both before and at the formal pre-application stage.

National Planning Policy Framework (NPPF)

2.5.44 The NPPF was most recently published in December 2024 and updated in February 2025 (Ref 10). Paragraph 5 of the NPPF sets out that it does not contain specific policies for NSIPs and states that:

> *"These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework)."*

2.5.45 Notwithstanding the above, paragraph 161 of the NPPF confirms the Framework's support for the transition to net zero by 2050 whilst taking full account of changing climate impacts. It states that:

> *"the planning system should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve*

resilience...and support renewable and low carbon energy and associated infrastructure."

2.5.46 While NPS EN-1 and NPS EN-5 remain the prime decision-making documents, the NPPF does include policies pertinent to generic development management considerations and some of its principles may be considered by the decision-making authority, where relevant to the Project. These principles are concerned with protection and conservation of the natural and built and historic environment, climate change and flooding as well as sustainable growth, development, and a strong, competitive economy.

2.5.47 At this stage, it is not possible to confirm if such secondary guidance will be considered important or relevant by the SoS, and it is therefore included for completeness.

2.5.48 Section 12 of the NPPF goes into greater detail on the requirements for *'Achieving well-designed places'*. Paragraph 137 sets out that:

"Design quality should be considered throughout the evolution and assessment of individual proposals. Early discussion between applicants, the local planning authority and local community about the design and style of emerging schemes is important for clarifying expectations and reconciling local and commercial interests. Applicants should, where applicable, provide sufficient information to demonstrate how their proposals will meet the design expectations set out in the local and national policy, and should work closely with those affected by their proposals to evolve designs that take account of the views of the community. Applications that can demonstrate early, proactive and effective engagement with the community should be looked on more favourably than those that cannot."

2.5.49 Paragraph 164 of the NPPF states that:

"New Development should be planned for in ways that:

a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and

b) can help to reduce greenhouse gas emissions, such as through its location, orientation, and design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards."

2.5.50 The revised NPPF put more emphasis on the need for renewable energy and low carbon development. Paragraph 168 states that

"*When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should:*

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the proposal's contribution to renewable energy generation and a net zero future;

b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;

c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site".

2.5.51 The NPPF is supported by the National Planning Practice Guidance.

National Infrastructure Commission (NIC) Project Level Design Principles (2024)

2.5.52 The NIC Design Group was established in 2019 to inspire renewed ambition for the quality of the UK's infrastructure, with a mission is to inspire, promote and champion design excellence on all major infrastructure projects, which has social value and responds creatively to the needs of people, places and the environment.

2.5.53 The 2024 NIC Design Principles document (Ref 11) replaces the previous Design Principles for National Infrastructure published in 2020.

2.5.54 Section 1 of the NIC Design Principles document covers the purpose and scope of the guidance, stating the National Infrastructure Commission's remit covers six economic infrastructure sectors, including the energy sector. It also impresses the importance of the design process being fit for purpose, and underpinned by principles that will drive standards and accountability, particularly as the UK's economic infrastructure needs to be transformed to:

- *"meet the challenge of net zero*
- *provide climate resilience*
- *deliver sustainable economic growth."*

2.5.55 Section 2 of the NIC Design Principles document emphasises the importance of an iterative, structured design process from the project outset to deliver environmental, social, and economic benefits, while limiting adverse impacts.

2.5.56 The design principles for national infrastructure are covered in section 3 of the NIC Design Principles document and include four main principles:

- *"Climate – seek opportunities to enable the decarbonisation of society through the mitigation of emissions, and allow the project to adapt over time to build resilience*
- *People – design infrastructure for people, not architects or engineers; make it human scale, easy to navigate and instinctive to use, helping to improve quality of life*
- *Places – provide a strong sense of identity and improve the natural and built environment; make a positive contribution to landscapes within and beyond the project boundary*
- *Value – achieve multiple benefits and solve problems well; add value by defining issues clearly from the outset and providing overall direction for everyone working on the project.*"

2.5.57 These principles form an outline framework for more detailed design thinking on individual schemes, and for the development of project level principles.

2.5.58 The development of project level principles is covered in section 4 of the NIC Design Principles document, noting that they should directly address the Design Principles for National Infrastructure laid out above. The development of project level design principles should be an iterative, process that becomes fixed once consent is

achieved to outline how projects will achieve their outcomes. The principles should also be used to align all parties around agreed, shared outcomes. Paragraph 7 in section 4 states that project's design principles should:

- *"reflect the overarching design vision and address the agreed project requirements, benefits and outcomes*
- *firmly anchor the proposal, supporting a design narrative that's relevant to the local context*
- *recognise place including landscape, the natural environment, culture and heritage*
- *be informed by the people affected, including residents, community groups, infrastructure users, interest groups, and local employers*
- *reflect an inclusive approach to ensure equitable delivery of benefits and prevention from harm*
- *demonstrate that opportunities have been identified to deliver wider benefits and outcomes beyond the project, utilising systems thinking*
- *be clearly written, with quantifiable measures, so that final outcomes can be tested against them."*

2.5.59 The importance of effective leadership is covered in section 5 of the NIC Design Principles document, with leaders having overall responsibility for effective design and driving buy in to the design process from the project team.

2.5.60 Section 6 of the NIC Design Principles document shows the process through which design principles can be developed and embedded within a project throughout its lifecycle and is particularly relevant to this **Supplementary Design Development Report for Section 5** with respect to how the design principles have influenced design development.

Nationally Significant Infrastructure Projects: Advice on Good Design (2024)

2.5.61 The Planning Inspectorate published the guidance, Advice on Good Design (Ref 12) in October 2024, which sets out how good design might be successfully delivered in applications for NSIPs. The note reiterates that the NPSs set out criteria for achieving good design in projects and that this guidance is non-statutory but is intended to compliment the legislation, regulations and guidance issued by government and is produced under section 51 of the Planning Act.

2.5.62 The advice note states that:

- *"achieving good design requires a holistic approach to deliver high quality, sustainable infrastructure that responds to place and takes account of often complex environments. Good design is not primarily about how infrastructure looks, although these considerations (the aesthetics) are important.*
- *Achieving high quality, good design outcomes requires an effective, intentional, transparent, deliverable process to be planned, followed and secured. Success in good design comes from a combination of securing both good process and good outcomes.''*

2.5.63 The guidance references the NIC Design Group, which recommends that considering design properly in NSIPs supports the government's ambition to speed up delivery and maximise value by addressing: a structured design process, design principles, and multiple beneficial outcomes. The guidance further makes reference to the NIC Design Principles of climate, people, place and value, and of the Project Level Design Principles, which provide applicants with the issues to consider under each of the design principles, as set out above.

2.5.64 The guidance states that a good design process includes the following components:

- *"An effective, intentional, transparent and deliverable process*
- *A collaborative, multi-disciplinary approach including positive community and land rights engagement*
- *A succinct and ambitious vision for the project, underpinned by a clear analysis of the context for the place, its environment and the opportunities for creating social value, including for the local and wider economy*
- *A clear statement of design principles that will drive the project and deliver wider value and benefits beyond the core purpose of the scheme*
- *A narrative that explains how the approach to design has evolved, the reasons for the choices that have been, or will be, made, an explanation of the multiple beneficial outcomes the project will achieve and how they will be secured*
- *Design leadership supported by an engaged design champion to ensure design governance is secured and the design principles drive a structured design process and hierarchy of design control."*
- *Achieving good design outcomes involves:*
- *"securing a clearly understood, integrated design concept, consistent design language, and project-wide sustainability*
- *consistent design language where all components can be followed through in post-consent decisions*
- *clarity on achieving project-wide sustainability that goes beyond mitigating adverse effects to achieve economic, environmental and social net-gain*
- *design principles that respond positively to the four elements – climate, people, place and value - established by the NIC*
- *realistic assessments of the project's durability and effectiveness during its operational phase, to underpin and secure a successful maintenance and monitoring regime*
- *sufficient flexibility for technical innovation balanced by sufficient detail and controls for post-consent approvals that will ensure good design outcomes are achieved*
- *particular attention on place-making to ensure the development's positive effects on the character of a place and delivery of public benefits*
- *well thought out mechanisms to enable design outcomes to be scrutinised, assessed and developed during the post-consent design process. For example, parameter plans, design codes, management plans, independent design review*

and intentional community engagement which are secured in requirements or certified documents."

2.5.65 The guidance sets out four key elements that applicants should consider during the pre-application process and should be addressed within an NSIP application. The extent to which these elements need to be covered will depend on the nature of the infrastructure proposed and the site. The four elements are set out below:

- Assemble – setting a brief including project's purpose, budget, timeline, multi-disciplinary team with design skills and baseline data gathering to inform consideration of alternatives and eventual site selection. The multi-disciplinary team must also develop a vision, considering construction and operation and define an ambition which goes beyond the Order limits in line with outcomes that are wider than the project limits. It must include the development of design principles.
- Research – An iterative process with analysis of constraints and opportunities of technology and location with a narrative of how the design evolved from the brief. It will need to mitigate adverse effects assessed as part of the EIA process and show how the proposed development will deliver positive outcomes and create a new and distinctive place. Engagement and consultation with statutory parties, affected persons, local communities and independent design panels should inform the project's design evolution and this should be explained.
- Co-ordinate – Further iteration to refine choices for details and parameters. This should incorporate consultation responses, independent design input and ensure that design principles are being met. Decisions need to be taken using strong design leadership, driven by the vision. This stage must set out the process by which future post-consent decision-making will be made.
- Secure – This stage must set out how the project's good design is secured and will be delivered, including ongoing design advice and community engagement. Applicants should be clear about the influence procurement decisions could have and that any differences with future consenting authorities are aired. ExAs will expect designs to be at a detailed level where the outcomes of the analysis, program and vision are defined. Clarity must be provided for how design elements with less certainty at application stage will be decided and secured post-consent.

2.5.66 The guidance note also draws attention to the EIA process and highlights how EIA is an important decision-making tool and can help to achieve good design outcomes. EIA should inform the design process, and its influence on the design should be clearly articulated in the Environmental Statement.

2.5.67 Annex A of the guidance sets out "good design issues" that applicants are encouraged to consider before submitting an NSIP application for Examination. These issues include:

- The Design Approach Document;
- Analysis and research of the site to inform good design;
- Response to main significant adverse effects identified in the EIA;
- Vision for the completed development and its surrounds;
- Design skills;

- Design development (including consideration of emerging design principles, design choices, flexibility and evolution, use of digital techniques, design outcomes, and presentation of a design narrative);
- Independent design review;
- Delivery of the design post-consent;
- Placemaking and community benefit;
- Consultation with statutory consultees, local authorities, communities and people with interest in the land;
- Integrated design approach;
- Compliance with National Policy Statements;
- Application of design principles and how they are secured; and
- Consideration of the NIC four principles of good design.

2.6 Marine Policy Statement

2.6.1 The MPS (March 2011) (Ref 22) provides the framework for preparing Marine Plans and taking decisions affecting the marine environment.

2.6.2 The objective of Marine Plans is to ensure that marine resources are used in a sustainable way in line with the high level marine objectives and thereby: promote sustainable economic development; enable the UK's move towards a low-carbon economy, in order to mitigate the causes of climate change and ocean acidification and adapt to their effects; ensure a sustainable marine environment which promotes healthy, functioning marine ecosystems and protects marine habitats, species and our heritage assets; and contribute to the societal benefits of the marine area, including the sustainable use of marine resources to address local social and economic issues.

2.7 Regional Planning Policy

2.7.1 The East Inshore and East Offshore Marine Plans (Ref 23) seek to apply or clarify the intent of national policy in the East Inshore and Offshore areas, taking into account the specific characteristics of the plan areas. The plan identifies that in the East Marine Plan areas the volume of new marine infrastructure is set to increase, both offshore (e.g. Offshore Wind Farms) and inshore (e.g. land-based infrastructure). **Supplementary PEI Report Volume 3 Part A Appendix 2B National and Regional Planning Policy** provides further information on relevant policies in the East Inshore and East Offshore Marine Plan which will be considered in the design of the Project and in the preparation of the DCO application documents.

2.8 Local planning policy

2.8.1 Appendix A sets out local planning policy of relevance to good design for Section 5 of the Project.

2.8.2 Other topic specific design considerations within local planning policy are set out in **Supplementary PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context** and supporting appendices.

3. Stage 1 and Stage 2 Consultation and Design Change Control relevant to Section 5

nationalgrid

3. Stage 1 and Stage 2 Consultation Design Change Control relevant to Section 5

3.1 Context

3.1.1 National Grid undertook the Stage 1 consultation for an 8-week period between 18 January and 13 March 2024. This was undertaken at an early stage of Project development and was followed by a Stage 2 statutory consultation, which is required under the Planning Act 2008. The Stage 2 consultation ran for an 8-week period between 11 June and 6 August 2025 and provided a further opportunity for views to be shared about the updated proposals for the Project. The Stage 2 consultation was a statutory consultation, however, proposals for the Refined Weston Marsh Substation Siting Zone (Section 5) were then at an early stage, and feedback was sought to help shape the design. As part of the Stage 2 consultation, a refined Weston Marsh Substation Siting Zone was presented, showing the proposed location for substation infrastructure. However, at the time of the Stage 2 consultation, the design and siting of up to two substations was still being considered. Since then, the requirement for two substations in the Weston Marsh area has been confirmed and a further targeted consultation is currently being undertaken by National Grid on Section 5.

The Proposals

3.1.2 The Stage 1 consultation presented an emerging preferred corridor and graduated swathe, divided into eleven sections, which indicated where new infrastructure was most likely to be built. Further detail is available in the Project Background Document accessible at the following link: download (nationalgrid.com).

3.1.3 The Stage 2 consultation included a more detailed design, divided into seven Sections, showing the proposed overhead line route and proposed locations of substations. At the time of the Stage 2 consultation, less design information was available for Section 5 compared to other Sections of the route. This was due to ongoing design work in the area, including consideration of whether up to two new substations would be required. Further detail is available in the Stage 2 consultation document accessible at the following link: Stage 2 consultation document.pdf

3.2 Responses to the Stage 1 consultation relevant to Section 5

3.2.1 All responses to the Stage 1 consultation relevant to Section 5 are provided in the **June 2025 Stage 1 Consultation Feedback Report**, however further details relating to some specific feedback and Design Change Requests (DCRs) relevant to Section 5 are provided in the **Section 5 Consultation Feedback Report.** This is because this feedback could not be fully considered at the time of publishing the **June 2025 Stage 1 Consultation Feedback Report** due to ongoing design work for Section 5.

3.3 Responses to the Stage 2 consultation relevant to Section 5

3.3.1 A total of 98 feedback submissions were received at Stage 2 consultation, relevant to Section 5, from local communities, stakeholders and other consultees. This comprised paper feedback forms, online feedback forms, emails and letters.

Consideration of consultation feedback

3.3.2 The Stage 2 consultation followed the approach set out in National Grid's Statement of Community Consultation published in June 2025 and provided in Appendix A of the **Section 5 Consultation Feedback Report**.

3.3.3 A range of both face-to-face and online events were held and promoted to provide opportunities for all stakeholders and communities to engage with the development of the Project proposals and provide feedback.

3.3.4 The feedback received during Stage 2 consultation, relevant to Section 5, has been carefully reviewed and considered as part of the ongoing technical work on the engineering design and the environmental impact assessment process.

3.3.5 Feedback relevant to Section 5 that contained requests for changes, or considerations relevant to design elements, was identified as Design Change Requests (DCRs) and carefully considered in the context of environmental and socioeconomic constraints and opportunities, engineering feasibility and cost, and planning policy considerations. Following this consideration, DCRs identified from Stage 2 consultation were not taken forward as part of the design development. Further details on the process of how DCRs have been considered by the Project is provided in section 3.4 of this report.

3.3.6 The current draft proposals continue to be developed as we take account of feedback and further engineering and environmental studies, including internal design changes which may also arise.

Summary of changes to our proposals in response to consultation feedback

3.3.7 Although DCRs were considered from feedback received at both Stage 1 and Stage 2 consultation, these requests did not result in changes to the design in Section 5.

3.3.8 Further detail on the consideration of proposed DCRs received from the Stage 2 consultation feedback, relevant to Section 5, is provided in Chapter 3 Section 3.5 of the **Section 5 Consultation Feedback Report.**

3.4 Design Change Requests and the Design Change Control Process

3.4.1 In order to be considered as DCRs, requests had to be specific and locatable. They will constitute a request to alter a specific element of the design or avoid a specific 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. Consultation feedback that was not considered a DCR was coded through consultation analysis and has been responded to in the **Section 5 Consultation Feedback Report**.

3.4.2 Each DCR identified in Section 5 was carefully considered through a Design Change Control (DCC) process as outlined in Image 3.1 below.

3.4.3 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.

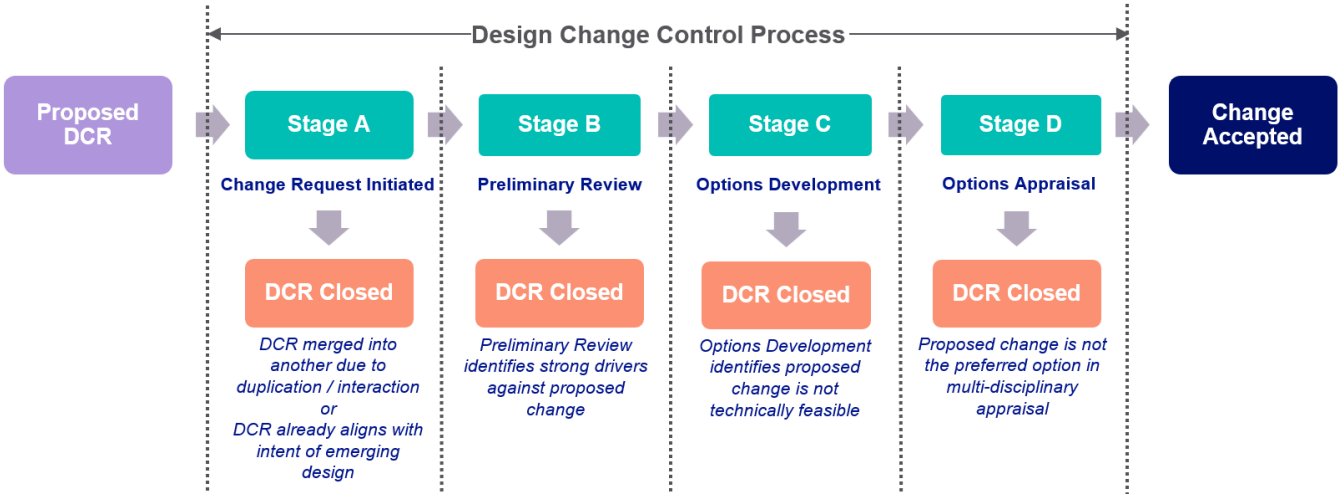
3.4.4 The DCC process covers any element of the design relevant to the stage of design development in the project programme. DCRs raised during the Stage 1 consultation period will relate to the graduated swathe; DCRs at a later stage of design development and during the Stage 2 consultation period may be raised for any element of the design, from individual pylon locations to access routes to environmental mitigation.

3.4.5 The DCC process is a four-stage process, as shown in Image 3.1 and consisting of the following appraisal stages:

- **Stage A (*Initiation of DCR*)** – Proposed DCRs are formally initiated in the DCC Process, ensuring sufficient information is recorded to support subsequent reviews. DCRs may be merged with others where duplicate, overlapping or conflicting requests are identified.
- **Stage B (*Preliminary Review*)** – A multi-disciplinary Stage B workshop is held to carry out a preliminary review of the DCR. Discipline representatives for engineering, environment, lands and consents discuss the DCR to agree whether it should be rejected at this stage or progressed for further appraisal at Stages C and D.
- **Stage C (*Options Development*)** – 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, to develop design options for consideration at Stage D.

- **Stage D (*Options Appraisal*)** – A detailed appraisal of the DCR is carried out by environment, consents and lands. 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.

Image 3.1 Design Change Control Process



4. Review of previous Development Stages

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4. Review of Previous Development Stages

4.1 Context

4.1.1 Throughout the Project's design, consultation and engagement process, previous preliminary assumptions are subject to review in light of feedback received, information gathered and assessments undertaken to date.

4.1.2 The following Chapter summarises a review, carried out following the Stage 1 consultation of the previous development stages of the Project including the strategic proposal stage and options identification and selection stage, as set out in:

- **Grimsby to Walpole – Strategic Options Report 2023**;
- **Grimsby to Walpole – Addendum to Strategic Options Report 2024**; and
- **Grimsby to Walpole – Corridor and Preliminary Routeing and Siting Study; (CPRSS) 2024**.

4.1.3 The results of this review are presented in the following documents:

- The **June 2025 North Humber to High Marnham and Grimsby to Walpole - Strategic Options Report Update**;
- **June 2025 PEI Report Volume 2 Part A Appendix 3A Western Corridor Review;** and
- **Weston Marsh Siting Study Report**

4.2 Strategic Proposal Review

4.2.1 The **June 2025 Strategic Options Report Update** was prepared by National Grid to present the review of the conclusions of the **Strategic Options Report** and **Grimsby to Walpole – Addendum to Strategic Options Report 2024**, carried out as part of the ongoing strategic options assessment and decision-making process involved in promoting new transmission projects. The **June 2025 Strategic Options Report Update** was prepared after close of the Stage 1 consultation for the Project.

4.2.2 The **June 2025 Strategic Options Report Update** considered the revised need case (set out in Chapter 4), and the strategic options for meeting this revised need case. To inform the **Strategic Options Report Update**, the strategic options were re-assessed to determine the most appropriate strategic option that meets the updated need case for both the North Humber to High Marnham and Grimsby to Walpole projects.

4.2.3 The **June 2025 Strategic Options Report Update** outlined that, without reinforcement, the transmission system between the North and South of England in the B8 and B9 system boundaries, will have insufficient capacity to accommodate contracted generation connections in the area.

4.2.4 Following the consideration of options to meet system need, the **June 2025 Strategic Options Report Update** proposed to continue to take forward the following options:

- A new primarily overhead line connection between a new Creyke Beck substation to a new High Marnham substation. This Option forms the North Humber to High Marnham project. This Option forms a separate project to Grimsby to Walpole, which will be consented under a separate DCO application.
- A new primarily overhead line connection between a new Grimsby West substation to a new Walpole B substation via Lincolnshire Connection substation(s) and new Weston Marsh substation(s) (the Project).

4.2.5 The **June 2025 Strategic Options Report Update** also included an update for up to two 400 kV substation(s) at Weston Marsh.

4.2.6 For further details see the **June 2025 Strategic Options Report Update**.

4.3 Western Corridor Review

4.3.1 The Western Corridor Review provides a summary of work undertaken in reviewing parts of the emerging preferred corridor in proximity to the Lincolnshire Wolds National Landscape (Area of Outstanding National Beauty) following the original appraisal that was reported in the CPRSS.

4.3.2 The review considered two different options; the Western Option (which comprises part of the emerging preferred corridor presented in the CPRSS) and the Eastern Option. Both options comprise individual corridor sections, with some common corridor sections between the options.

4.3.3 The review considered additional information obtained by National Grid following the publication of the CPRSS to assess the appropriateness of selecting the Western Option for the Project compared to the alternative Eastern Option in this geographical area.

4.3.4 The outcome of the review is that the additional information and resulting change to the appraised constraints/impacts in the Western Option in comparison with the Eastern Option does not materially alter the previous conclusions reported in the CPRSS and the preference for the Western Option. Therefore, the review has confirmed the appropriateness of selecting the Western Option, as included in the emerging preferred corridor.

4.3.5 That conclusion is supported by the potential negative programme impact of a change in route corridor at this stage in the development of the Project, with the delivery of the Project on time playing a vital role in achieving the UK Government's ambition of connecting 50GW of offshore wind by 2030.

4.3.6 Having considered the results of the review, National Grid is continuing to progress the design of the Western Option and presented it at Stage 2 consultation.

4.3.7 For further details see **June 2025 PEI Report Volume 2 Part A Appendix 3A Western Corridor Review.**

4.4 Weston Marsh Siting Study

4.4.1 The Weston Marsh Siting Study builds on the previous siting work contained in the CPRSS and provides a summary of the work undertaken in identifying the preferred Siting Area for the Weston Marsh Substation A and preferred Siting Area for the Weston Marsh Substation B.

4.4.2 The need for two substations was identified by National Grid through engaging with generators who are contracted to connect in the Weston Marsh area, as well as reviewing the technical specifications required, since Stage 1 Consultation. Two substations were found to provide resilience on the transmission network and would ensure the network's safety and reliability. The need for a 1 km clearance, and underground cable connection, between these two substations was identified to manage system-wide resilience.

4.4.3 For further details see the **Weston Marsh Siting Study Report**.

5. Review of the Proposals Presented at Stage 1 and Stage 2 Consultation Relevant to Section 5

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5. Review of the Proposals Presented at Stage 1 and Stage 2 Consultation Relevant to Section 5

5.1 Introduction

5.1.1 This chapter provides an overview of the design development that has taken place in Section 5 since Stage 1 consultation, in relation to the emerging preferred corridor and siting zone presented at Stage 1 consultation and the Refined Weston Marsh Substation Siting Zone presented at the June 2025 Stage 2 consultation.

5.1.2 Design development in Section 5 has been based on National Grid's technical and environmental appraisals and engagement with generators contracted to connect in the Weston Marsh area. Although design change requests were considered from feedback received at both Stage 1 and Stage 2 consultation, these requests did not result in changes to the design in Section 5.

5.2 Design Development Between Stage 1 Consultation and June 2025 Stage 2 Consultation

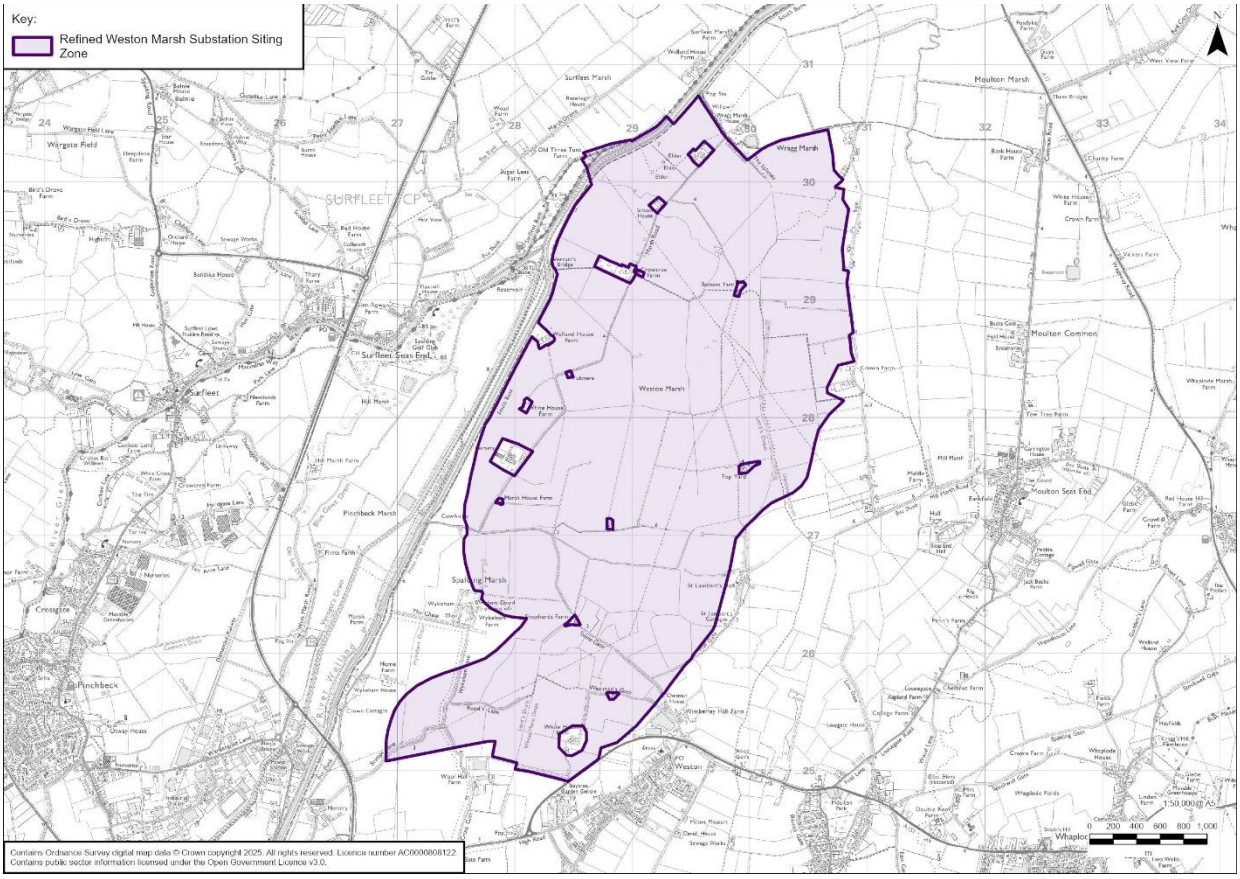
5.2.1 Following Stage 1 consultation, further design parameters emerged which resulted in the requirement for National Grid to undertake more extensive design activities within the substation siting zone.

5.2.2 At the time of the June 2025 Stage 2 consultation, these additional design activities were still progressing, thus only minor amendments to the substation siting zone were made for Stage 2 consultation.

5.2.3 The Refined Weston Marsh Substation Siting Zone was based on a combination of the overhead line graduated swathe and the Weston Marsh substation siting zone presented at Stage 1 consultation. The rationale for the merging of these two swathes considered the ongoing design evolution in this area for the positioning of infrastructure. Slight modification was made to the original graduated swathe and substation siting zone to remove areas where infrastructure would not be sited. As such the Refined Weston Marsh Substation Siting Zone included additional cut-outs around identified structures and curtilage that were not originally cut from the graduated swathe and substation siting zone. The extent of the refined zone was also clipped in some areas to avoid constraining features, beyond which the positioning of new or modified infrastructure was not being considered.

5.2.4 Image 5.1 below shows the Refined Weston Marsh Substation Siting Zone presented as part of the June 2025 Stage 2 consultation.

Image 5.1 Refined Weston Marsh Substation Siting Zone



5.3 Design Development Since June 2025 Stage 2 Consultation

Number of Substations

5.3.1 Since the Stage 1 consultation, National Grid has been engaging with generators who are contracted to connect in the Weston Marsh area, as well as reviewing the technical specifications required. This engagement and review has continued since Stage 2 consultation, including consideration of the extent of the need and whether the identified need requires the provision of two separate substations.

5.3.2 This review and the subsequent design work has been undertaken in the context of the statutory duties placed on National Grid as licence holder. National Grid must develop and maintain an efficient, co-ordinated and economical system of electricity transmission. This requires the reliability, security and resilience of the existing transmission network to be maintained when developing proposals for new substations, ensuring that the network is resilient by design in relation to incidents arising as a result of internal and external causes.

5.3.3 With the significant amount of generation planned to connect into the Weston Marsh area, network analysis was carried out to determine the optimal configuration for the network and the substations within this region, taking into account the need to ensure the resilience of the network. This analysis identified the need for there to be two separate substations at Weston Marsh.

5.3.4 The requirement for two substations at Weston Marsh is influenced by the national and regional power demand, and the amount of generation planned to connect in the Weston Marsh area, of which there is a particularly large amount. By providing two

substations at Weston Marsh the design establishes resilience on the transmission network given the number of new connections. Furthermore, with two substations it is much more straightforward to provide for maintenance on the network where outages are required and to reduce the impact of faults in the area, therefore mitigating against the risk of the network becoming reliant on a single ‘node’ connecting substantial amounts of power generation and ensuring the network's safety and reliability.

Clearance and Connection

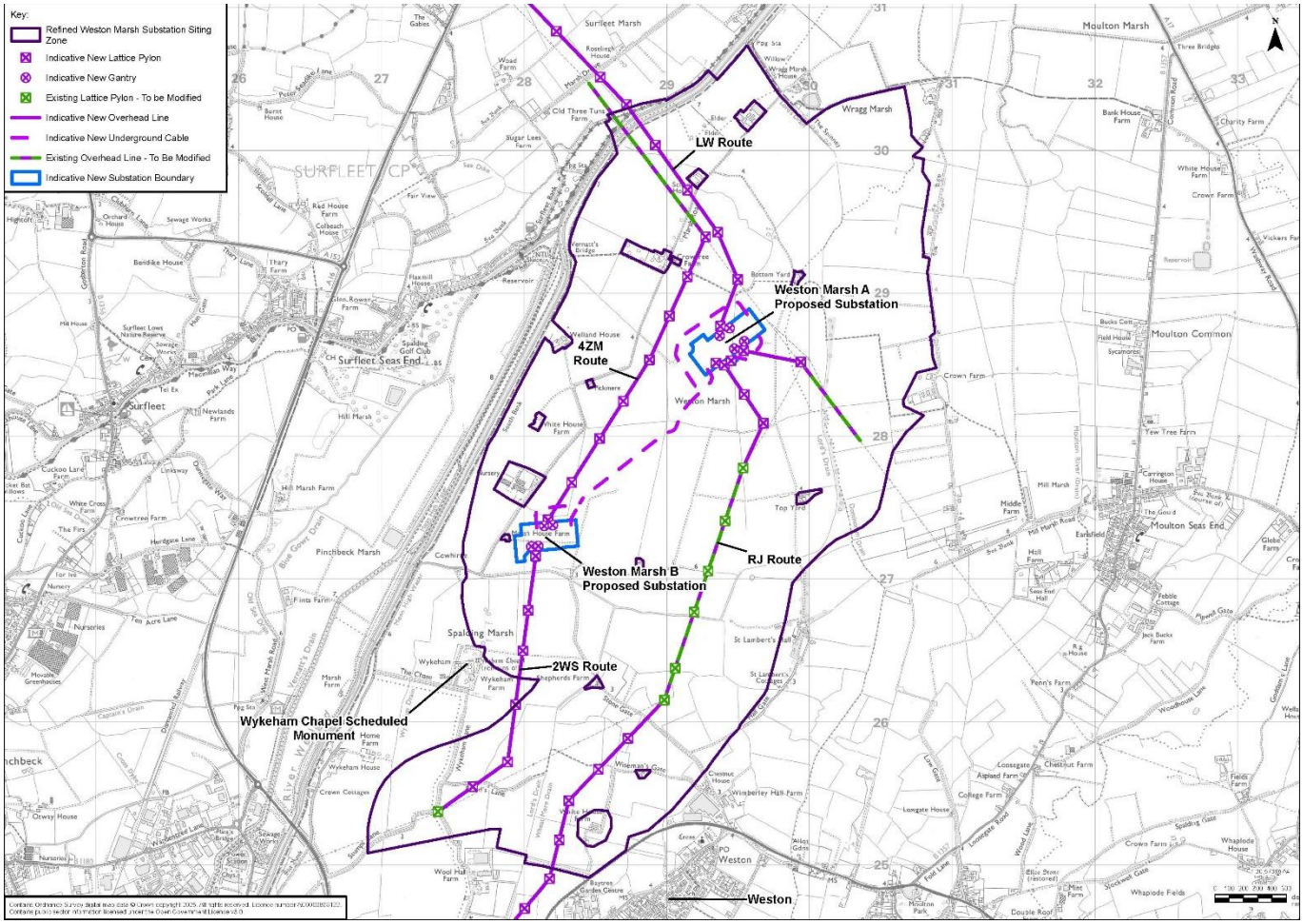
5.3.5 The network analysis identified the need for at least 1 km clearance between the new Weston Marsh Substation A and the new Weston Marsh Substation B to manage system-wide resilience. In addition to this separation, the network analysis identified a requirement for the connection between the two substations to be via underground cable to provide additional mitigation for residual system-wide resilience.

Siting of Infrastructure

5.3.6 As shown in Image 5.2 below, the substation locations, overhead lines and underground cable proposed in Section 5 sit almost wholly within the Refined Weston Marsh Substation Siting Zone presented as part of the June 2025 Stage 2 consultation, with the exception of the proposed new alignment of the existing 400 kV overhead line from Spalding North (known as the 2WS route) where it is diverted to connect into the new Weston Marsh Substation B, which routes outside the Refined Weston Marsh Substation Siting Zone over a length of approximately 200 m to the east of Wykeham Chapel scheduled monument.

5.3.7 An alignment for the 2WS route further to the east, which remains entirely within the Refined Weston Marsh Substation Siting Zone, was considered during design development, but was not preferred because it resulted in greater landscape, visual, ecological and water environment impacts, and increased technical complexity, without offering any demonstrable reduction in the potential significant effect on the scheduled monument. The options considered in the development of the alignment for the 2WS route and the reasons for preferring the alignment that routes outside of the Refined Weston Marsh Substation Siting Zone over a short distance are explained further in Chapter 7 of this report (7.2.35) and in the **Supplementary PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**.

Image 5.2 Substation, overhead line and underground cable proposals in Section 5



5.3.8 Chapter 7 of this report describes in detail the siting of the proposed new Weston Marsh Substation A and new Weston Marsh Substation B and the proposed overhead line and underground cable routeing in Section 5, the design considerations that have resulted in these proposals and the design evolution that has taken place in Section 5.

5.3.9 Further details of the work National Grid has undertaken to establish the preferred siting areas for the two substations within Section 5 are provided in the **Weston Marsh Siting Study Report.**

5.4 Design Change Considerations in Section 5

5.4.1 The design development in Section 5 since Stage 1 consultation results from engagement with generators contracted to connect in the Weston Marsh area and review of the technical specifications required. Although National Grid considered and appraised design change requests in Section 5 originating from both Stage 1 consultation and the June 2025 Stage 2 consultation, no changes to the design in Section 5 were made as a result of these requests.

5.4.2 Design change requests that were raised from Stage 1 consultation feedback but were ultimately not taken forward into design are discussed in the **Stage 1 Consultation Feedback Report,** with further details relating to some of the Stage 1 consultation feedback provided in the **Section 5 Consultation Feedback Report.**

5.4.3 Design change requests that were raised for Section 5 from the June 2025 Stage 2 consultation feedback but ultimately not taken forward into design are discussed in the **Section 5 Consultation Feedback Report.**

6. Design Evolution

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6. Design Evolution

6.1 Overview

6.1.1 This chapter outlines the overarching technical, planning and environmental considerations that have informed the design evolution of the proposed alignments and substation sitings in Section 5.

6.1.2 These considerations form the basis of National Grid's development of the design described in Chapter 7 from the Stage 1 consultation corridor, the Refined Weston Marsh Substation Siting Zone and the decisions regarding number of substations, clearance and connection described in Chapter 5.

6.2 National Grid's Approach to Routeing and Siting

6.2.1 Chapter 2 sets out in detail the legislation and planning policy context relevant to the design of the Project in Section 5. Through the Electricity Act 1989 (Ref 1), as set out in Chapter 2, National Grid has statutory duties placed upon it to operate under the terms of its transmission licence. In addition, the Holford and Horlock rules, also described in Chapter 2, are used as two sets of guidelines for National Grid's routeing and siting approach.

6.2.2 National Grid employs the Holford and Horlock rules as the basis of the approach to overhead line routeing and substation siting, and these have underpinned the development of the proposed alignments and substation layouts described in Chapter 7.

6.2.3 In addition, a range of technical, planning and environmental considerations have been taken into account when developing the design for the Project in Section 5. The design seeks to avoid planning designations and environmental features wherever it is reasonable to do so, within technical and other limitations and while remaining in compliance with the Holford and Horlock rules.

6.2.4 This chapter sets out the principles, considerations and constraints that have informed the Project's design evolution in Section 5 alongside the applicable legislation and planning policy described in Chapter 2. Chapter 7 goes on to describe in detail how the application of these has resulted in the proposed alignments and substation sitings presented at the Weston Marsh Targeted Consultation.

6.3 Design Principles and Technical Considerations

Overhead Line Considerations

6.3.1 This section sets out, in the context of developing the overhead line permanent infrastructure within the 'graduated swathe' presented at Stage 1 consultation, the technical principles and parameters generally applied in respect to overhead line routeing and pylon siting and how this has progressed to the overhead line design presented at the Weston Marsh Targeted Consultation.

The Graduated Swathe

6.3.2 The graduated swathe provided an indicative overhead line corridor in which the permanent infrastructure could be located. Permanent infrastructure was considered more or less likely to be located, shown by the varying levels of shading; darker shaded areas represented where infrastructure is likely to be better located. This was a sufficiently wide corridor to provide a relative degree of flexibility in order for an indicative centreline of an overhead line to be developed.

6.3.3 At the time of producing the graduated swathe, an engineering assessment was undertaken to test the feasibility of overhead line routeing options within the corridor. The initial linear feasibility study at this stage was conducted in accordance with National Grid's 'Our Approach to Consenting' (see Section 1.3) and an entirely overhead line alignment was considered feasible.

Indicative Centreline of an Overhead Line

6.3.4 The Holford Rules are relevant to the development of an indicative centreline of an overhead line alignment within a wider corridor. The Holford Rules were first set out in 1959 and subsequently reviewed by National Grid in 1992. Paragraph 2.8.5 of National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 5) states that the Holford Rules *'should be used by developers when designing their proposals'*. They have become accepted within the electricity transmission industry as the basis for overhead line routeing. National Grid employs the Holford Rules to inform the design and routeing of all new overhead line projects, including this Project. The Holford Rules set out, at a general level, and in the absence of any other overriding constraints, the design principles that should be applied in developing permanent overhead line infrastructure. How Section 5 complies with the Holford Rules is set out in detail in Paragraphs 7.1.7 to 7.1.60 of this report.

6.3.5 The process of developing an indicative centreline for an overhead line, therefore, firstly begins with an analysis of known constraints within the corridor. The constraint types when designing or redesigning an overhead line route can generally be broken up into the following categories:

- engineering constraints;
- constructability constraints;
- service/outage constraints;
- economical constraints;
- environmental constraints; and
- socio-economic constraints.

6.3.6 This section does not seek to address the considerations of those constraints and how they have influenced the design (which is instead set out in detail in Chapter 7) but sets out the principles generally applied in respect to technical considerations for overhead line routeing.

6.3.7 When developing the indicative centreline of an overhead line alignment, prior to the siting of pylons along the alignment, a number of parameters to reach an appropriate design solution are considered, which are in turn considered compatible with the Holford Rules. From a technical perspective and relevant to the strategic proposal for Section 5 of the Project, such parameters are considered to include the following:

- Substation bay positioning (the connection point for each circuit of the overhead line within the substation – determined by the required electrical layout of the substation).
- Long straight sections of overhead line, avoiding sharp changes of direction, are preferred to avoid the need for more angle pylons. This has visual benefits as angle pylons are typically heavier set, financial benefits as they are typically more expensive to construct, and construction benefits as angle pylons are typically more technically challenging to construct. For example, a pylon with a sharp angle of deviation will require a larger pylon working area for construction activities, resulting in more stone material to construct the working area. Additionally, more angles on an indicative centreline of an overhead line alignment will increase the overall length of the overhead line, increasing cost and overhead line presence. Whilst long straight sections are preferred, in some instances sharper angles may be required to navigate existing constraints, such as to increase a separation distance from a residential property, or to avoid other sensitive environmental features.
- Perpendicular over sailing of main roads, railways and significant watercourses is preferred (where possible) to limit the length of the span across that feature.
- Where the indicative centreline of an overhead line alignment is situated between constraints, an assessment balancing the effects on those constraints and their relative importance is undertaken, promoting equidistant routeing where the effects are comparable.
- Major buried utility assets, such as high-pressure gas pipelines, generally are considered and avoided when developing the indicative centreline of an overhead line alignment, where possible, noting the complexities involved in mitigating any impact on such assets.
- Generally, the indicative centreline of an overhead line alignment would seek to avoid the paralleling of other linear metallic features, such as buried metallic pipelines and railway lines, to reduce the risk of induced voltage occurring. National Grid seeks to maintain a 50m lateral separation distance between the overhead line and other linear metallic features (below or above ground). Such risks can be mitigated with cathodic protection measures, but such measures would increase Project cost, add technical complexities and often involve third party agreements with the asset owner of the feature.
- Wherever practicable, National Grid's preferred approach is the avoidance of direct oversail of residential properties during routeing of new infrastructure, and National Grid also seeks to avoid oversailing any non-domestic buildings as far as possible, with a preference for avoiding built-up areas altogether. Generally, a stand-off distance of around 50 m is sought in respect of residential properties.
- When developing the indicative centreline of an overhead line alignment, National Grid is also cognisant of other factors associated with the construction of that overhead line. Enough space should be retained either side of the indicative centreline to allow for a limit of deviation (LoD) (see Section 8.9) and to facilitate the temporary works associated with the construction of the overhead line (see Chapter 8).

Close Parallel of Overhead Line Opportunities

6.3.8 The supplementary note to Holford Rule 6, which is in turn endorsed by paragraph 2.8.5 of EN-5 (Ref 5), states '*arrange wherever practicable, parallel or closely related routes with tower [pylon] types, spans and conductors forming a coherent appearance.'*, the impact of which is to reduce the magnitude of landscape and visual effects and the concentration of overhead line and wirescapes in the landscape. National Grid recognises that close paralleling of an existing overhead line has the potential to reduce the overall extent of environmental impacts arising from the Project by avoiding the spread of impacts to receptors currently unaffected by existing overhead line, albeit this may well increase impacts on receptors already affected.

6.3.9 The minimum distance between overhead lines is determined by technical and safety constraints and would typically be 85 m. Whilst the maximum distance at which the benefits of close paralleling might be achieved depends on local factors, this is considered to be approximately around 200 m in most circumstances. Beyond 200 m, it is considered that the benefits associated with close paralleling begin to be outweighed. This larger separation distance increases the possibility of encircling receptors such as residential properties.

6.3.10 There are technical challenges associated with the construction and operation of a close parallel alignment, including difficulties with achieving the required offset from the existing overhead line and access where the existing overhead line is already within a relatively constrained working area. Opportunities for close paralleling have been considered from the early design stages on the Project. However, there are relatively few locations within the proposed route alignment where there are opportunities for close parallel with an existing overhead line. This is because opportunities are largely dictated by the existence of existing overhead lines within the study area, as well as other constraints that are to be avoided.

Pylon Siting

6.3.11 Following the refinement of an indicative centreline of an overhead line alignment, National Grid 'sites' pylons along the centreline of the overhead line alignment.

6.3.12 Pylons are used to regulate the statutory clearances. Statutory clearance for an overhead line refers to the legally required minimum distance that must be maintained between the conductors and other structures, objects, or the ground. This clearance is put in place to ensure safety and to allow for proper maintenance and operation of the overhead line. Minimum clearances can vary depending on factors such as the operating voltage of the overhead line and any constraints within the vicinity of that overhead line. The required height of the pylon is, therefore, influenced by the sag profile of the conductor and the span distance between adjacent pylons. Pylons need to be sufficiently tall to ensure that statutory clearances from the bottom conductors are achieved in all weather conditions and for the maximum permissible operating temperature. Steel lattice pylon heights are adjusted by adding extension panels, each typically adding around 3m for each extension panel.

6.3.13 Appropriate pylon siting, from a technical perspective, is considered to include the following:

- An average span length of 350 m, to balance the presence of pylons within the landscape and to regulate the statutory clearances. In some rarer instances, a longer span length may be required to oversail features or reduce the number of

pylons in a section. In these instances, the sum of adjacent spans must not exceed 800 m.

- For traditional lattice pylons, a change in direction of up to 90 degrees can be achieved. However, for the reasons set out above, long straight sections, avoiding the need for angle pylons, are preferred.
- Careful siting of individual pylons is adopted to avoid direct and indirect impacts on protected habitats (including considering conductor swing, to avoid or minimise loss of vegetation), as far as practically possible. Conductor swing refers to the expected movement of the conductors (wires) of an overhead line due to external factors such as wind and temperature changes; causing the distance between the conductors and other structures (such as buildings, trees, or other conductors) to vary and change.
- Maintaining an offset from significant watercourses of around 15 m limits environmental impacts and allows enough space for the construction of pylon working areas.

Underground Cable Considerations

6.3.14 As described in Section 5.3, the need for two substations at Weston Marsh, connected by underground cables (hereafter referred to as the 'Weston Marsh substation interconnector cables'), has been established.

6.3.15 This section sets out, in the context of developing the underground cabling infrastructure from the new Weston Marsh Substation A to the new Weston Marsh Substation B, the technical principles and parameters generally applied in respect to underground cable routeing for the Weston Marsh substation interconnector cables, and how this has progressed to the underground cable design presented at the Weston Marsh Targeted Consultation.

Swathe Width

6.3.16 The underground cable swathe width (the distance from the centreline of the cable route to its outer edges) is dependent upon a number of technical parameters, including but not limited to:

- the number of circuits (two Weston Marsh substation interconnector circuits) and cables per phase;
- the operating voltage of the underground cables (i.e. 400 kV) and the amount of current they must carry;
- the type of cable used and its capability;
- the type of bonding for earthing purposes;
- the depth at which the cable is buried; and
- environmental conditions, such as the thermal resistivity of the soil and the ambient temperature.

6.3.17 Where applicable, these parameters are set in accordance with National Grid Technical Specifications, for example the minimum depth of cables in agricultural land.

6.3.18 The above information is used in conjunction with modelling software to inform the specific arrangements (including the depth and the spacing between cables) which ensures the proposed underground cable arrangement meets the requirements and operates within acceptable limits.

6.3.19 A key output of the model is a cross-section showing the proposed underground cable types, depths, and the spacing between the individual cables within the swathe.

6.3.20 In some instances, such as crossings of drains or existing services, the buried depth of the underground cables must increase, and/or methods such as horizontal directional drilling (HDD) must be employed. In these instances, a wider underground cable swathe is likely to be required.

6.3.21 In addition to the space physically occupied by the underground cables, allowance must be made for construction activities. Further information is outlined in Section 8.5.

Cable Routeing

6.3.22 The two circuits of the Weston Marsh substation interconnector cables link Weston Marsh Substations A and B over approximately 3 km of new proposed 400 kV underground cable. Their routeing is influenced by the following key factors and principles:

- substation bay positioning (the connection point for each circuit of the cable within the substation – determined by the required electrical layout of the substation);
- developing as direct an alignment as possible between Weston Marsh Substation A and Weston Marsh Substation B;
- avoiding sharp changes of direction, as underground cables have a minimum bending radius which must be maintained;
- perpendicular crossings of roads and watercourses is preferred (where possible);
- major buried utility assets, such as high-pressure gas pipelines, generally are considered and avoided when developing the indicative centreline of the underground cable route, where possible, noting the complexities involved in mitigating any impact on such assets;
- avoiding areas of the highest amenity value where possible; and
- including sufficient space to facilitate the temporary works associated with the construction of the underground cable.

6.3.23 Due to the position of the substation bays, each circuit at both ends of the underground cable terminate at different points. In these areas where the circuits are split, the width of the underground cable swathe is approximately 50m.

6.3.24 However, between the substations where the two circuits can be routed in parallel with each other, both circuits are brought together to form a single 80m swathe that links the two substations. Combining the circuits into a single swathe reduces the overall spread of infrastructure and minimises the size of the overall space required for construction.

Substation Considerations

6.3.25 This section sets out, in the context of developing the substation permanent infrastructure within the Refined Weston Marsh Substation Siting Zone presented at the Stage 2 consultation, the technical principles generally applied in respect to substation size and siting and how this has progressed to the substation design presented at the Weston Marsh Targeted Consultation.

6.3.26 Within Section 5, the project proposes to construct two new substations which will connect the new overhead line route and customers to the wider transmission network. These are located north east of Spalding in South East Lincolnshire and are referred to as the new Weston Marsh Substation A and the new Weston Marsh Substation B.

6.3.27 Initial designs for these substations have been developed in accordance with National Grid standards and specifications, which will ensure that the new sites can be constructed, operated and maintained safely.

6.3.28 Also relevant in this context is the Horlock Rules. National Grid devised the Horlock Rules in 2003, and these were subsequently updated in 2009. The Horlock Rules provide guidelines for the siting and design of new substations, or substation extensions, to avoid or reduce the environmental effects of such developments. They facilitate consideration of the environment and amenity during the design and siting of new substation infrastructure. These were considered during the identification of potential locations for the proposed two substations and have influenced the siting and design of the substations.

6.3.29 Both proposed substations have been designed as air insulated switchgear (AIS) substations rather than gas insulated switchgear (GIS) substations. AIS technology uses atmospheric air as an insulation medium between the electrical equipment in the substation, whereas GIS technology seals electrical equipment in pressured chambers filled with insulating gas (typically sulphur hexafluoride (SF6) which is an extremely potent greenhouse gas, although alternative insulation gases are becoming increasingly available). AIS technology usually requires a larger footprint than GIS, with substation equipment typically located outdoors and requiring greater separation distances between each other to maintain electrical isolation, whilst for GIS, equipment is usually much closer together and enclosed within a building. For new substations, GIS is typically only implemented where there are significant space constraints or in areas where atmospheric pollution may impact outdoor AIS equipment (for example, due to nearby industry or in marine environments). In the absence of any requirements to use GIS, the Project is continuing on the basis of implementing AIS. Despite a larger land take for AIS, GIS is considered to have a greater impact on views and landscape character due to the height and scale of the building surrounding the equipment.

Substation Sizes (Footprint)

6.3.30 The size of the proposed substations is determined by their technical requirements, which include:

- number of customers to be connected;
- capacity of customer connections;
- mode of connection to the existing transmission network (i.e. number of overhead line or underground cable connections); and

- selection of AIS or GIS technology, as outlined above.

6.3.31 A greater number or capacity of customer connections, or a more complex connection to the existing transmission network, will generally result in a larger footprint.

Substation Siting

6.3.32 As stated above, the siting of the proposed substations within their siting areas has been developed in accordance with the Horlock Rules. Rules 7 to 11 are particularly relevant as they establish some technical design parameters. Details as to how Section 5 of the Project has complied with the Horlock Rules are set out in detail at Paragraphs 7.1.61 to 7.1.111 of this report.

6.3.33 In addition several technical factors, compatible with the Horlock Rules, have influenced the siting of the proposed substations:

- Preference for level, open areas free from existing above or below-ground infrastructure. This reduces the potential scope of enabling works (including groundworks and diversion of existing infrastructure).
- Where applicable, proximity to existing overhead line infrastructure if connections are required into them, to reduce the extent of new overhead line required.
- Where transformers are required to connect into the local distribution network, proximity to the connection point to the wider distribution network to minimise the amount of lower voltage cables or overhead lines required.
- Consideration given to the nature of the surrounding road network and its capacity to support construction and operational traffic.
- Sufficient space surrounding the substation for overhead line and underground cable connections.

6.3.34 Further details regarding the substation design requirements that have influenced the development of proposed siting locations are outlined below to provide a technical basis for the siting narrative in Chapter 7.

New Weston Marsh Substation A

6.3.35 The new Weston Marsh Substation A is proposed to be located between the River Welland and the existing 400 kV 4ZM overhead line, east of Surfleet Seas End and north of Weston. The substation is required to connect new customers (battery storage, solar generation and wind generation) to the electricity transmission system.

6.3.36 The proposed development would comprise a new 400 kV air insulated switchgear (AIS) substation and associated works, comprising:

- twenty bays;
- seven overhead line gantries;
- standard substation plant including circuit breakers, disconnectors, earth switches, instrument transformers, cable sealing ends, and busbars (not necessarily an exhaustive list);
- substation control building, amenity building, workshop, store, and portable relay rooms (PRRs);

- security fencing;
- lighting columns;
- CCTV surveillance;
- a new vehicular permanent access route;
- temporary construction compounds, welfare and laydown areas; and
- landscaping, drainage features and mitigation areas.

6.3.37 The new Weston Marsh Substation A is proposed to be served by a new access road off Marsh Road.

6.3.38 The construction works would involve temporary diversions of the existing 400 kV overhead lines connecting Bicker Fen, Spalding North and Walpole, which currently meet at an existing junction (known as a tee-point) to the south east of the proposed location of the new Weston Marsh Substation A.

6.3.39 The construction works would also involve the permanent reconfiguration of the existing overhead lines, to be transferred from the existing tee-point to the new Weston Marsh Substation A and Weston Marsh Substation B, and connection of new overhead lines. The detail of the overhead line works is presented in Chapter 7.

New Weston Marsh Substation B

6.3.40 The new Weston Marsh Substation B is proposed to be located between the River Welland and the existing 400 kV 2WS overhead line, south east of Surfleet Seas End and north of Weston. The substation is required to connect new customers (battery storage, solar generation and wind generation) to the electricity transmission system. The new Weston Marsh Substation B will also provide a point of connection for the proposed Weston Marsh to East Leicestershire overhead line.

6.3.41 The proposed development would comprise a new 400 kV air insulated switchgear (AIS) substation and associated works, comprising:

- fourteen bays;
- six overhead line gantries: two for the 4ZM, two for the 2WS, and two for the Weston Marsh to East Leicestershire (WMEL) overhead line. The WMEL gantries are positioned at the western edge of the substation to facilitate the approach of the overhead line as indicated by the WMEL Graduated Swathe. These circuits are proposed to transition from overhead line to underground cable via cable sealing ends close to the western edge of the substation (where the gantries are located). The underground cables would pass under the 2WS overhead line, running along the southern edge of the substation to connect to the appropriate bays;
- standard substation plant including circuit breakers, disconnectors, earth switches, instrument transformers, cable sealing ends, and busbars (not necessarily an exhaustive list);
- substation control building, amenity building, workshop, store, and portable relay rooms (PRRs);
- security fencing;
- lighting columns;

- CCTV surveillance;
- a new vehicular permanent access route;
- temporary construction compounds, welfare and laydown areas; and
- landscaping, drainage features and mitigation areas.

6.3.42 The new Weston Marsh Substation B is proposed to be served by a new access road off Marsh Road.

6.3.43 The construction works would involve temporary diversions of the existing 400 kV overhead lines connecting Bicker Fen, Spalding North and Walpole, which currently meet at an existing junction (known as a tee-point) to the south east of the proposed location of the new Weston Marsh Substation A.

6.3.44 The construction works would also involve the permanent reconfiguration of the existing overhead lines, to be transferred from the existing tee-point to the new Weston Marsh Substation A and Weston Marsh Substation B, and connection of new overhead lines. The detail of the overhead line works is presented in Chapter 7.

Substation Design Considerations

6.3.45 The specific design considerations of the new substations are set out in Chapter 7, including how the designs proposed respond to the local environment and socio-economic considerations, and to feedback from Stage 1 and June 2025 Stage 2 consultation.

6.4 Pylon Type Considerations

6.4.1 Whilst the vast majority of transmission lines in Britain use lattice steel pylons with three sets of cross arms, alternative pylon types have been approved for use which achieve the technical performance required for the Project. These pylon types are set out below. The choice of pylon design for overhead lines is considered on a project-by-project basis. This section of the report provides information on the features of 'traditional' lattice pylons, low height lattice and the T-pylon, including their construction, operation and maintenance. For the overhead line connection, in order to determine pylon types which meet the technical requirements of a project, consideration must be given to both:

- the conductor, which must be capable of carrying the required power; and
- the pylon type, which needs to be able to support the conductor bundles (wires) and an earth wire, as well be able to withstand any loading which will be applied to it by the environment it will be sited within (including wind and ice loading).

Conductor Options

6.4.2 The overhead wires that transport the electrical power are known as conductors and these are usually installed in a set (or bundle) on both sides of the pylon. Overhead lines can have different conductors, in terms of size (diameter), current carrying capacity, material, and the number combined to form a bundle. At 400 kV, conductor bundles can be twin (two), triple (three), or quad (four).

6.4.3 The type of conductor selected depends largely on the required rating of the overhead line (the maximum amount of electrical power that the new line needs to be

capable of transmitting). The conductor choice will also dictate the range of pylon designs available, as not all are capable of carrying heavier conductor bundles.

Pylon Options

Design Characteristics

6.4.4 There are two main types of pylon used by National Grid in England and Wales – steel lattice pylons and the T-pylon.

6.4.5 Whilst there are differences between the steel lattice and T-pylon designs, they share a number of technical characteristics. These include the following:

- they are above ground structures built on permanent foundations;
- they can (typically) support two discrete electrical circuits (one on either side of the structure); and
- the height of the structures can be adapted to suit different terrains and physical obstacles (such as river/road crossings) to ensure statutory clearance distances from the conductors, although it should be noted that low height pylons can be subject to height extension limitations.

6.4.6 For standard height steel lattice pylons, each of the three arms supports a single conductor bundle on either side of the pylon body and the top of the pylon supports an earth wire, as illustrated on Image 6.1. Low height lattice pylons comprise just two sets of cross arms; a wide lower cross arm and a standard width upper crossarm. The lower crossarms each support two bundles of conductors, meaning four bundles are arranged in a horizontal alignment beneath this pair of cross arms. The upper cross arm supports just one conductor bundle on each side of the pylon body in the same way that a standard lattice pylon does.

6.4.7 In comparison, the T-pylon design connects all three conductor bundles for each circuit together in an inverted triangle configuration using solid insulated bars. With suspension from the cross beam of the "T", this forms a diamond shape. One of these diamond configurations (comprising all three bundles of conductors) is suspended from each side of the single cross beam of the T-pylon with a separate earth wire for each side of the pylon supported above the conductors.

6.4.8 For traditional steel lattice pylons, where an overhead line changes direction, and where lines terminate at substations, stronger tension structures (tension pylons) are required. These have larger foundations, heavier steelwork and larger footprints than the suspension pylons used where an overhead line runs in a straight line. Taller and heavier pylons with larger footprints may also be required to negotiate more complex terrain.

6.4.9 As with the traditional lattice pylons, where an overhead line changes direction, and where lines terminate at substations, stronger and heavier T-pylons (with an additional supporting member stabilising the diamond to the main structure, are required). T-pylons are shorter than traditional lattice pylons whilst maintaining statutory clearances.

6.4.10 Low height lattice pylons are also lower in height but wider than traditional lattice pylons and are generally used over relatively short straight sections of an overhead line route. Low height lattice pylons may be incorporated into a design to mitigate specific circumstances, for example, this may be considered on a case-by-case basis

in the vicinity of airfields or to reduce the visual effect of the overhead line where landscape character and the distribution and orientation of local viewpoints afford this opportunity.

6.4.11 Steel lattice pylon heights are adjusted by adding extension pieces, each typically adding around 3 m. For a typical T-pylon height extensions are limited to 3 m for suspension pylons and 7 m for tension structures.

Construction

6.4.12 As construction methods for traditional steel lattice pylons and T-pylons are similar, this section of the report provides a brief comparison of the main differences in construction. In summary:

- Although construction work areas for both the T-pylon and lattice pylons are similar in size, T-pylon work areas require a fully stoned and compacted level work area for delivery of the large tubular sections of pylon. Earthworks to level out sloping terrain would be required for all T-pylons.
- In general foundation installation is similar, utilising common piling or concreting techniques, however the T-pylon requires a level, compressed surface to facilitate the specialist installation of the base flange which upon the pylon sits.
- Both pylon types are erected by mobile crane, however due to larger components a greater capacity crane is required for T-pylons.
- As T-pylons cannot be climbed, access for the installation of conductors and fittings is made from a specialised Mobile Elevated Work Platform (MEWP). This requires a suitable access route and a level working area, both of which will be required to be left in situ for future maintenance and defect repairs.
- Conductors and fittings should be installed soon after the construction of T-pylons to reduce the impact of weather induced fatigue. A more critical, sequenced construction programme is therefore required. Lattice pylons can be erected in advance of conductor installation with less risk of fatigue, allowing greater flexibility in the construction programme with a lower risk of delay.

Operation and Maintenance

6.4.13 Typically, pylon steelwork and foundations have a life expectancy of approximately 80 years, the conductors have a life expectancy of approximately 40 to 60 years and the insulators and fittings have a life expectancy of approximately 25 to 40 years. As the overhead conductors have a life expectancy which is lower than the pylon structures themselves, reconductoring will be required during the 80-year lifespan of the Project.

6.4.14 For pylons, maintenance operations include painting, corroded or damaged member replacement, insulator and fittings and conductor fittings replacement, pylon furniture repairs and other activities. Painting of the structures occurs approximately every 20 years and is based on a condition assessment. Painting of the crossarms and some sections of the pylon bodies requires the circuits to be switched out. Pylon inspection is currently done by helicopter or drone as well as occasional line walks. Helicopters can travel swiftly between structures and hold steady during pylon inspection whilst taking HD resolution video for subsequent analysis.

6.4.15 All lattice pylons on the network are climbable so many activities can be carried out without equipment such as specialised MEWPs.

6.4.16 Bespoke and conventional maintenance and defect rectification procedures, manuals and methodologies for steel lattice pylons are widely available within National Grid. These procedures have been developed over many years and are compliant with National Grid's and UK safety requirements, covering not only structures but also insulators, conductor systems and other overhead line components.

6.4.17 For the T-pylon, challenges may be anticipated when carrying out maintenance, defect rectification or refurbishment works on these lines, including painting, insulator and conductor and fitting replacement. Maintenance works are especially intricate due to the complex nature of the insulator arrays installed. Due to access requirements repair times could be increased and may need longer outages.

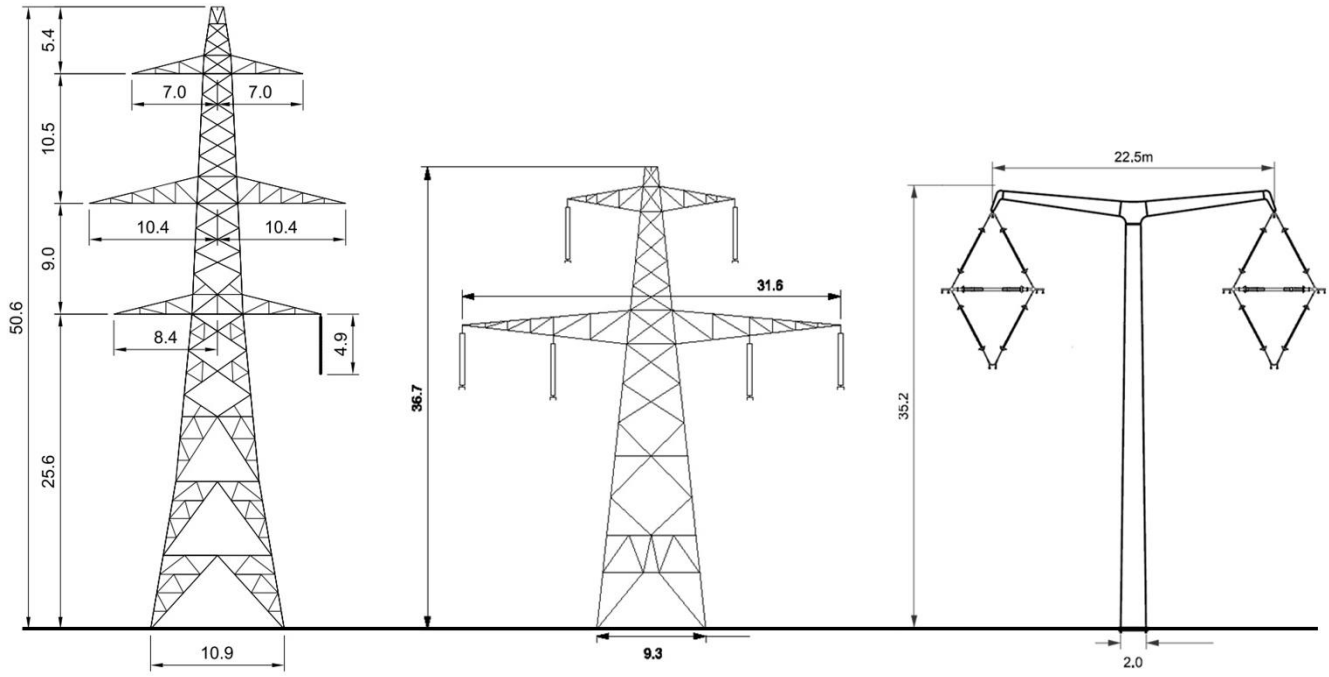
6.4.18 Access using conventional methods such as climbing is not possible for T-pylons and MEWPs will be required to access overhead line components for repair and/or replacement. A permanent access will therefore be required to be left in situ to each individual T-pylon site.

Pylons Options Available to the Project

6.4.19 For the Project, the all-aluminium alloy conductor (AAAC) type needed to meet the rating requirements for the new circuits is a triple bundle of 37 mm diameter (Araucaria) conductor. This conductor system has been selected at this stage due to its high current carrying capacity which can accommodate the high levels of power flow expected on the new overhead line circuits once in operation. Only the larger standard lattice steel designs (both standard height and low height) and T-pylons are capable of supporting this conductor bundle.

6.4.20 Newer conductor types constructed with composite material cores may also be considered for the Project as the design progresses. If it is appropriate to use these newer conductor types then a slightly lighter form of pylon design could potentially be utilised throughout as a more lightweight solution of twin conductor bundles could be sufficient. However, based on design work conducted to date, it is assumed that a triple bundle of Araucaria AAAC will be used on this Project to provide maximum possible capacity and flexibility in the design. Routeing and siting, as well as environmental studies for Stage 2 consultation and the Weston Marsh Targeted Consultation, have been carried out on this basis. Further detail on the final choice of conductor system will be provided as part of the Development Consent Order (DCO) application, whilst further detail on the selection of pylon design for this stage of the Project based on the use of triple AAAC conductor can be found in Chapter 7.

Image 6.1 Pylon types available to the Project



Full Height Lattice (L6m) Low Height Lattice (L13) T-Pylon

6.5 Planning and Environmental Considerations

6.5.1 Planning designations and environmental features have been considered throughout the routeing and siting process. A buffer was applied to some of these features in compiling the materials that informed the Stage 1 consultation and developing the graduated swathe (**Section 5 of the CPRSS**).

6.5.2 As the design has developed, these features have continued to be considered as part of assessments informing the proposed alignment and substation siting. As a first principle, the design of the Project has sought to avoid the planning designations and environmental constraints outlined below wherever possible and appropriate.

6.5.3 There are instances where some features cannot be avoided entirely, due to technical limitations or conflicting constraints. Chapter 7 highlights how the proposed alignment has been developed in relation to planning and environmental constraints, and Chapter 8 includes details of National Grid's approach to environmental mitigation for affected features.

6.5.4 The features considered include the following:

- Air Quality: Residential Properties, Education Establishments (such as schools and colleges), Buildings (other than residential properties e.g. retail, industrial estates, religious and healthcare buildings), and Air Quality Management Areas (AQMA).
- Aviation and Defence: Radar, Radio Navigation Beacon, or Radio Sites, Ministry of Defence Low Flying Zone (only high priority and regular), Licensed Airfields, Unlicensed Airfields with Buildings, Unlicensed Airstrips, Ministry of Defence Properties, Civil Aviation Authority Airports, Civil Aviation Authority Aerodromes, Military Airfield/Passenger Airport.

- Ecology: Ancient woodland (including ancient and veteran trees), Statutory designated sites (Ramsar, Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR)), Non Statutory designated sites (Local Wildlife Sites, Sites of Importance for Nature Conservation (SINC), County Wildlife Sites (CWS), roadside nature reserves), Habitats of Principal Importance, Protected Species and Species of Principal Importance, and Important Bird Areas.
- Socio-economic Activity: Businesses that operate as a commercial entity, renewable energy generation, aviation facilities (airfields), community facilities (places of worship, education, hospitals, etc.), open space, development land allocations (identified through local plans, which includes mineral resource allocations), tourism accommodation and bed space, strategic visitor attractions, and public rights of way and promoted recreational routes.
- Geology and Soils: Geological Sites of Scientific Interest, Local Geodiversity Sites, Peaty Soils, Best and Most Versatile Land, Landfill Sites (historic and authorised), and Mines.
- Health and Wellbeing: individual and clusters of residential properties, community facilities, parks, green open spaces, and promoted recreational routes.
- Historic Environment: Scheduled Monuments, Listed Buildings (Grade I, II* and II), Registered Parks and Gardens (Grade I, II* and II), Conservation Areas, and non-designated heritage assets.
- Landscape and Visual: Areas of Outstanding Natural Beauty (AONB) (now known as National Landscapes), locally designated landscapes, Landscape Character Types (LCT), Regional Landscape Character Types (RLCT), Landscape Character Areas (LCA), Residential Properties, Viewpoints, Communities, and Recreational routes and receptors (e.g. National Trails, National Cycle Network).
- Noise and Vibration: Residential Properties, Education Establishments (e.g. schools and colleges), and Buildings (other than residential properties e.g. retail, industrial estates, religious and healthcare buildings).
- Traffic and Movement: National and Local Cycle Network, Public Rights of Way, promoted and recreational routes, Railway Infrastructure, Navigable Waterways, Highway Network including local roads, classified road network and the Strategic Road Network (SRN).
- Water: Statutory Main Rivers, Internal Drainage Board (IDB) watercourses, ordinary watercourses, tidal and fluvial floodplains, flood defences, Water Framework Directive (WFD) water bodies, Groundwater Dependent Terrestrial Ecosystems, primary and secondary aquifers, and groundwater Source Protection Zones
- Existing utility assets: high pressure gas pipelines, existing 400 kV and 132 kV overhead lines and other major utility buried assets such as carbon capture pipelines, fuel pipelines and high voltage electricity underground cables

6.5.5 Environmental surveys, including ecological, historic environment, and landscape and visual surveys, commenced in November 2022 and are ongoing. Design development to date has taken account of available environmental survey data and sought to avoid constraints identified through survey. Where appropriate, further

refinements to the design will be made ahead of the DCO application as new information is made available through environmental survey.

Aviation Considerations

6.5.6 While aviation wasn't a consideration in respect of Section 5, due to there being no operational airfields within a 5 km search area of the graduated swathe presented at Stage 1 consultation for this section, it has been considered as part of the wider routeing and siting for the Project, as detailed in the **June 2025 Design Development Report**.

Solar Farm Considerations

6.5.7 While solar farms weren't a consideration in respect of Section 5, due to there being no existing or consented solar arrays interacting with the proposed infrastructure in this section, solar farms have been considered as part of the wider routeing and siting for the Project, as detailed in the **June 2025 Design Development Report**.

Landscape Considerations

6.5.8 While the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty) wasn't a consideration in respect of Section 5, due to this being located far enough away to not be impacted by the proposals in Section 5 (approximately 40 km), it has been considered as part of the wider routeing and siting for the Project, as detailed in the **June 2025 Design Development Report**.

7. Development of the Proposed Alignment and Substation Sitings

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7. Development of the Proposed Alignment and Substation Sitings

7.1 Introduction

7.1.1 This chapter describes the proposed overhead line and underground cable alignments and substation sitings which form the subject of the Weston Marsh Targeted Consultation. The proposed alignments and substation sitings presented in this chapter have been developed in response to engagement with generators, further environmental and technical assessments, and a review of work undertaken to date.

7.1.2 This chapter outlines the design considerations and decisions made by National Grid to inform the proposed alignments and substation sitings. Although National Grid considered and appraised design change requests in Section 5 originating from both Stage 1 consultation and the June 2025 Stage 2 consultation, no changes to the design in Section 5 were made as a result of these requests. The **Stage 1 Consultation Feedback Report** and **Section 5 Consultation Feedback Report** provide details on design changes requested through consultation feedback that were not taken forward.

7.1.3 The images presented within this chapter show the proposed alignments and substation sitings for Section 5. The images included in this chapter have been produced to aid understanding of the development of the proposed alignments and substation sitings and are not intended to show all the design elements and constraints associated with the Project, to ensure the images are legible. The images within the text have been scaled down and are not to scale; full size versions of the images are included in Appendix B of this report.

Pylon Choice

7.1.4 This chapter also sets out the pylon choice selected for each of the overhead line sections. The following factors, along with the pylon type considerations outlined in Section 6.4 of this report, have been considered in arriving at a proposed pylon design for the new overhead line:

- landscape and visual;
- historic environment;
- biodiversity;
- aviation; and
- technical considerations.

7.1.5 Across the Project, the starting point for pylon design choice is standard height steel lattice and this has been the basis for the development of the proposed overhead alignment. This is primarily because in most circumstances, standard height steel lattice pylons provide the greatest flexibility in design as they can provide angle deviations up to 90 degrees, as opposed to low height pylons or T pylons which are

both limited to 30 degrees, and they are able to be easily extended where required to provide additional clearance above specific constraints such as navigable waterways. Standard height pylons also require a narrower corridor for vegetation clearance than both low height lattice and T-Pylons, so across the full length of the Project the selection of standard height lattice reduces permanent impacts on vegetation and biodiversity. Developing the proposed overhead line design in this way, with a consistent starting point across the full route, also ensures that the overhead line has a consistent appearance across the majority of the Project which helps to reduce the negative visual impacts that can arise with multiple designs in close proximity.

7.1.6 However, where there are specific drivers to deviate from this standard design, both low height lattice pylons and T-pylons have been considered as alternative options primarily for the purpose of mitigation for a potential effect with respect to the factors listed in Paragraph 7.1.4. The summary of the appraisal for pylon choice where these areas for mitigation through the use of a different pylon type have been identified are provided in Section 7.2.

Holford Rules

7.1.7 Paragraph 2.8.5 of the National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 5) states that the Holford Rules *'should be used by developers when designing their proposals'.* The Holford Rules were first set out in 1959, and subsequently reviewed by National Grid in 1992. They have become accepted within the electricity transmission industry as the basis for overhead transmission line routeing. National Grid employs the Holford Rules to inform the design and routeing of all new overhead line projects, including the Project.

7.1.8 Whilst referred to in Chapter 2 and Chapter 6, the following sections of this Chapter further set out, in turn, how the Holford Rules are applied by National Grid and have formed an important part of developing the proposed alignments. Much of the text is replicated from the **June 2025 Design Development Report** as it relates to general principles for the full Project that are equally applicable to Section 5. Updates to the text have been made to remove reference to specific elements of the Project not within Section 5 and to include further detail where this is available for Section 5 following the development of the substation locations and overhead line and underground cable alignments.

7.1.9 In cases where an overhead route has been selected, as is the case for the Project, National Grid will continue to apply the Holford Rules, as a starting point. However, other factors have also influenced the proposed alignment and design of the project; such as, environmental, engineering and socioeconomic considerations as well as feedback received during consultation. On occasion, such factors provide an overriding justification to depart from the Holford Rules, and all decisions in the design and delivery of major infrastructure projects inevitably balance a variety of considerations, with weight determined by legal and policy considerations. However, in most cases, where all other considerations are equal, the Holford Rules provide the guiding design principles. EN-5 states that the Secretary of State should be satisfied that the Project, so far as is reasonably possible, complies with the Holford Rules.

7.1.10 Holford Rules 1, 2, 3 and 7 have been particularly relevant in the selection of strategic options, route corridor and the proposed overhead line alignment for the project. Holford Rules 4, 5 and 6 have been relevant in the consideration of possible landscape and visual effects that may arise from the project.

7.1.11 This report considers below the application of the Holford Rules in respect of Section 5 and the proposed works therein. Taking into consideration the works proposed within Section 5, and the relevance of the Holford Rules in their application to those works, not all Holford Rules are applicable or hold as great a weighting as assessed for other areas of the Project.

Holford Rule 1

7.1.12 Holford Rule 1 states, *'avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the line in the first place, even if total mileage is somewhat increased in consequence. Areas of highest value include AONBs, National Parks, Heritage Coasts, World Heritage Sites and Registered Parks and Gardens.'*

7.1.13 Holford Rule 1 was considered particularly during the development of the graduated swathe presented within Section 5 at the Stage 1 consultation and subsequently in the development of the Refined Weston Marsh Substation Siting Zone. The graduated swathe sought to avoid areas of highest value altogether, including Areas of Outstanding Natural Beauty (AONB), now known as National Landscapes, National Parks, Heritage Coasts, World Heritage Sites and Registered Parks and Gardens, thereby ensuring that any proposed alignment within the graduated swathe would not be in direct conflict with these designations. Section 5 is not located in close proximity to any of the designated areas as listed above.

7.1.14 The appraisal demonstrates that Holford Rule 1 has informed the design and routeing within Section 5.

Holford Rule 2

7.1.15 Holford Rule 2 states, '*avoid smaller areas of high amenity value or scientific interest by deviation, provided this can be done without using too many angle towers [pylons] i.e. the bigger structures which are used when lines change direction.'*

7.1.16 The additional note to Holford Rule 2 goes on to state, *'Some areas (e.g. Site of Special Scientific Interest) may require special consideration for potential effects on ecology (e.g. to their flora and fauna). Where possible choose routes which minimise the effects on the setting of areas of architectural, historic and archaeological interest including Conservation Areas, Listed Buildings, Listed Parks and Gardens and Ancient Monuments.'*

7.1.17 Whilst not defined by Holford Rule 2 specifically, areas of high amenity or scientific interest, are considered to mean areas of high 'environmental' or 'historic' amenity which may include, but are not limited to:

- Ancient woodland (including ancient and veteran trees);
- Ecological statutory designated sites (Ramsar, Special Area of Conservation (SAC), Special Protection Area (SPA), Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR);
- Ecological non-statutory designated sites: Local Wildlife Sites, Sites of Importance for Nature Conservation (SINC), County Wildlife Sites (CWS), roadside nature reserves), Habitats of Principal Importance, Protected Species and Species of Principal Importance, and Important Bird Areas; and

- Historic Environment: Scheduled Monuments, Listed Buildings (Grade I, II* and II), Registered Parks and Gardens (Grade I, II* and II), Conservation Areas, non-designated heritage assets, and National Trust Inalienable Land.

7.1.18 The Refined Weston Marsh Substation Siting Zone presented at Stage 2 consultation sought to avoid areas which benefit from a statutory designation, as such, any proposed alignments within the Section 5 would not be in direct conflict with these designations. Due to their statutory designations, these are afforded more weight in terms of avoidance, than non-statutory designated sites.

7.1.19 Whilst proposals within Section 5 do not site infrastructure within any of the above listed sites, some prominent identified features relating to Holford Rule 2 were identified within Section 5. These include three Grade II listed structures, and the Wykeham Chapel scheduled monument and Grade I listed structure, located to the south west of the Refined Weston Marsh Siting Zone. Overhead line routeing in proximity to these features is assessed based on a range of environmental factors, designations and constraints. Case-by-case specific design and routeing decisions have been made where the alignment encounters such features. These are detailed in the relevant sections of this chapter, as it is not straightforward, at a macro scale, to define all these micro design decisions.

7.1.20 Relevant in this context is the fact that Holford Rule 2 does caveat that avoidance is the starting point, unless it introduces '*too-many angle towers [pylons]*'. As such, on a case-by-case basis, the proposed alignments have sought to weigh the impact of potentially routeing in close proximity to an area of high amenity value against the respective design solution to avoid it, as avoidance usually results in additional angle pylons. Additional angles would generally increase the overall number of pylons required and would increase environmental effects and costs. Holford Rule 3 below details the reasons the shortest route between two points is generally preferred.

7.1.21 A summary of all the design decisions taken forward and the key environmental factors considered within the appraisal is, therefore, presented within Section 7.2, thus demonstrating that Holford Rule 2 has informed the design and routeing of the Project within Section 5.

Holford Rule 3

7.1.22 Holford Rule 3 states, *'other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers [pylons].'*

7.1.23 The additional note to Holford Rule 3 goes on to state, '*Where possible choose inconspicuous locations for angle towers, terminal towers and sealing end compounds.'*

7.1.24 Long straight sections of overhead line, avoiding sharp changes of direction, are preferred to avoid the need for more angle pylons. This has visual benefits as angle pylons are typically heavier set, financial benefits as they are typically more expensive to construct, and construction benefits as angle pylons are typically more technically challenging to construct.

7.1.25 Whilst long straight sections are preferred, overhead line routeing in Section 5 is, given the requirements of the substations, largely dictated by the positioning of bays[2].

[2] Substation bay: a set of equipment that connects a circuit into a substation. Bays can be connected to generation, such as renewable generators, or demand, where high consumption of power requires direct connection, for

Whilst the substation design has sought to ensure bay positions are logical for incoming overhead line connections, there are certain restrictions placed on these positions by the electrical layout of the substation. In some instances sharper angles may also be required to navigate existing constraints, such as to increase a separation distance from a residential property (see Holford Rule 7 and Holford Rule Supplementary Note 1).

7.1.26 A summary of the opportunities to provide a straight alignment in Section 5, where possible, is presented in Section 7.2. As a result, overhead line routeing within Section 5 follows where practicable Holford Rule 3, however exceptions may be made where required by technical constraints or other external constraining factors, in some instances sharper angles may be required to navigate existing constraints, such as to increase a separation distance from a residential property (see Holford Rule 7 and Holford Rule Supplementary Note 1 or to avoid other sensitive environmental features (see Holford Rules 1 and 2).

7.1.27 A summary of the opportunities to provide a straight alignment in Section 5, where possible, is presented in Section 7.2, thus demonstrating that Holford Rule 3 has informed the design and routeing of the Project within Section 5.

Holford Rule 4

7.1.28 Holford Rule 4 states, '*choose tree and hill backgrounds in preference to sky backgrounds wherever possible. When a line has to cross a ridge, secure this opaque background as long as possible, cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.'*

7.1.29 In consideration of Rule 4, National Grid has taken opportunities to work with the characteristics of the landscape and backgrounding when planning the route of the overhead line and selecting the type of pylon to be used in the landscape.

7.1.30 However, it is generally noted that Section 5 is situated in an area which is predominantly rural in character, covering a large, low-lying, flat fenland landscape with many large agricultural fields and drainage ditches, dykes and rivers. As such, with limited undulating landscape features, there have been relatively few opportunities to optimise route alignments in lower-lying areas of land, such as valleys, screened by higher areas of land, such as ridges.

7.1.31 In addition, steel lattice pylons benefit from backgrounding because the thin steel members in an open structure make background features visible beyond, helping them to visually recede at greater distances. An assessment of pylon design considered different designs of pylons that could be used on the project and the potential effects of each. As detailed in Paragraph 7.1.5, standard height steel lattice towers would be the preferred pylon design across the majority of the Project as the starting point, primarily for reasons of design flexibility, however further narrative on the appraisal of alternative pylon options for Section 5 is provided later in this chapter.

7.1.32 The appraisal of strategic and pylon design options demonstrates that Holford Rule 4 has informed the design and routeing of the project.

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example electrified railways. Each bay usually includes its own set of switchgear and may include a transformer. Bays can be connected to overhead lines (using gantries for example) or to underground cables (using cable sealing ends for example).

Holford Rule 5

7.1.33 Holford Rule 5 states, '*prefer moderately open valleys with woods where the apparent height of towers [pylons] will be reduced, and views of the line will be broken by trees'.*

7.1.34 The additional note to Holford Rules 4 and 5 goes on to state, '*Utilise background and foreground features to reduce the apparent height and domination of towers from pan viewpoints. Minimise the exposure of numbers of towers on prominent ridges and skylines. Where possible avoiding cutting extensive swathes through woodland blocks and consider opportunities for skirting edges of copses and woods. Protecting existing vegetation, including woodland and hedgerows, and safeguard visual and ecological links with the surrounding landscape.'*

7.1.35 As previously stated in Holford Rule 4, within Section 5, the landform is flat with minimal changes in terrain height and few areas of vegetation. Therefore, few opportunities present themselves within Section 5 for the utilisation of background features. The Project has sought to minimise the impact as far as possible on existing vegetation including woodland and hedgerows.

7.1.36 The consideration of landform, existing landscape features and site context demonstrates that Holford Rule 5 has informed the design and routeing of the project.

Holford Rule 6

7.1.37 Holford Rule 6 states, *'where country is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration of lines or wirescapes'.*

7.1.38 The additional note to Holford Rule 6 goes on to state '*Arrange wherever practicable, parallel or closely related routes with tower [pylons] types, spans and conductors forming a coherent appearance.'*

7.1.39 The term wirescape is a combination of the terms 'wire' and 'landscape', used to describe the often complex and sometimes visually intrusive network of cables/wires, poles and pylons, that can dominate views in certain areas.

7.1.40 The landscape baseline includes existing high voltage lattice steel pylons and lower voltage wood pole overhead line infrastructure. Prior to works pursuant to Section 5, overhead line third-party infrastructure would need to be diverted, undergrounded, or protected; with the general starting principle being that any existing overhead line asset, which interfaces with the proposed overhead line, would be undergrounded.[3] Not only does this help facilitate the construction of the overhead line, by ensuring the proposed route alignment is free from tall physical constraints and by not increasing the statutory clearances required over these features; the resultant impact is to also reduce the magnitude of landscape and visual effects and the concentration of line and wirescapes in the landscape.

7.1.41 In addition, National Grid recognises that close paralleling of an existing overhead line has the potential to reduce the overall extent of environmental impacts arising from the Project by avoiding the spread of impacts to receptors currently unaffected

[3] The required mitigation methods and duration of mitigation works (permanent or temporary) need to be confirmed with the asset owners prior to any works being carried out.

by existing overhead line, albeit this may well increase impacts on receptors already affected by existing infrastructure.

7.1.42 Opportunities for close paralleling have been considered from the early design stages on the Project. Opportunities are dictated by the presence of existing overhead lines, of a similar scale and route direction, within the relevant study area, as well as other constraints that are to be avoided. Section 5 presents an opportunity for the proposed alignment to close parallel the existing 4ZM route, synchronising the pylon positions with the existing route where possible, helping create a coherent appearance in these span sections.

7.1.43 Due to a mix of external constraining features and the location of bay positions for the overhead line connections into each substation, the proposed alignment does not achieve close parallel to all existing National Grid assets in Section 5. Where the proposed alignment routes in close proximity to existing National Grid infrastructure, converging overhead lines have been avoided wherever practicable.

7.1.44 In addition, customer connections into Weston Marsh Substations A and B have also been considered in the positioning of proposed National Grid infrastructure in accordance with Holford Rule 6, and technical considerations for the routeing of overhead lines. National Grid recognises the need for a coordinated approach to interactions with these customer connections. Within Sections 5, National Grid has worked collaboratively with the Outer Dowsing and Ossian Wind Farm Projects to ensure compatibility between DCO applications and have sought to engage the Meridian Solar Farm Project to ensure the same levels of compatibility can be achieved. Following the Stage 2 Consultation, National Grid will continue to coordinate with customers, in accordance with the Holford Rules. National Grid has taken account of the need to avoid constraining future overhead line routes that are also proposed to route through this section once constructed (including the Weston Marsh to East Leicestershire Project). Following the Stage 2 Consultation, National Grid will continue to coordinate the with other National Grid projects across the route, in accordance with Holford Rule 6.

7.1.45 It is also noted, introducing a different pylon structure near an existing steel lattice pylon may produce an incoherent appearance; this would be a greater change than introducing a series of similar structures. As such, a good design measure incorporated into the design and in consideration of Holford Rule 6, includes the proposed use of standard lattice pylons which is the same style as the existing 400 kV overhead lines in the vicinity. In other locations where the new overhead line routes in close proximity to other overhead lines which are not of the same voltage or construction type, or where close paralleling is not technically feasible, the Project has sought to maintain appropriate clearances from the other overhead lines to minimise the concentration of wirescapes where possible.

7.1.46 The appraisal and the consideration of pylon design demonstrates that Holford Rule 6 has informed the design and routeing of the project.

Holford Rule 7

7.1.47 Holford Rule 7 states, '*approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.'*

7.1.48 The additional note to Holford Rule 7 goes on to state, *'When a line needs to pass through a development area, route it so as to minimise as far as possible the effect on development. Alignments should be chosen after consideration of effects on the amenity of existing development and on proposals for new development. When siting substations take account of the effects of the terminal towers and line connections that will need to be made and take advantage of screening features such as ground form and vegetation.'*

7.1.49 Whilst the new 400 kV overhead line would be of the highest voltage, so is less relevant in terms of Holford Rule 7, National Grid has still given due regard to this principle.

7.1.50 The Project is located in the Humber, East Midlands, East of England and East Anglia regions of England. The area of Section 5 is predominately rural, with large parts of land under arable farming use. The towns of Spalding and Boston are located within 5 km of Section 5. There are also multiple villages and scattered properties nearer by to the Project. However, these urbanised areas are largely avoided all together, with the exception of some rural and more isolated sites. Hence, Holford Rule 7 is not strictly relevant to the Project.

7.1.51 In siting these proposed substations and overhead line entries, National Grid has sought to maximise the separation from these communities as far as practicable, balanced with other technical and environmental factors; to reduce as far as possible the potential amenity impacts to these receptors.

7.1.52 The relevant National Policy Statement does not preclude the use of overhead line connections in most circumstances and the use of underground cables, at a considerably higher cost would, in such circumstances, not meet National Grid's statutory duties to develop the network in an economic and efficient manner, where it is considered that there are viable overhead line design solutions. In the case of Section 5, underground cables have been adopted by requirement for short sections from Cable Sealing End Compounds (CSECs) to the substation to facilitate circuits of overhead line connections that would otherwise cross one another. A cable connection is also proposed between Weston Marsh Substations A and B to provide additional mitigation for residual system-wide resilience, as outlined in Chapter 5, and in compliance with Holford Rule 6 to help mitigate a potential wirescape though avoiding converging overhead lines.

7.1.53 Whilst the Project does not approach urban areas, the appraisal demonstrates that Holford Rule 7 has still informed the design and routeing of the Project.

Holford Rules Supplementary Notes

7.1.54 In addition to the above, three supplementary notes have been added to the Holford Rules.

7.1.55 Holford Rule Supplementary Note 1 states, *'avoid routeing close to residential areas as far as possible on grounds of general amenity.'*

7.1.56 Section 5 is located in an area that is predominately rural in nature, with large parts of land under arable farming use. The proposed alignments, however, do route nearby to scattered residential properties. In almost all cases, National Grid's preferred approach is the avoidance of direct oversailing of residential properties during routeing of new infrastructure, and National Grid also seeks to avoid oversailing any non-domestic buildings as far as possible, with a preference for avoiding built-up

areas altogether. Generally, a stand-off distance is sought in respect of residential properties and/or residential curtilage. Across the Project, including within Section 5, there are no instances of permanent overhead line or substation infrastructure being sited within a residential curtilage.

7.1.57 Holford Rule Supplementary Note 2 states, '*where possible choose routes which minimise the effect on special landscape areas, areas of great landscape value and other similar designations of county, district or local importance.'*

7.1.58 None of the designated areas listed above or similar designated areas that would apply to Holford Rule Supplementary Note 2 are present within Section 5.

7.1.59 Holford Rule Supplementary Note 3 states *'in addition to adopting appropriate routeing, evaluate where appropriate the use of alternative tower [pylon] designs now available where these would be advantageous visually and where the extra cost can be justified.'*

7.1.60 As noted in respect to Holford Rule 4 above, an assessment of pylon design was undertaken which considered different designs of pylons that could be used on the Project and the potential effects of each. The assessment concluded that the steel lattice pylon would be the preferred pylon design.

Horlock Rules

7.1.61 The Horlock Rules provide guidelines for the siting and design of new substations, substation extensions or cable sealing end (CSE) compounds and these rules have been an important consideration in the design and siting of such infrastructure across the Project.

7.1.62 Much of the text below is replicated from the **June 2025 Design Development Report** as it relates to general principles for the full Project that are equally applicable to Section 5. Updates to the text have been made to remove reference to specific elements of the Project not within Section 5 and to include further detail where this is available for Section 5 following the development of the substation locations and overhead line and underground cable alignments.

7.1.63 NPS EN-5 states, '*The Horlock Rules – guidelines for the design and siting of substations – were established by National Grid in 2009 in pursuance of its duties under Schedule 9 of the Electricity Act 1989. These principles should be embodied in Applicants proposals for the infrastructure associated with new overhead lines.*'

7.1.64 Potential sites for substations were considered within Section 5 at each of the three substation siting areas as outlined in the **Weston Marsh Siting Study Report** and for the Weston Marsh Substation A as part of **Chapters 9 to 12 of the CPRSS**, presented at the Stage 1 Consultation (held in Spring 2024) undertaken by National Grid. The Horlock Rules informed the selection of the siting areas themselves. A summary of the siting areas considered, technical considerations and the key environmental factors that were put forward in the appraisals are also presented in **Chapters 9 to 12 of the CPRSS** and the **Weston Marsh Siting Study Report**.

Overall System Options and Site Selection

7.1.65 **Horlock Rule 1** states, '*in the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new*

developments against the consequential environmental effects in order to keep adverse effects to a reasonably practicable minimum.'

7.1.66 Environmental issues were a key driver in the site selection process for the substation siting locations, as well as the locations for the cable sealing end (CSE) compounds required at Weston Marsh Substations A and B.

7.1.67 Substation siting identification takes into consideration the key design drivers and individual needs cases for each substation(s) (such as, the connection of new generation), the substation(s) technical parameters (as detailed in Section 6.3.25 to 6.3.45) and the relevant environmental constraints (identified in Section 6.5.4).

7.1.68 Given the functional design nature of substations, landscape and visual amenity was considered to be of particular importance. As such, the availability of existing screening elements and the potential to introduce additional screening elements was a key driver. In addition, appropriate topography, proximity to major roads (to minimise the extent of required new access roads) and being outside of areas of higher flood risk (where possible), were also key drivers.

7.1.69 National Grid is regulated by Ofgem, the electricity and gas markets regulator, to ensure value for money for consumers and is required under the Electricity Act to '*develop and maintain an efficient, coordinated and economical electricity transmission system, and to facilitate competition in supply and generation of electricity*.' These duties and obligations mean that National Grid has a responsibility to deliver new electricity transmission infrastructure but also to be responsible for managing the cost of projects, as costs will ultimately be borne by electricity users.

7.1.70 In accordance with Horlock Rule 1, environmental constraints are sought to be avoided from the outset and during the early stages of optioneering, as well as the consideration of technical complexity and capital costs. Therefore, whilst strategic options have been developed to avoid environmental constraints as far as possible, this had to be balanced against the need to select a strategic option that provides the most cost-effective reinforcement to the network.

7.1.71 The conclusion of the strategic optioneering was that the option of constructing a new 400 kV overhead transmission line between Grimsby to Walpole and associated substations would achieve a balance between National Grid's technical, economic and environmental obligations. This is taking account of National Grid's statutory obligations, its licence requirements and other relevant considerations. However, National Grid also recognises that due to amenity issues or where environmental constraints are to be avoided, an appropriate balance must be struck between avoiding the constraints, whilst not resulting in unreasonable cost or complexity; for example, by virtue of a significant increase in the length of overhead line or siting a substation in a location which would be difficult for construction access or provide limited space for customer connections.

7.1.72 In the context of Horlock Rule 1, Table 7.1 below sets out any substation siting specific considerations relevant to each substation.

Table 7.1 Application of Horlock Rule 1

Section	Substation	Application of Rule 1
5	Weston Marsh Substations A & B	• The proposed siting seeks to locate the substations close to a tee-point of the existing 400 kV 4ZM and 2WS overhead lines to reduce the length of overhead line reconfiguration and 400 kV overhead lines into the new substations to minimise environmental impacts (by reducing the geographical extent of effects) and cost. • The proposed siting avoids identified centres of population

Amenity, Cultural or Scientific Value of Sites

7.1.73 **Horlock Rule 2** states, '*the siting of new National Grid Company substations, sealing end compounds and line entries should as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.*'

7.1.74 None of the proposed substation siting locations are located within internationally and nationally designated areas of the highest amenity, cultural or scientific value.

7.1.75 **Horlock Rule 3** states, '*areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable*.'

7.1.76 Practically all the land utilised for the proposed substation locations is within active agricultural use, which tends to have overall less habitat value. National Grid has also refined the positioning of the substations in response to significant survey findings.

7.1.77 The proposed siting of the substations sought to avoid areas of local amenity value. In the context of Horlock Rule 3, Table 7.2 below sets out any substation siting specific considerations relevant to each substation.

Table 7.2 Application of Horlock Rule 3

Section	Substation	Application of Rule 3
5	Weston Marsh Substations A & B	• The proposed siting of Weston Marsh Substations A and B considered the setting of the Wykeham Chapel Grade I listed building and Scheduled Monument as well as other Grade II listed structures. Pylon siting has taken care to ensure appropriate screening from the views of these features wherever practicable and substation screening is proposed to minimise visual impacts. • The earthwork remains of a medieval sea bank (HER Ref. MLI98445) identified by desk-based research and aerial photographic and LiDAR analysis, located to the south of Weston Marsh Substation B, have been avoided by temporary and permanent construction works related to the substation and overhead line entries.

Local Context, Land Use and Site Planning

7.1.78 **Horlock Rule 4** states, '*the siting of substations, extensions and associated proposals should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum*.'

7.1.79 The substation siting locations would take advantage of screening which is provided by existing tree belts, hedgerows and woodland areas. There is also adequate space to carry out supplementary planting at all substation sites and within Section 5. Supplementary planting could consist of woodland planting and use of low mounds around the peripheries of the substation locations, which are not already screened by mature vegetation. The screening offered by existing field boundaries would be strengthened with supplementary planting where this would help to reduce negative effects on landscape character.

7.1.80 In the context of Horlock Rule 4, the Table 7.3 below sets out any substation siting specific considerations relevant to each substation.

Table 7.3 Application of Horlock Rule 4

Section	Substation	Application of Rule 4
5	Weston Marsh Substations A & B	• Although there is little existing vegetation in the vicinity of the new substations, the flat landform in this area means that any mounding and planting introduced will be effective in screening the substation from the residential areas at Weston.

7.1.81 **Horlock Rule 5** states, '*the proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum*.'

7.1.82 Avoidance and mitigation of environmental effects was a key driver in the selection process for the proposed substation locations and fundamental to decisions to take areas of the original proposed siting zones forward for more detailed analysis.

7.1.83 With respect to the avoidance and mitigation of environmental effects, influencing factors have been identified in response to Horlock Rules 1, 2 and 3, as set out above. In respect of the avoidance and mitigation of visual effects, influencing factors have been identified in response to Horlock Rules 4, 7, 10 and 11 above and below.

7.1.84 In respect of influencing factors to minimise noise impacts, any substation would be designed to avoid any perceptible increase in background noise levels at residential properties. This would include enclosure of the transformers and the use of low noise cooler fans at substations that include this equipment.

7.1.85 In addition, all the proposed substations have been designed as air insulated switchgear (AIS) substations rather than gas insulated switchgear (GIS) substations. In terms of the likely environmental effects, by comparison with AIS, a GIS substation would be likely to have a greater impact on views and landscape character which is not as readily screened by vegetation due to the height and scale of the building surrounding the equipment.

7.1.86 **Horlock Rule 6** states, '*the land use effects of the proposal should be considered when planning the siting of substations or extensions*.'

7.1.87 The land use of the proposed siting locations and land immediately surrounding the proposed siting locations has influenced the design and siting of the substations. In the context of Horlock Rule 6, Table 7.4 below sets out any substation siting specific considerations relevant to each substation

7.1.88 Practically all the land utilised for the proposed substation locations is within active agricultural use. National Grid recognises that there is the potential for impacts on those affected agricultural landholdings and will continue to work with all affected landowners to understand the impacts of the Project. It is recognised that a proportion of the agricultural land affected by the Project (and specifically the substation locations) will experience permanent or temporary land loss or disturbance.

7.1.89 Whilst previously developed 'brownfield' land may be preferred for redevelopment, and this has been considered as part of the design evolution, other nearby sites lacked any existing previously developed land that could be used when taking into account technical and environmental considerations, and many sites were considered too far away to meet the strategic proposal criteria.

7.1.90 Meanwhile, attempts have been made to avoid Best and Most Versatile (BMV) agricultural land as part of the design evolution. Where BMV agricultural land is to be developed, if possible, this will be directed at land of the lowest possible grade within the site area.

Table 7.4 Application of Horlock Rule 6

Section	Substation	Application of Rule 6
5	Weston Marsh Substations A & B	• The proposed siting of the Weston Marsh Substations A and B has been developed to minimise the need for new build overhead line, so far as practicable, allowing for direct routeing of new and existing lines into the substations. • The proposed siting of the Weston Marsh Substation A takes into account the Intergen high-pressure gas pipeline to the east of the substation, maintaining sufficient standoff. • The proposed siting of both Weston Marsh Substations A and B takes account of the need to avoid constraining connection routes for proposed customer connections that are proposed to connect to the new substations once constructed. • Substation footprints and compounds have been arranged to use the smallest practicable area, avoiding encroachment into adjacent land parcels and reducing the extent of permanent land take. • Appropriate stand-off distances have been maintained for Lord's Drain, a non-navigable watercourse.

7.1.91 **Horlock Rule 7** states, '*in the design of new substations or line entries, early consideration should be given to the options available for terminal towers [pylons], equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.*'

7.1.92 In assessing the siting areas from an engineering perspective, consideration was given to:

- individual site characteristics, environmental constraints and existing infrastructure to determine the appropriate location and orientation of the substation(s);
- the most appropriate form of connection to existing networks;
- the most appropriate route of any cable connections taking account of environmental constraints; and
- the most appropriate route for a permanent access route and the need for temporary works including overhead line diversions.

7.1.93 The proposed substation compounds have been oriented as to minimise overlapping of field boundaries as far as is reasonably practicable. However, this is not possible at all substation locations.

7.1.94 The proposed substation buildings and ancillaries form an integral part of the substation design, located near to the main entrance to allow for internal separation from the live 400 kV compound within the substation.

7.1.95 In the context of Horlock Rule 7, Table 7.5 below sets out any substation siting specific considerations relevant to each substation.

Table 7.5 Application of Horlock Rule 7

Section	Substation	Application of Rule 7
5	Weston Marsh Substations A & B	• The proposed siting of Weston Marsh Substation A, in proximity to the existing Spalding Tee-Point, offers greatest opportunities to limit the spread of environmental effects by limiting the lengths of realignments and replacement of the existing 4ZM and 2WS circuits to tie the substation into the existing network (thereby also reducing the wirescape in the area). • The new proposed overhead line route will attempt to reutilise existing assets that otherwise would become redundant under the proposed overhead line works, reducing new build infrastructure and rationalising the network. • The cable sealing end compounds and cable routes at both Weston Marsh Substations A and B are needed due to electrical requirements within the internal layout. Where two or more overhead line circuits connecting to the substation cross one another, the preferred method to facilitate that crossing is to terminate one of the circuits into a cable sealing end compound (thereby also reducing the wirescape as a consequence) and install underground cable for the remaining section into the substation. This solution has been adopted for a single circuit of the proposed alignment at Weston Marsh Substation A and for both circuits of the National Grid Weston Marsh to East Leicestershire Project at Weston Marsh Substation B. National Grid has also considered the careful

Section	Substation	Application of Rule 7
		routeing of the underground cable for the short section between the two substations. Optimising underground cable design to follow the most direct route helps minimises environmental impact by reducing the amount of land disturbed during installation; a shorter, more efficient path reduces the amount of excavated land, habitat disruption and vegetation clearance and overall provides for a quicker installation.

7.1.96 **Horlock Rule 8** states, '*space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation*.'

7.1.97 The size of the proposed substations is determined by their technical requirements, which include:

- number of customers to be connected;
- capacity of customer connections;
- mode of connection to the existing transmission network (i.e. number of overhead line or underground cable connections); and
- selection of AIS or GIS technology.

7.1.98 Despite typically having a smaller overall land take than AIS substations, a GIS substation would be likely to have a greater impact on views and landscape character due to the height and scale of the building surrounding the equipment, when compared to an AIS substation. All the proposed substations are assumed to be AIS substations, which will, therefore, inherently will have less of an environmental and visual impact.

7.1.99 A greater number or capacity of customer connections, or a more complex connection to the existing transmission network, will generally result in a larger substation footprint.

7.1.100 In addition, for each of the proposed substations siting areas, space to carry out some additional woodland and hedgerow planting is proposed. Opportunities for mitigation are restricted in some areas where a permanent clear easement is required, such as under the existing overhead lines and downleads and over the underground cable swathes.

7.1.101 Larger pieces of equipment and plant, too big for standard heavy goods vehicles are categorised as an Abnormal Indivisible Load (AIL) and are carried on vehicles capable of transporting such loads. Within Section 5, no AIL movements are currently anticipated.

7.1.102 In the context of Horlock Rule 8, Table 7.6 below sets out any substation siting specific considerations relevant to each substation.

Table 7.6 Application of Horlock Rule 8

Section	Substation	Application of Rule 8
5	Weston Marsh Substations A & B	• The proposed siting takes account of the need to avoid constraining connection routes for customer connections that are proposed to connect to the new Weston Marsh Substations A and B once it is constructed. • The construction compounds have been located in close proximity to both proposed substations, a practical arrangement which minimises severed land between the temporary compound and permanent infrastructure. The substations have been sited to allow for future extension if required, without introducing additional environmental or physical constraints. • The proposed access roads take the shortest most practical path to the substations facilitated by road widening on the existing highways. Opportunities will be explored to utilise temporary overhead line haul roads to minimise works to the public highway where practicable.

7.1.103 **Horlock Rule 9** states, '*the design of access roads, perimeter fencing, earthshaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings*.'

7.1.104 Horlock Rule 9 relates more so to the detailed design stages of the substations which would be undertaken at a later stage.

7.1.105 However, each proposed substation will have a temporary access during construction which will be made permanent for future operation and maintenance. The access will be constructed to enable AILs where required, to transport large equipment and plant, from main roads, suitable for this type of vehicle, to the site during construction.

7.1.106 In the context of Horlock Rule 9, Table 7.7 below sets out any substation siting specific considerations relevant to each substation.

Table 7.7 Application of Horlock Rule 9

Section	Substation	Application of Rule 9
5	Weston Marsh Substations A & B	• One permanent access for Weston Marsh Substation A and one permanent access for Weston Marsh Substation B are proposed both from Marsh Road. In the case of Weston Marsh Substation A this coincides with an access for the overhead line. During construction this will form a single construction access. • Mitigation planting is proposed to screen views from Weston and surrounding scattered residential / commercial properties. Low mounding will be used where possible to increase the height of this planting. Any planting and mounding will be

Section	Substation	Application of Rule 9
		designed to take account of underground connections into the substation.

Line Entries

7.1.107 **Horlock Rule 10** states, '*in open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance*.'

7.1.108 The landscape baseline includes both existing high voltage steel lattice pylons and overhead lines and lower voltage wood pole overhead line infrastructure. Prior to the construction of the Project, a significant amount of this existing overhead line third-party infrastructure would need to be diverted, undergrounded, or protected, with the general starting principle being that any existing overhead line asset, which interfaces with the proposed overhead line, would be undergrounded. Not only does this help facilitate the construction of the overhead line, by ensuring the proposed route alignment is free from tall physical constraints and by not increasing the statutory clearances required over these features, the resultant impact is to also reduce the magnitude of landscape and visual effects and the concentration of line and wirescapes in the landscape.

7.1.109 In the context of Horlock Rule 10, Table 7.8 below sets out any substation siting specific considerations relevant to each substation.

Table 7.8 Application of Horlock Rule 10

Section	Substation	Application of Rule 10
5	Weston Marsh Substations A & B	• The proposed siting of Weston Marsh Substation A, in proximity to the existing Spalding Tee-Point, offers the greatest opportunities to limit the spread of environmental effects by limiting the lengths of realignments and replacement of the existing 4ZM and 2WS circuits to tie the substation into the existing network (thereby also reducing the wirescape in the area). • The new proposed overhead line route will reutilise a significant section of the existing 2WS that otherwise would become redundant under the proposed overhead line works, reducing new build infrastructure and rationalising the network. • A cable interconnector is proposed between Weston Marsh Substations A and B, to provide additional mitigation for residual system-wide resilience, as outlined in Chapter 5. This would also reduce the number of overhead lines in the vicinity of the two substations.

7.1.110 **Horlock Rule 11** states, '*the inter-relationship between towers [pylons] and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the*

exposure of terminal towers [pylons] on prominent ridges should be minimised by siting towers [pylons] against a background of trees rather than open skylines.'

7.1.111 Due to the fenland character of the landscape with its flat landform and relatively low level of vegetation along much of the Project, there is little opportunity to use backgrounds of landform or vegetation to reduce the effects of pylons. The substation locations have made best use of landform and existing vegetation, and terminal pylons will be seen in that context.

7.2 Section 5 – New Weston Marsh Substations A and B

Overview

7.2.1 Section 5 is located to the north east of Spalding, east of the River Witham near Surfleet Seas End and west of Moulton Seas End. The northern boundary of Section 5 sits to the immediate north of the River Welland between Surfleet Seas End and Fosdyke Bridge and the southern boundary is to the immediate north of the A515 Weston Bypass to the west of Weston.

7.2.2 Section 5 of the Project comprises the following permanent works:

- one new 400 kV substation to the east of Surfleet Seas End and the north west of Moulton Seas End, the new Weston Marsh Substation A;
- one new 400 kV substation to the south east of Surfleet Seas End and the west of Moulton Seas End, the new Weston Marsh Substation B;
- an approximately 1.9 km long section of new 400 kV overhead line between Section 4 and the new Weston Marsh Substation A, routeing in a generally south easterly direction and connecting into the substation on its north western side;
- an approximately 4.2 km long section of new 400 kV overhead line between the new Weston Marsh Substation A and Section 6, routeing in a generally south westerly direction from the south eastern side of the substation and comprising a combination of 2.5 km of new-build overhead line and 1.7 km of reconductoring of the existing 400 kV overhead line from Spalding North (known as the 2WS route), facilitated by the diversion of the 2WS into the new Weston Marsh Substation B;
- a total length of 3.0 km of new cable corridor construction forming the interconnector between the new Weston Marsh Substation A and the new Weston Marsh Substation B, routeing in a generally north east to south west direction;
- modifications to the existing 400 kV overhead line between Bicker Fen and Walpole (known as the 4ZM route) to facilitate its connection to the new Weston Marsh Substation A and new Weston Marsh Substation B, comprised of approximately 2.9 km of new-build overhead line, approximately 2.0 km of reconductoring (of which approximately 260 m falls within Section 4 of the route, to the north west of the boundary between Sections 4 and 5) and approximately 1.2 km of overhead line dismantling and removal;
- modifications to the existing 400 kV overhead line from Spalding North (known as the 2WS route) to facilitate its connection into the new Weston Marsh Substation B, comprised of approximately 2.0 km of new-build overhead line, approximately 0.4 km of reconductoring, approximately 2.6 km of overhead line dismantling and removal, and approximately 1.7 km of the current 2WS route being reconductored

to form part of the new overhead line between the new Weston Marsh Substation A and Section 6; and

- a cable sealing-end compound and approximately 0.3 km of underground cable on the south eastern side of the new Weston Marsh Substation A to facilitate the connection into Weston Marsh Substation A of one circuit of the overhead line route from Section 6, where it needs to cross underneath the modified 4ZM route into the substation.

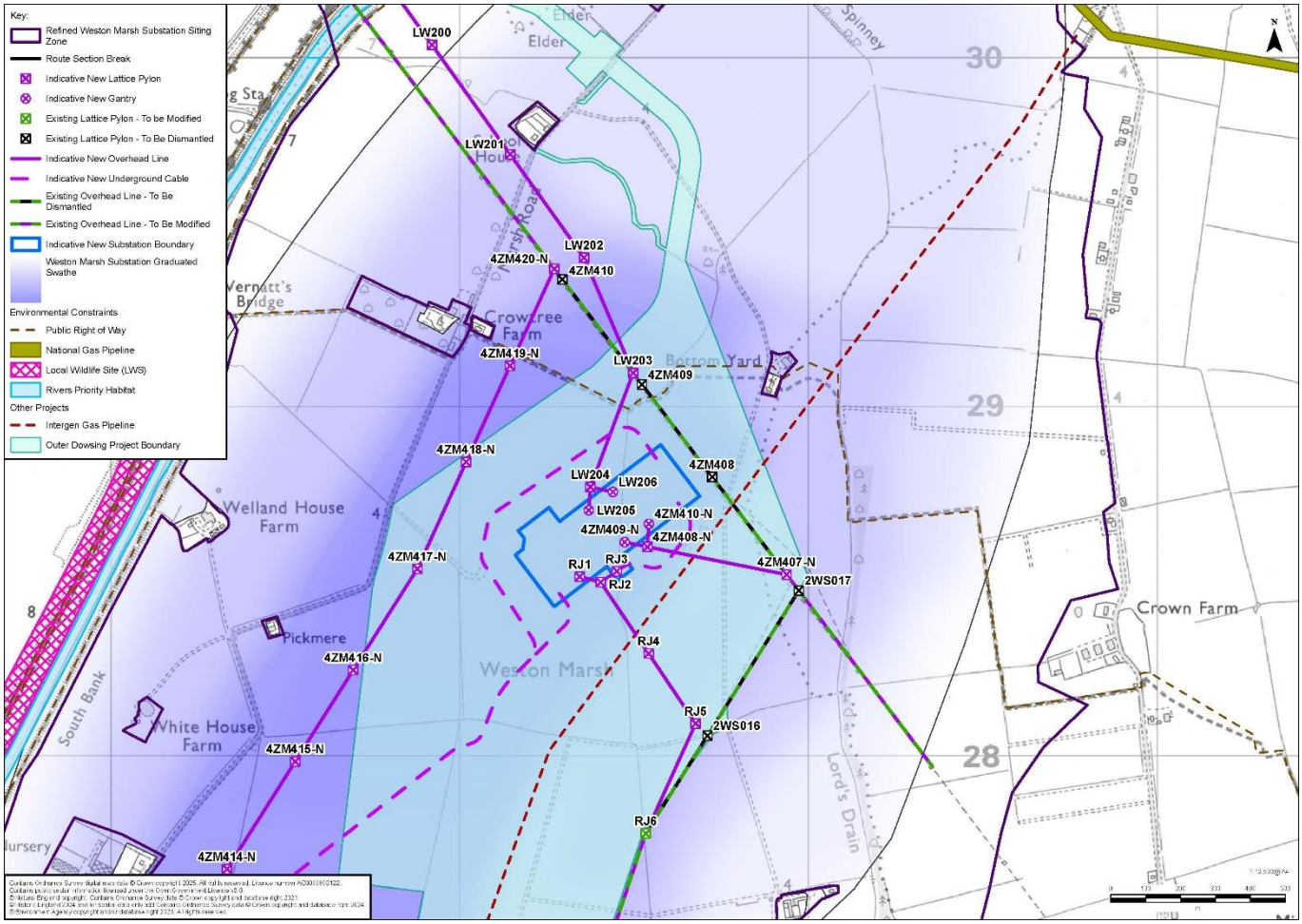
7.2.3 This section of the report describes the proposed siting of the proposed new Weston Marsh Substation A and Weston Marsh Substation B, and the proposed alignments of the new 400 kV overhead line through Section 5, the new underground cable substation interconnector and the modifications to the existing 400 kV overhead lines in Section 5 to connect into the new substations.

Proposed Alignment and Substation Siting

7.2.4 The siting of the proposed new Weston Marsh Substation A and Weston Marsh Substation B and the alignments of the proposed overhead lines and underground cable in Section 5 have considered a range of constraints, including environmental features, residential communities and existing infrastructure. These features are discussed below and illustrated in further detail in Image 7.1 to Image 7.3 below.

New Weston Marsh Substation A

Image 7.1 Proposed siting of the new Weston Marsh Substation A



7.2.5 The proposed new Weston Marsh Substation A is located to the east of Marsh Road, approximately due east of Surfleet Seas End, and is located to the immediate west of the Spalding tee-point, which is the intersection between the existing 400 kV overhead line between Bicker Fen and Walpole (the 4ZM route) and the existing 400 kV overhead line from Spalding North (the 2WS route).

7.2.6 The proposed location of the new Weston Marsh Substation A sits within the darkest shading of the graduated swathe presented at Stage 1 consultation.

7.2.7 The proximity to the existing 400 kV overhead lines was a key consideration in selecting the substation locations in Section 5, since this reduces the length of new-build overhead line that would be required to connect the existing overhead lines into the new substation (Holford Rule 3; Horlock Rule 6). By locating the proposed new Weston Marsh Substation A adjacent to the existing Spalding Tee Point, the extent of new overhead line construction required to divert the 4ZM route into Weston Marsh Substation A is kept to a minimum (Horlock Rule 7). For this reason, and consistent with the graduated swathe presented at Stage 1 consultation, other areas within the Refined Weston Marsh Substation Siting Zone located further from the existing tee-point were not preferred.

7.2.8 The proposed location for the new Weston Marsh Substation A is in a predominantly agricultural area, generally avoiding the substation being sited close to residential properties (Holford Supplementary Note 1). The substation has been located with consideration to minimise the number of affected land parcels, to reduce impact on landowners as far as practicable, and also with consideration of the length of new-build access road that would be required to reach the nearest existing highway, since a longer access road has the potential to cause greater land severance (Horlock Rule 6). The substation avoids any interaction with an Intergen gas pipeline that routes across the Refined Weston Marsh Substation Siting Zone from south west to north east to the south of the proposed substation.

7.2.9 In selecting the preferred location for the new Weston Marsh Substation A, consideration was also given to the design of other overhead lines proposed to connect into the substation. The substation location and orientation have been developed to allow efficient circuit entry from the approach directions of the new 400 kV overhead line from Route Sections 4 and 6 and from the likely approach directions of customers known to be connecting into Weston Marsh Substation A, to avoid the creation of narrow or overly constrained routeing corridors for these overhead lines (Horlock Rule 7; Horlock Rule 10).

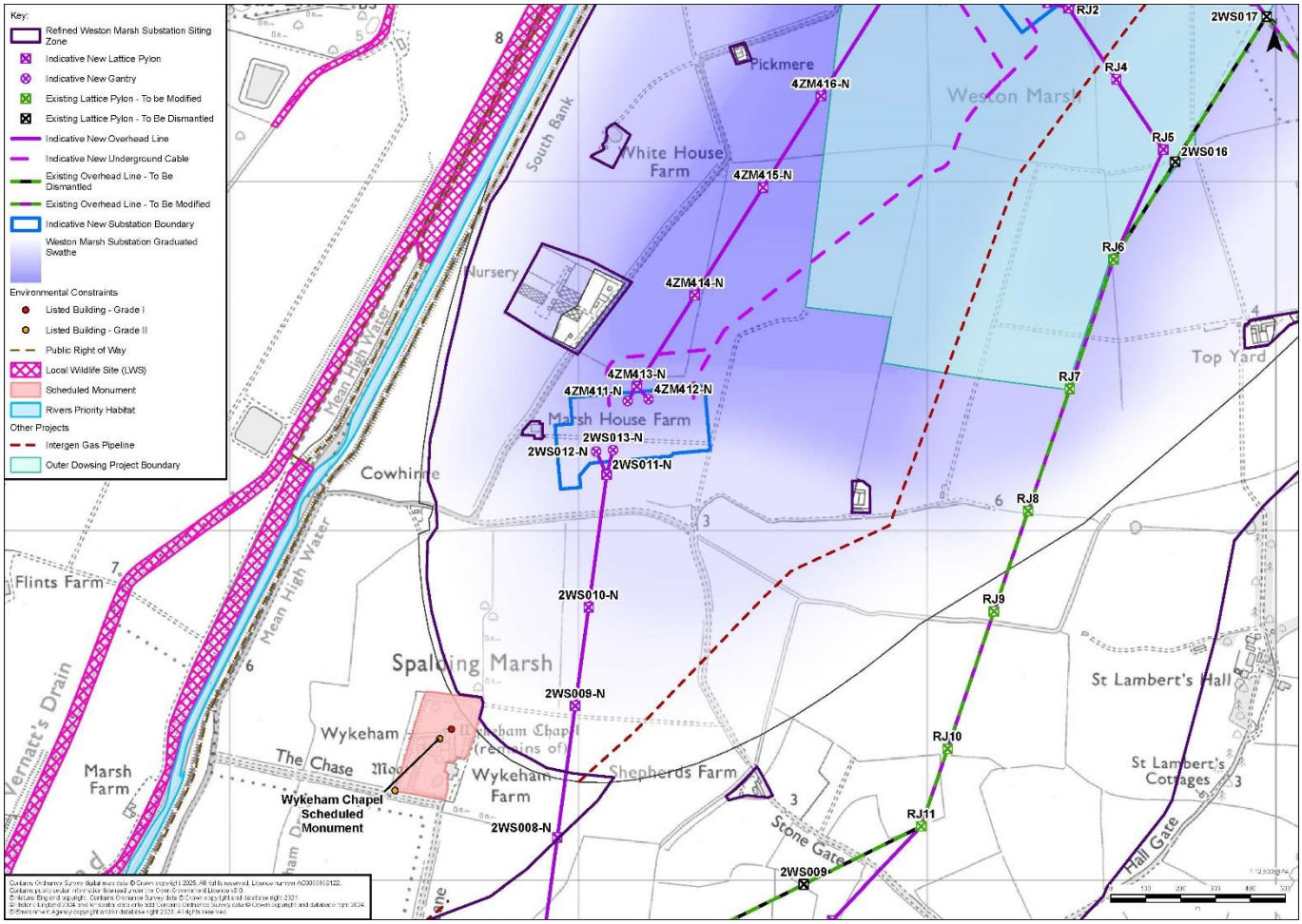
7.2.10 The bay positions within the substation have been designed, as far as practicable, to facilitate direct and efficient line entries without requiring lines to cross each other, which could result in excessive cabling, complex interactions of circuits or the need for additional cable sealing-end compounds (Horlock Rule 7).

7.2.11 The position of Weston Marsh Substation A supports the routeing of the proposed new 400 kV overhead line from north to south through Section 5 without excessive deviation or land-take, while minimising the extent of new overhead line construction required to connect the existing 4ZM route into the substation and also providing opportunity for the new 400 kV overhead line to potentially utilise otherwise redundant pylons from the diversion of the 2WS route into the new Weston Marsh Substation B (described later in this section) (Holford Rule 3; Horlock Rule 6; Horlock Rule 10).

7.2.12 Further details of the work National Grid has undertaken to establish the locations of the two substations within Section 5 are provided in the **Weston Marsh Siting Study Report**. This includes a re-appraisal of the rationale in the **Corridor and Preliminary Routeing and Siting Study (CPRSS)** to confirm that the darkest shaded area of the graduated swathe remains the preferred location for the new Weston Marsh Substation A.

New Weston Marsh Substation B

Image 7.2 Proposed siting of the new Weston Marsh Substation B



7.2.13 The proposed new Weston Marsh Substation B is located approximately due west of Moulton Seas End and to the south east of Surfleet Seas End. It is situated to the immediate east of Marsh Road and the immediate north of Stone Gate, close to the junction of these two roads.

7.2.14 As indicated on Image 7.2 above, the proposed location of the new Weston Marsh Substation B sits the at edge of the shaded area of the graduated swathe presented at Stage 1 consultation.

7.2.15 Chapter 5 outlines the further work carried out by National Grid since Stage 1 consultation to define the design requirements in Section 5. The network analysis undertaken identified the need for at least 1 km clearance between the new Weston Marsh Substation A and the new Weston Marsh Substation B to manage system-wide resilience. Having defined the location for the new Weston Marsh Substation A based on the proximity to the Spalding tee-point, as outlined above, the location for

the new Weston Marsh Substation B has been developed to comply with the requirement for 1 km clearance, resulting in a distance of approximately 1.4 km between the substations at their closest points (Horlock Rule 6).

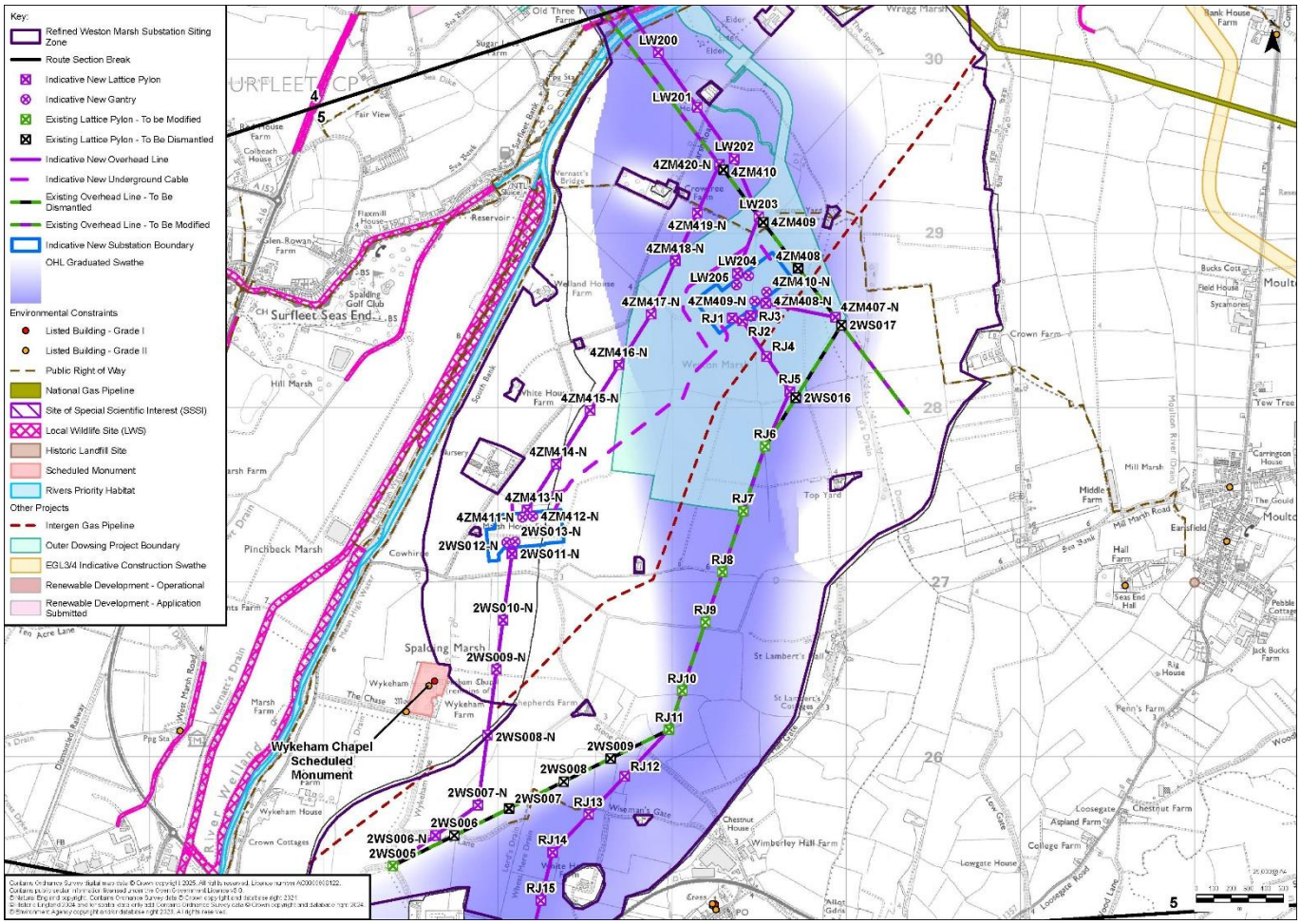
7.2.16 The proposed location for the new Weston Marsh Substation B is in a predominantly agricultural area, generally avoiding the substation being sited close to residential properties (Holford Supplementary Note 1). The substation has been located with consideration to minimising the number of affected land parcels, to reduce impact on landowners as far as practicable, and also with consideration of the length of new-build access road that would be required to reach the nearest existing highway, since a longer access road has the potential to cause greater land severance. The substation avoids any interaction with an Intergen gas pipeline that routes across the Refined Weston Marsh Substation Siting Zone from south west to north east to the east of the proposed substation (Horlock Rule 6).

7.2.17 In selecting the preferred location for the new Weston Marsh Substation B, consideration was also given to the design of other overhead lines proposed to connect into the substation. The substation has been positioned to support efficient connections for the 4ZM and 2WS routes and to allow efficient circuit entry from the likely approach directions of customers known to be connecting into Weston Marsh Substation B, to avoid the creation of narrow or overly constrained routeing corridors for these overhead lines (Horlock Rule 7; Horlock Rule 10). This included consideration of the proposed overhead line connection of the Weston Marsh to East Leicestershire (WMEL) project, which would approach the new Weston Marsh Substation B from the west, across the River Welland.

7.2.18 The bay positions within the substation have been designed, as far as practicable, to facilitate direct and efficient line entries without requiring lines to cross each other, which could result in excessive cabling, complex interactions of circuits or the need for additional cable sealing-end compounds (Horlock Rule 7).

7.2.19 Further details of the work National Grid has undertaken to establish the locations of the two substations within Section 5 are provided in the **Weston Marsh Siting Study Report**. This includes the identification of potential siting areas for the new Weston Marsh Substation B and the detailed options appraisal of these areas.

Image 7.3 Proposed overhead line and underground cable alignments in Section 5



Approach to Line Entry Design

7.2.20 The proposals in Section 5 require coordinated overhead line alignment designs for:

- the proposed new 400 kV overhead line continuing from Section 4 to the new Weston Marsh Substation A, known as the LW route;
- the proposed new 400 kV overhead line from the new Weston Marsh Substation A to continue southwards into Section 6, known as the RJ route;
- the modifications to the existing 400 kV overhead line between Bicker Fen and Walpole (known as the 4ZM route) to connect into the Weston Marsh substations; and
- the modifications to the existing 400 kV overhead line from Spalding North (known as the 2WS route) to connect into the Weston Marsh substations.

7.2.21 At Stage 2 consultation, the proposed new 400 kV overhead line in Section 6 of the Project was referred to as the SW route. The proposed RJ route in Section 5 connects to the proposed SW route described at Stage 2 consultation at the boundary between Section 5 and Section 6, to form a continuous overhead line route which, going forward, will be known as the RJ route over its entire length southwards to the proposed new Walpole B Substation. The previous pylon numbering on the SW route will be replaced by new, continuous pylon numbering following the RJ

route, with the pylon at the boundary between Sections 5 and 6 (previously known as SW1) becoming RJ16 and the numbering continuing into Section 6 from there.

7.2.22 In addition to the above overhead lines, an underground cable interconnector is also proposed between the two substations.

7.2.23 Image 7.4 and Image 7.5 below show the existing network arrangement in Section 5 with no modifications and the final network configuration in Section 5 including the new Weston Marsh Substations A and B and the overhead lines and underground cable outlined above. The diagrams are not drawn to scale and are indicative only, to aid understanding of the proposed modifications to the existing transmission network.

Image 7.4 Existing network configuration at Weston Marsh

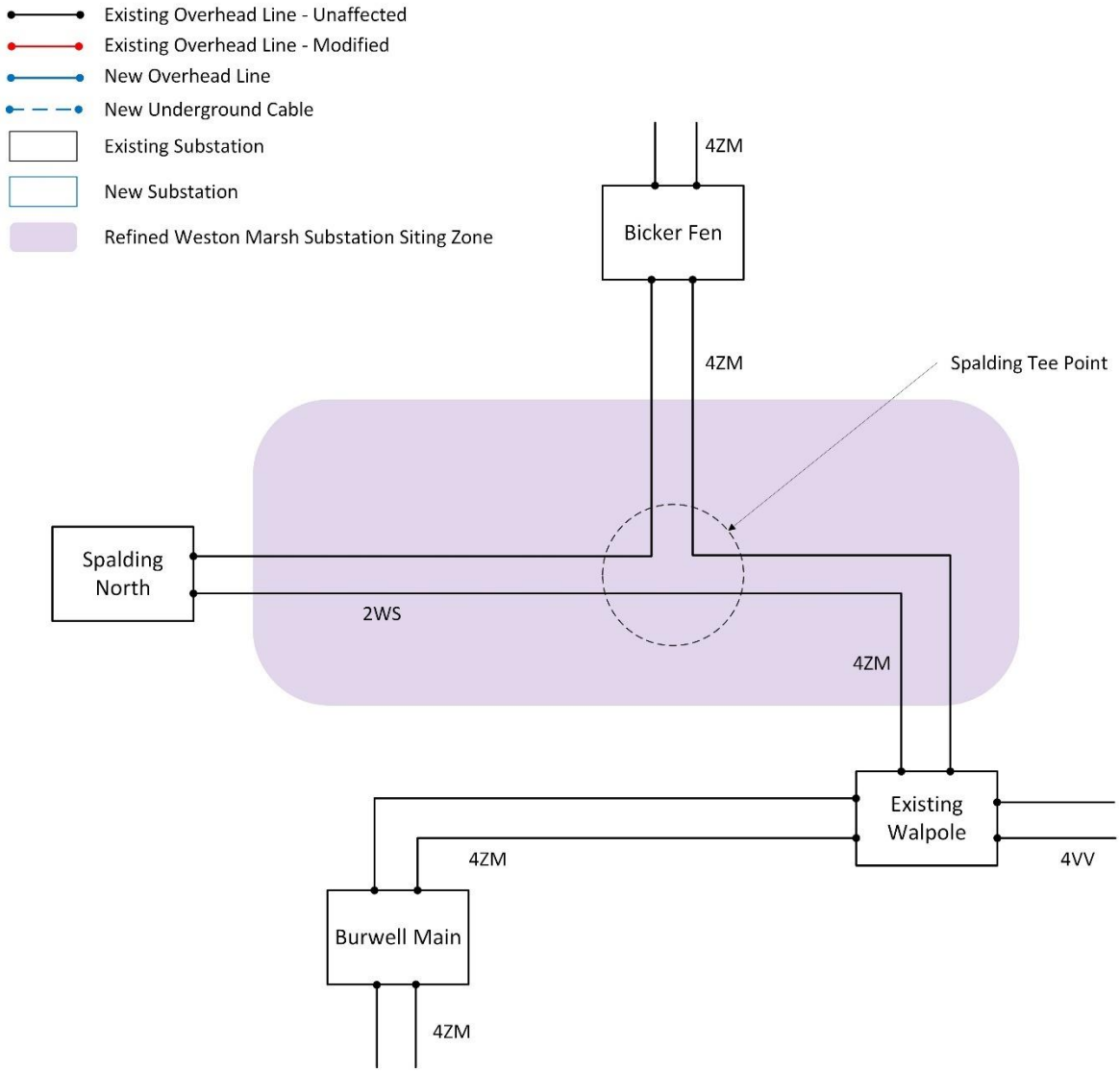
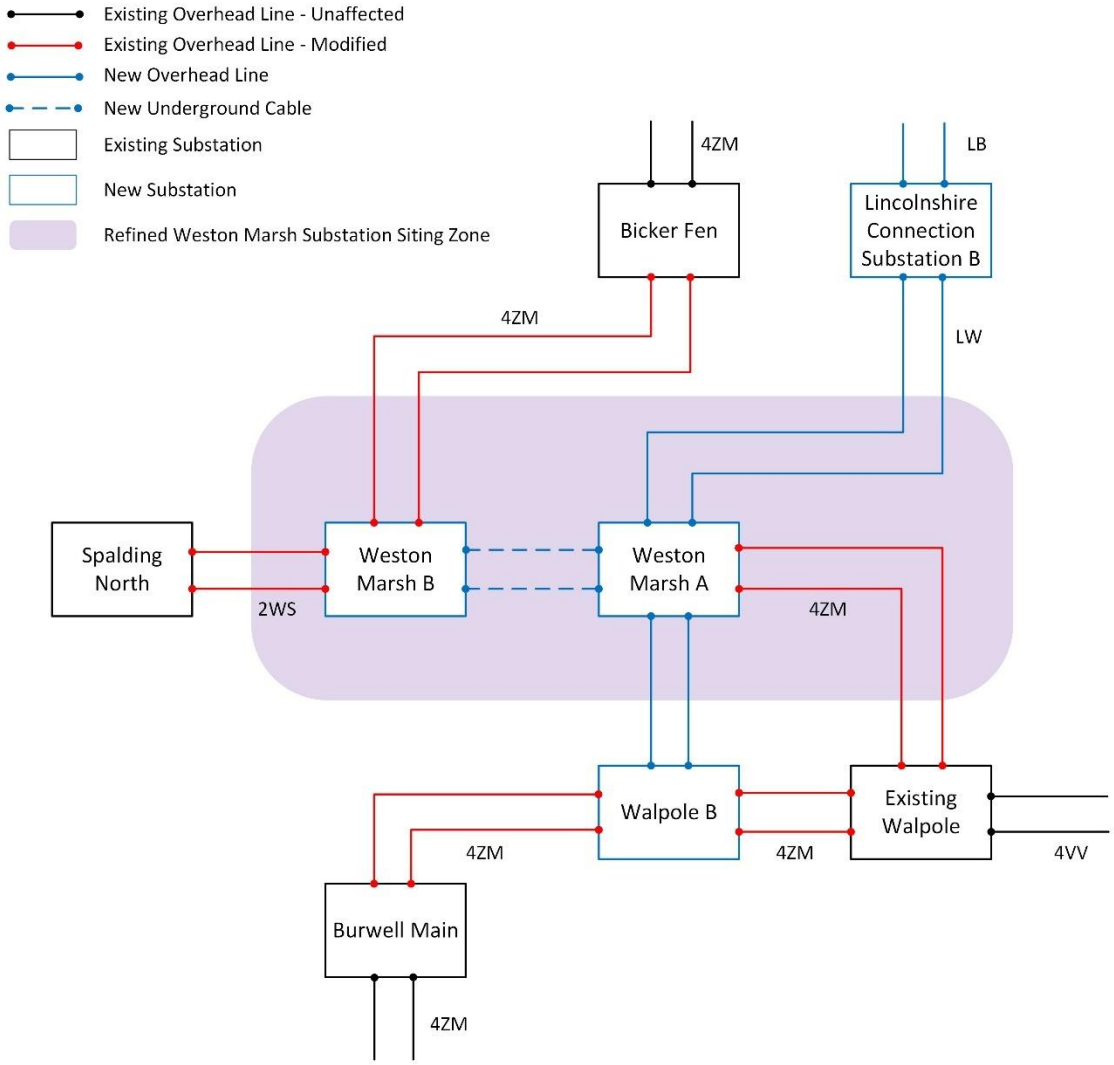


Image 7.5 Proposed final network configuration at Weston Marsh



7.2.24 The alignments within Section 5 have been developed to prioritise:

- direct and straight overhead line routes wherever feasible, to result in the shortest practicable alignments (Holford Rule 3);
- avoiding the creation of wirescapes in the area, by limiting the convergence of lines as far as possible unless there are formal parallel routeing arrangements for two overhead lines (Holford Rule 6; Horlock Rule 10);
- maintaining appropriate stand-off distances from sensitive features and properties (Horlock Rule 6);
- re-using existing pylons that would otherwise be made redundant by the proposals wherever practical to do so, to minimise the footprint of new infrastructure (Horlock Rule 6); and
- avoiding overly constrained alignments, to maintain flexibility for the proposed routeing to accommodate future customer infrastructure and connections (Horlock Rule 7).

7.2.25 Two particular constraints which have been considered in the alignment development in Section 5 are:

- an Intergen gas pipeline, which routes across Section 5 from south west to north east, for which a minimum separation of 50 m between pipeline centreline and the centreline of cables or overhead line pylons has been maintained in all cases (Horlock Rule 6); and
- Lord's Drain, a non-navigable watercourse, for which appropriate stand-off distances have been maintained in all cases (Horlock Rule 6).

4ZM Route

7.2.26 Further design and analysis undertaken for the two substations in Section 5, and design development of the bay positions within the substations, has resulted in a requirement for the 4ZM route from Bicker Fen to be diverted to connect into the northern side of the new Weston Marsh Substation B and the 4ZM route from Walpole to be diverted to connect into the southern side of the Weston Marsh Substation A.

7.2.27 Since the new Weston Marsh Substation A is located adjacent to the existing 4ZM route, the diversion of the 4ZM route from Walpole into the southern side of the substation is only approximately 500 m in length, and has been designed to minimise the number of new-build pylons required. The diversion will use a new pylon (4ZM407-N) constructed adjacent to the existing tee-point pylon (2WS017) and the overhead line will follow the shortest and straightest possible route as an overhead line connection into the relevant bay of the substation (Holford Rule 3). The new overhead line will cross the Intergen gas pipeline between 4ZM407-N and the substation and Lord's Drain between 4ZM406 and 4ZM407-N (Horlock Rule 6).

7.2.28 To facilitate the permanent diversion of the 4ZM route into the new Weston Marsh Substation A, a temporary diversion of the 4ZM route will be required between 4ZM406 and 4ZM408, requiring one temporary pylon or mast[4] approximately 60 m to the east of the existing 4ZM route near 2WS017, and reconductoring of the 4ZM route will be required between 4ZM405 and the new-build section of overhead line.

7.2.29 The diversion of the 4ZM route from Bicker Fen into the northern side of the new Weston Marsh Substation B routes generally from north east to south west and is approximately 2.3 km in length. The proposed alignment for this diversion has been developed to route to the north of the proposed Weston Marsh Substation A and the underground cable interconnector between the two substations (described below), and to the south of Marsh Road, running approximately parallel to the road and maintaining as straight an alignment as practicable, with one angle required to ensure the overhead line does not route too close to Marsh Road (Holford Rule 3; Holford Rule 6; Horlock Rule 6). The diversion will route via a new pylon (4ZM420-N) constructed adjacent to the existing 4ZM410.

7.2.30 To facilitate the permanent diversion of the 4ZM route into the new Weston Marsh Substation B, a temporary diversion of the 4ZM route will be required between 4ZM409 and 4ZM411, requiring one temporary pylon or mast approximately 60m to the east of the existing 4ZM route near 4ZM410, and reconductoring of the 4ZM route will be required between the new-build section of overhead line and 4ZM414, north of

[4] A temporary mast has minimal foundation requirements compared with a temporary pylon, and is therefore quicker to erect and dismantle, less intrusive and has lower embodied carbon, however it needs to be supported by back-stays which can result in a greater land-take being required for the duration that the temporary mast is in place. Temporary masts are typically only designed for use over short durations of up to six months.

the River Welland and located within Section 4 of the route, approximately 260 m north west of the boundary between Sections 4 and 5.

7.2.31 The diversion of the 4ZM route into the two new substations will result in the existing overhead line between 2WS017 and 4ZM410 being dismantled and removed, requiring the removal of three pylons on the 4ZM plus 2WS017 at the tee-point. The removal of 4ZM409 and the existing overhead line span between 4ZM409 and 4ZM410 facilities the proposed alignment for the LW route described below.

2WS Route

7.2.32 Further design and analysis undertaken for the two substations in Section 5, and design development of the bay positions within the substations, has resulted in a requirement for the 2WS route from Spalding North to be diverted to connect into the southern side of the new Weston Marsh Substation B.

7.2.33 The diversion of the 2WS route into the new Weston Marsh Substation B has been developed to utilise the existing angle pylon on the 2WS route, at 2WS005, to introduce a deviation in the alignment of the 2WS route further towards the north east than its existing alignment. By utilising the existing angle pylon in this way, the requirement to build a new pylon immediately adjacent to the 2WS route is avoided and the extent of temporary diversion and outage requirements is reduced (Holford Rule 3; Horlock Rule 6).

7.2.34 The proposed 2WS alignment does not route directly in a straight line from 2WS005 to the new Weston Marsh Substation B since this would introduce too great a change in angle at 2WS005, and also route the overhead line too close to Wykeham Lane and to the scheduled monument and Grade II listed buildings at Wykeham Chapel, as well as requiring the removal of a belt of trees to the immediate south east of Wykeham Chapel. The proposed 2WS alignment therefore routes north east over two spans, as far as 2WS007-N, diverging slightly from its existing alignment, before turning northwards towards the new Weston Marsh Substation B to pass approximately 270 m from the scheduled monument. This results in an overall length of approximately 2.0 km for the 2WS diversion (Holford Rule 6; Horlock Rule 6; Horlock Rule 7).

7.2.35 During design development, consideration was given to alignment options which routed the 2WS further to the east to increase the distance from the scheduled monument, but the two alternative alignments put forward for the 2WS were not preferred to the alignment described above, as any reduction in impact on the scheduled monument was considered to be outweighed by an increased risk of greater ecological, water environment, landscape and visual and socio-economic impacts (Holford Rule 3; Holford Rule 6; Horlock Rule 6; Horlock Rule 7).

7.2.36 The first alignment considered increased the distance from the scheduled monument to approximately 460 m by connecting to the existing 2WS route at a new pylon near 2WS008. While this alignment would increase the distance between the 2WS overhead line alignment and Wykeham Chapel, it would not offer any material reduction in the potential significant effect on the scheduled monument, and instead would result in an increased risk of impacts on other environmental receptors, including:

- greater potential for impacts upon the water environment (such as deterioration of water quality or impacts on hydromorphology), due to an increase in the number of overhead line crossings of the Lord's Drain, a high priority Internal Drainage

Board (IDB) watercourse, to three, compared with only one crossing for the preferred alignment;

- greater potential for socio-economic impacts (on users of public rights of way (PRoWs)), due to an increase in the number of intersections of PRoW WSTN/3/1 to two, compared with one intersection for the preferred alignment;
- greater potential for visual impacts to a residential property at Shepherds Farm, due to the overhead line being routed in closer proximity; and
- greater potential for landscape impacts due to an extra pylon being required in the final configuration of overhead lines compared with the preferred alignment.

7.2.37 The second alignment considered increased the distance from the scheduled monument to approximately 710 m by routeing the 2WS towards the south east from the new Weston Marsh Substation B to connect to the existing alignment of the 2WS near 2WS011. While this alignment would further increase the distance between the 2WS alignment and Wykeham Chapel, it would increase the number of new build pylons required, increasing technical complexity, and would result in an increased risk of impacts on other environmental receptors, including:

- greater potential for ecological impacts (such as potential for habitat loss and disturbance of protected species), due to a greater number of water vole ditches being crossed by the overhead line in this option compared with the other two options, as well as being in closer proximity to identified badger setts and otter holts;
- greater potential for impacts upon the water environment (such as deterioration of water quality or impacts on hydromorphology), due to an increase in the number of overhead line crossings of the Lord's Drain, a high priority IDB watercourse, to three, compared with only one crossing for the preferred alignment;
- greater potential for socio-economic impacts (on users of PRoWs), due to an increase in the number of intersections of PRoW WSTN/3/1 to two, compared with one intersection for the preferred alignment;
- greater potential for visual impacts to the residential property at Shepherds Farm, with the overhead line routeing in close proximity to the property to its north, east and south, and to Bass Cottages to the north due to the 2WS being routed closer to these properties; and
- greater potential for landscape impacts due to four additional pylons being required in the final configuration of overhead lines compared with the preferred alignment.

7.2.38 Although the preferred alignment is in the closest proximity to the Wykeham Chapel receptor group, this was chosen:

- to avoid receptors identified in the proximity of the alternative alignments, including water vole ditches, badger setts and otter holts, as well as multiple drainage ditches including the Lord's Drain (high priority IDB watercourse) and public rights of way; and
- because it has comparatively less landscape and visual impact, by being further from Shepherd's Farm and requiring fewer pylons.

7.2.39 The consideration of options for the diversion of the 2WS with respect to the scheduled monument and Grade II listed buildings at Wykeham Chapel is also

presented in the **Supplementary PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**.

7.2.40 The new 2WS overhead line will cross the Intergen gas pipeline between 2WS008-N and 2WS009-N (Horlock Rule 6).

7.2.41 To facilitate the permanent diversion of the 2WS route into the new Weston Marsh Substation B, modification works are proposed to existing angle pylon 2WS005 to realign the existing alignment on to a permanent new-build alignment. Required modifications will be confirmed through further detailed design and at this stage temporary diversions are not considered necessary. Restringing and conductor removal will be required in the section of 2WS005 to 2WS010 and earthing works will be required back to tower 2WS004. Installation of new conductor will take place between 2WS005 and the proposed Weston Marsh Substation B.

7.2.42 The diversion of the 2WS route into the new Weston Marsh Substation B will result in the existing overhead line conductor between 2WS005 and 2WS017 being removed. This will require the removal of five pylons on the 2WS (2WS006 to 2WS009 and 2WS016), in addition to 2WS017 (at the tee-point) which can be removed following the 4ZM and 2WS works. The removal of pylons 2WS010 to 2WS015 is not proposed as these pylons can be utilised for the RJ route (described below).

LW Route

7.2.43 Further design and analysis undertaken for the two substations in Section 5, and design development of the bay positions within the substations, has resulted in a requirement for the LW route from Section 4, from the proposed new Lincolnshire Connection Substation B, to connect into the northern side of the new Weston Marsh Substation A.

7.2.44 As described in the **June 2025 Design Development Report**, routeing at the southern end of Section 4 has been developed to place the proposed alignment in close parallel with the 4ZM route at the southern end of Section 4, from LW193 southwards to LW199 at the boundary between Sections 4 and 5. This alignment was adopted to avoid creating a wirescape in the area (in accordance with Holford Rule 6) and to provide the most direct route towards the Refined Weston Marsh Substation Siting Zone that minimises angle pylons (in accordance with Holford Rule 3), and to avoid any interaction with the proposed substation and high voltage alternating current (HVAC) underground cable route proposed as part of the onshore elements of the Outer Dowsing Offshore Wind Farm.

7.2.45 In Section 5, the proposed alignment continues to close parallel the 4ZM route over the River Welland and south east towards the Weston Marsh Substation A, as far as LW202. LW202 is located near to the existing 4ZM410, which is to be replaced by 4ZM420-N (new), from which the 4ZM route diverges from the LW route towards the new Weston Marsh Substation B to the south west.

7.2.46 From LW202, the LW route continues towards the new Weston Marsh Substation A via LW203, a new pylon constructed adjacent to the existing 4ZM409 (which is to be removed following the diversion of the 4ZM route), and then into the relevant bay of the substation as an overhead line connection. The overall length of the LW route from LW199 to the substation is approximately 1.9 km.

7.2.47 To facilitate the construction of the new pylon at LW203, a temporary diversion of the 4ZM route will be required between 4ZM408 and 4ZM410, requiring one temporary pylon or mast approximately 60 m to the east of the existing 4ZM route near 4ZM409.

RJ Route

7.2.48 Further design and analysis undertaken for the two substations in Section 5, and design development of the bay positions within the substations, has resulted in a requirement for the RJ route from Section 6, from the proposed new Walpole B Substation, to connect into the southern side of the new Weston Marsh Substation A.

7.2.49 As described in the **June 2025 Design Development Report**, routeing at the northern end of Section 6 placed the northernmost pylon of Section 6, SW1, to the north of the A151 Weston Bypass and the east of Cross Gate.

7.2.50 The **June 2025 Design Development Report** describes the proposed alignment in Section 6 as the SW route, but, as described previously, going forward the SW route will be incorporated into the RJ route, with continuous RJ numbering across the boundary between Sections 5 and 6 (with SW1 becoming RJ16 and so on). From RJ16 southwards, the RJ route is identical to the SW route presented at Stage 2 consultation, but with the pylons renumbered.

7.2.51 Between RJ16 (SW1) and the proposed new Weston Marsh Substation A, the overhead line is required to route in a generally south west to north east direction. This presents an opportunity for the RJ route to re-use existing pylons from the current 2WS route, which is to be diverted towards the new Weston Marsh Substation B as described above. A total of six pylons from the 2WS route (2WS010 to 2WS015) are proposed to be re-used for the RJ route (as RJ11 to RJ6), rationalising infrastructure and minimising the extent of new build (Horlock Rule 10). Within this section of overhead line, the proposed alignment will cross the Lord's Drain, on the existing 2WS alignment, between RJ10 and RJ9 (the existing 2WS011 and 2WS012).

7.2.52 South of RJ11, the proposed alignment of the RJ route has been designed to route approximately equidistant between residential properties on Cross Gate and Wiseman's Gate (Holford Rule Supplementary Note 1).

7.2.53 North of RJ6, it is necessary for the proposed alignment to deviate from the current alignment of the 2WS route and for a new pylon to be constructed at RJ5, adjacent to 2WS016, since the existing pylon at 2WS016 is not an angle pylon and therefore cannot support the change in direction required for the proposed alignment to route towards the new Weston Marsh Substation A. From RJ5 the proposed alignment routes north west into the substation and will cross the Intergen gas pipeline between RJ4 and RJ3. The overall length of the RJ route from RJ16 to the substation is approximately 4.2 km, comprising a combination of 2.5 km of new-build overhead line and 1.7 km of reconductoring of the existing 2WS route (Holford Rule 3).

7.2.54 Due to the substation bay layout, the RJ route only supports one overhead line circuit connection. The second circuit is required to cross the diverted 4ZM connection into the substation, between 4ZM407-N and 4ZM408-N. To facilitate this, one circuit of the RJ route will connect to a cable sealing-end compound adjacent to Weston Marsh Substation A. This compound allows for the high voltage overhead lines to transition to cable in a secure fenced off area with necessary insulation, which facilitates the RJ circuit crossing beneath the 4ZM overhead line via a short underground cable, approximately 0.3 km in length.

Substation Interconnector (Underground Cable)

7.2.55 Chapter 5 outlines the further work carried out by National Grid since Stage 1 consultation to define the design requirements in Section 5. The network analysis undertaken identified a requirement for the connection between the two substations to be via underground cable to provide additional mitigation for residual system-wide resilience (Horlock Rule 1).

7.2.56 The underground cable substation interconnector has been routed as directly as possible from north east to south west between the new Weston Marsh Substation A and the new Weston Marsh Substation B, with some minor deviation from a straight line at watercourse crossings so that these remain close to perpendicular (Holford Rule 3).

7.2.57 Due to the substation bay layout, at each substation the two circuits of the substation interconnector split to route to opposite ends of the substations. This results in one circuit of the substation interconnector routeing around the west and north sides of the new Weston Marsh Substation A and one circuit of the substation interconnector routeing along the north side of the new Weston Marsh Substation B. This gives a total length of new cable corridor construction of approximately 3.0 km.

7.2.58 The substation interconnector includes a total of four watercourse crossings, which are expected to be constructed via horizontal directional drilling.

Pylon Choice

7.2.59 This section is approximately 6 km in length and is predominantly rural in character, encompassing large, low-lying, flat landscapes with many drainage ditches, dykes and rivers that slowly drain towards the Wash. The main residential areas are Spalding, Surfleet and Weston. Within the wider rural area there are a number of other villages including Moulton Seas End and Loosegate (Holford Rule 6).

7.2.60 The landscape contains a number of other existing overhead lines including the 4ZM which broadly runs north to south and the 2WS which connects Spalding Substation to the west. These comprise standard full height pylons on both 400 kV and 132 kV overhead lines (Holford Rule 6).

7.2.61 Due to the presence of the existing overhead lines which use standard height lattice pylons in this section, and consideration of notes on Holford Rule 6 to minimise confusing appearance, T-pylons in this area would be inconsistent with existing infrastructure, and are not preferred from a landscape and visual perspective on this basis (Holford Rule Supplementary Note 3).

7.2.62 The proposed overhead line route in Section 5 also includes several locations where the route of the overhead line changes direction by more than 30 degrees. T-pylons are designed for a maximum angle deviation of 30 degrees, so a change to T-pylons for these parts of the alignment would result either in multiple consecutive angle pylons at closer proximity to receptors, or a short section of lattice towers to enable the angle deviation of greater than 30 degrees at one lattice tension pylon. Both of these options would potentially increase the visual impact on nearby receptors (Holford Rule 3).

7.2.63 In combination with the general technical disadvantages of the T-pylon design outlined in Chapter 6, there was not considered to be a justification for T-pylons to be used in Section 5 (Horlock Rule 7).

7.2.64 The use of low height pylons was also considered. However, as the landscape includes other existing full height overhead lines, the use of low height was considered inappropriate and would be visually inconsistent with the existing lines. The Project would parallel parts of the 4ZM between LW200 and LW203 before connecting into the new Weston Marsh Substation A and looks to synchronise pylon type and location to create a coherent appearance. South of the new Weston Marsh Substation A, the Project reuses the alignment of the 2WS between RJ4 and RJ10 so the use of full height would maintain the baseline. Furthermore, no environmental disciplines or aviation constraints identified a need to consider low height in Section 5 (Holford Rule Supplementary Note 3).

Summary

7.2.65 In summary it is considered that the use of an alternative pylon design to standard lattice pylons in Section 5 is not justified.

Alternative Consenting Regimes

7.2.66 Under Section 9(2) of the Electricity Act 1989, National Grid has a statutory obligation to develop and maintain an efficient, co-ordinated and economical system of electricity transmission. This obligation entails consideration of the best mechanism for delivery of improvements or additions to the transmission system. In practice this can entail review of different statutory processes, where these can result in the acceleration of delivery of projects.

7.2.67 One of the energy generation projects proposed to connect at the new Weston Marsh Substation A is the Outer Dowsing Offshore Wind Farm. As part of the connection agreement between the National Energy System Operator (NESO) and Outer Dowsing Offshore Wind (and therefore as part of the reciprocal contractual agreement between NESO and National Grid), a connection point onto the transmission system must be made available by 2030. Therefore, to accommodate this, an element of the Weston Marsh Substation A will need to be operational ahead of the Project's programmed completion date of 2033.

7.2.68 To expedite delivery of a connection substation for Outer Dowsing Offshore Wind Farm ahead of the Project's programmed completion date of 2033, consent is being sought in advance to construct and operate the elements of the Weston Marsh Substation A required to be operational to provide a connection point onto the transmission system. The means by which this could be achieved include:

- relying upon the proposed development consent order (DCO) application for the Project, although this has the potential to delay the delivery of the Outer Dowsing Offshore Wind Farm;
- relying upon the promoters of the Outer Dowsing Offshore Wind Farm to deliver enhancements to the transmission system under their DCO application, though this is problematic given the need for National Grid to manage its transmission system and works to it; and
- as noted, promoting separate applications to deliver Weston Marsh Substation A in advance of the DCO for the Project. This approach enables National Grid to accelerate key elements to serve the Outer Dowsing Offshore Wind Farm and to manage its transmission system.

7.2.69 Therefore, in addition to the Project's development consent order (DCO):

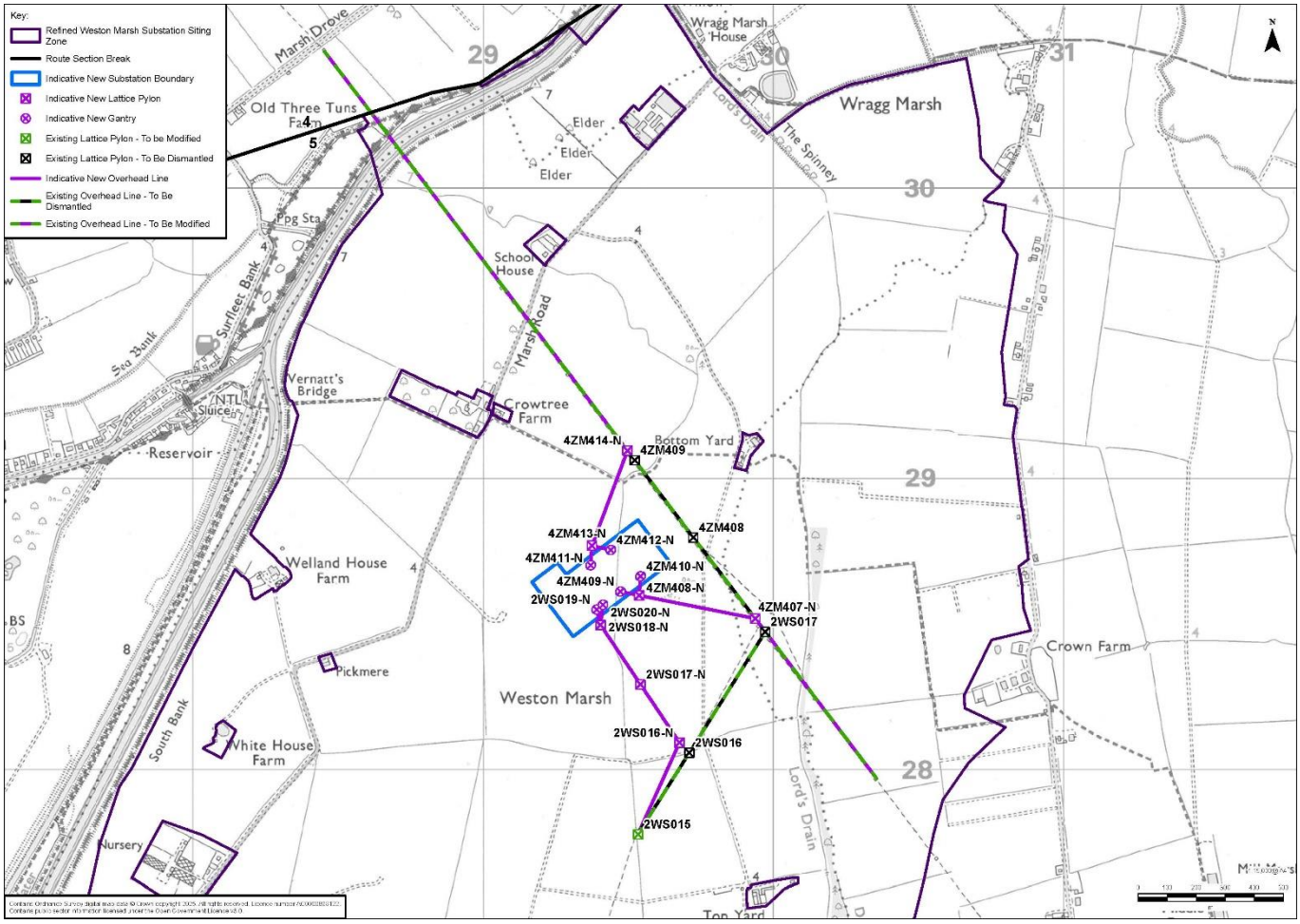
- planning permission for Weston Marsh Substation A is being sought under the Town and Country Planning Act 1990 (TCPA) for the substation; and
- an application for consent is being made under Section 37 of the Electricity Act 1989 for necessary parts of the overhead line, as well as an application for deemed planning permission.

7.2.70 The design of the works described previously within this chapter represents the complete design for Section 5 of the Project that is to be consented under the DCO.

7.2.71 Under the TCPA and Section 37 applications, National Grid is seeking consent for the elements of the Section 5 design shown in Image 7.6 below. The TCPA and Section 37 design comprises the following:

- a partial build of the new Weston Marsh Substation A, including only the substation infrastructure necessary to connect the existing 4ZM route, the existing 2WS route and the Outer Dowsing Offshore Wind Farm;
- diversions of the 4ZM route to connect the existing overhead line from Bicker Fen to the north side of the new substation and the existing overhead line from Walpole to the south side of the substation, plus associated temporary diversions required to facilitate the construction of the modified 4ZM route; and
- a diversion of the 2WS route to connect the existing overhead line to the south side of the substation, plus associated temporary diversions required to facilitate the construction of the modified 2WS route.

Image 7.6 Elements to be consented via Town and Country Planning Act 1990 and Section 37 of the Electricity Act 1989



7.2.72 The modifications to connect the diversion of the 4ZM route from Walpole into the southern side of the substation under the TCPA and Section 37 applications are identical to the modifications described previously in this chapter for the DCO design.

7.2.73 The interim modifications to the transmission system that connect the diversion of the 4ZM route from Bicker Fen into the northern side of the substation under the TCPA and Section 37 applications differ from the DCO design described previously in this chapter, since the 4ZM route from Bicker Fen is ultimately proposed to connect into the new Weston Marsh Substation B under the final DCO arrangement. Under the TCPA and Section 37 applications, a new pylon (4ZM414-N) will be constructed adjacent to the existing 4ZM409 to facilitate the 4ZM route being diverted towards the new Weston Marsh Substation A. This pylon would be placed at the same location as LW203 in the DCO design, and the bay position allocated to the 4ZM route from Bicker Fen in the TCPA and Section 37 designs is the same bay as the bay allocated to the LW route in the DCO design. This means that the new-build pylons constructed for the 4ZM route for the interim network configuration that would be provided under the TCPA and Section 37 consent can be re-used as part of the LW route in the final configuration.

7.2.74 The interim modifications to connect the diversion of the 2WS route from Spalding North into the south side of the substation under the TCPA and Section 37 applications differ from the DCO design described previously in this chapter, since the 2WS route is ultimately proposed to connect into the new Weston Marsh Substation B under the final DCO arrangement. Under the TCPA and Section 37

applications, the interim network configuration would result in a new pylon (2WS016-N) constructed adjacent to the existing 2WS016 to facilitate the 2WS route being diverted towards the new Weston Marsh Substation A. This pylon has been placed at the same location as RJ5 in the DCO design. Similarly, the pylons 2WS017-N and 2WS018-N, taking the diverted 2WS route towards the substation under the TCPA and Section 37 applications, have been placed at the same locations as RJ4 and RJ2 in the DCO design. This means that the new-build pylons constructed for the 2WS route under the TCPA and Section 37 consent can be re-used as part of the RJ route in the final configuration of the Project.

7.2.75 Provided that the TCPA and Section 37 applications are successful, the elements of the Section 5 design shown in Image 7.6 and described above will be constructed and made operational ahead of the rest of the Project as a standalone interim development.

7.2.76 Once the DCO is obtained for the Project as a whole, the remaining elements of the Section 5 infrastructure would then be constructed, comprising:

- the remaining bays of the new Weston Marsh Substation A;
- the new Weston Marsh Substation B;
- the underground cable interconnector between the two substations;
- the diversion of the 4ZM route from Bicker Fen, from connecting to the northern side of the new Weston Marsh Substation A to connecting to the northern side of the new Weston Marsh Substation B, and the modification of the previous 4ZM line entry into the new Weston Marsh Substation A to form part of the LW route into the substation;
- the diversion of the 2WS route, from connecting to the southern side of the new Weston Marsh Substation A to connecting to the southern side of the new Weston Marsh Substation B, and the modification of the previous 2WS line entry into the new Weston Marsh Substation A to form part of the RJ route into the substation; and
- the construction of the remainder of the LW and RJ routes northwards and southwards towards Sections 4 and 6 respectively.

7.2.77 Should the TCPA and Section 37 applications be unsuccessful, it is proposed that construction would still be sequenced based on the staged approach described above. The elements of the Section 5 design shown in Image 7.6 would be constructed and made operational ahead of the rest of the Project to accommodate the Outer Dowsing Offshore Wind Farm connection to the transmission system.

8. Draft Order Limits Development

nationalgrid

8. Draft Order Limits Development

8.1 Overview

8.1.1 This chapter describes the further considerations made by National Grid in developing the Draft Order Limits associated with the proposed alignments and substation sitings presented in Chapter 7. Much of the text is replicated from the **June 2025 Design Development Report** as it relates to general transport and construction strategies for the full Project that are equally applicable to Section 5. Updates to the text have been made to remove reference to specific elements of the Project not within Section 5 and to include further detail where this is available for Section 5 following the development of the substation locations and overhead line alignment.

8.1.2 This chapter discusses the temporary works proposals, including the overall transport strategy, access strategies for construction, temporary compounds and other temporary works requirements.

8.1.3 It also describes the approach to works by third parties, which may include existing overhead and underground third-party services that would need to be diverted, removed, undergrounded, or protected in order to mitigate impacts of the Project; access strategies for maintenance; and the development of environmental mitigation areas.

8.1.4 Finally, it will summarise how the design evolution presented in Chapter 5 and Chapter 7 and the other works and land required for the Project described in this chapter (8) inform the scale and location of the outermost boundary for the Project, known as the draft Order Limits. Eventually, the final DCO Order Limits will define all the land required to construct, operate and maintain the Project.

8.1.5 The Draft Order Limits and the temporary works elements described in this chapter can be viewed on the **Weston Marsh Targeted Consultation Plans**.

8.2 Overall Transport Strategy

8.2.1 The Transport Strategy for the Project is informed by the requirement for the movement of materials (such as stone, concrete, steelwork, conductors and cables), equipment and construction personnel. It is also influenced by the nature and location of existing transport infrastructure, including roads suitable for two-way Heavy Goods Vehicle (HGV) movements and/or Abnormal Indivisible Loads (AIL), ports with appropriate water depth and offloading facilities, and available rail paths and offloading facilities. Construction programmes may cause these requirements to change if plant and material can be re-used between Project route sections.

8.2.2 Locally, the deliveries and movement to the overhead line locations and substations would be by HGVs, light goods vehicles (LGVs) and private vehicles for site personnel. AILs would only be used for the transport of the super grid transformers to the two new substation locations at either end of the Project, the new Grimsby West Substation and the new Walpole B Substation.

8.2.3 Local deliveries and movements, between the ports, rail and/or strategic road network (SRN) to the site access points, are the focus of the Project design and assessment, with the movement requirements and nature of the road network informing the strategy set out in the next section.

8.2.4 The specific siting of different elements facilitating local access has been informed by highway safety and environmental and socio-economic considerations. The avoidance of adverse transport effects forms an inherent part of the Project's design development approach.

8.2.5 Multi-modal considerations are relevant to the long-distance movement of material from source to the SRN and are also influenced by commercial considerations in the context of a potentially global supply chain, and to some extent by contractor preference. National Grid are investigating the potential use of material and plant import facilities at ports within the region, which will support the Project. Details will be presented within the Development Consent Order (DCO) application.

8.3 Access Strategies for Construction

Construction Haul Road

8.3.1 The linear nature of the Project and characteristics of the road network within which it is routed present constraints to the construction of the Project. The Project is crossed by a number of roads suitable for HGV traffic but also by many that are not appropriate for potentially two-way HGV movements, for example due to narrow carriageway widths. Additional constraints such as field drains, existing street furniture and weak bridges need to be considered. There are also locations where the local road is not suitable for HGV traffic due to substandard pavement construction and/or strength.

8.3.2 This has led to the conclusion that the most appropriate transport solution is to identify a series of primary access routes (PAR) to the SRN, connected along the Project corridor by new site access points (bellmouths) leading to off-highway haul roads. Primary Access Routes are formed of one or more roads within the road network between the SRN/classified road network and the site access bellmouths. The PARs are made up of core routes, which are the main A roads providing connections across the roads providing local access to the individual bellmouth accesses.

8.3.3 Where road closures are required, the period of the closure would be kept to a minimum and diversions would be via the most appropriate alternative route. Access to properties would be maintained at all times. Any route diversions or closures will be discussed with the Local Highway Authority.

8.3.4 Haul road routes aim to reduce the volume of construction traffic required to use the existing local road network. HGVs would cross unsuitable parts of the highway network at crossover points (using suitable bellmouths with restricted left and right turns) to and from the haul road. LGVs and private vehicles for site personnel would use these haul road routes but would also be expected to use the wider road network where use of the haul road would not be practicable or appropriate.

8.3.5 Where there is a requirement to use the local road network, a review has been conducted to ensure roads are wide enough to cater for large construction vehicles, identifying indicative locations for temporary highway improvements (for example

passing places or road widening) on roads only suitable for single lane running (see Paragraphs 8.3.15 to 8.3.16). At pinch point locations such as sharp bends with street furniture or drainage ditches, these have been avoided. Where they are unavoidable, proposals would be put in place to either temporarily remove such features, protect or bridge them, to allow construction vehicles to pass. Settlements and sensitive locations such as schools or hospitals have been avoided where possible to reduce potential effects on receptors.

8.3.6 Existing bridges need to be assessed for weight, width and height restrictions to establish if there is a need to avoid, widen or strengthen, before they are used by HGVs and AILs.

8.3.7 Environmental and socio-economic considerations have influenced the proposed alignment of the haul road connecting between the bellmouths. It is preferred for haul roads to predominantly be parallel to the proposed overhead line alignment, which has inherently sought to avoid areas of environmental sensitivity, and to seek to minimise adverse effects. Their alignment also considers the length of the haul roads, to achieve the shortest length where practicable. Consideration of appropriate siting of bellmouths on existing roads has also influenced the alignment of the haul road (see Paragraph 8.3.13). Shorter available routes between the SRN and classified road network and access points have been selected where possible, balancing distance and the suitability of links to accommodate construction traffic.

8.3.8 Where practicable, the haul roads terminate at navigable watercourses and drainage ditches, to avoid crossing these features. Where crossing such features cannot be avoided, structures would be placed perpendicular to the water flow wherever possible. Some environmentally sensitive locations are avoided by longer diversions of the haul road, for instance avoiding bridging the River Welland and South Forty Foot Drain.

Bellmouths and Visibility Splays

8.3.9 The proposed new access points for the haul roads and substations require bellmouth junctions to be installed.

8.3.10 The Project has sought to locate bellmouths as close to the proposed works as possible to reduce the overall requirement for construction traffic movements on site. They will also be sited on the Primary Access Routes along the local road network. Siting has also been informed by highway safety considerations, including distance from bends and junctions, and visibility splay requirements, and environmental and socio-economic considerations. Where possible, proposed bellmouths use or widen existing gates or are positioned at gaps in boundary vegetation and seek to minimise effects on other existing or proposed land-use activities.

8.3.11 Within the visibility splays at bellmouths, vegetation may need to be cut to a specified height and obstacles removed, depending on local conditions, the speed limit of the road and whether traffic management would be in place. The design and location of bellmouths may also require the removal and relocation of street furniture.

8.3.12 Where the local highway network is not appropriate for the use of HGVs, crossover points (with associated bellmouths) will be developed to allow construction vehicles to access or exit the haul roads.

8.3.13 A number of considerations have influenced the siting of bellmouths, including but not limited to:

- use of existing field boundary entrances;
- use of existing watercourse crossing points;
- topographical constraints;
- the existing geometry of the local highway network and visibility considerations;
- limiting sharp bends in the haul road route; and
- limiting multi-crossing of the overhead lines.

Through these considerations, the siting of bellmouths has influenced the development of the overall alignment of the haul road.

8.3.14 The Project's proposed bellmouths may require a realignment, protection and/or diversion of existing underground services.

Works to Existing Public Highways

8.3.15 To facilitate HGV access for the construction of the Project, temporary highway improvement works are required at some locations where existing carriageway widths are narrow.

8.3.16 The Project has adopted a generic worst-case approach to the identification of these possible works by identifying areas where a carriageway may be used to access the Project and is less than 6 m in width. For such routes, sections have been identified along the highway which could be widened to create an HGV passing place. These are placed at regular intervals along the narrower carriageways. Consideration will be given to the volume of construction traffic using these narrow routes, which may necessitate more extensive road widening. However, this work is currently ongoing, and further details will be discussed with the relevant Local Highway Authority and landowners so that a final design layout can be agreed. The Project will not require the full extents of the indicative areas identified for highway improvements and these will be further refined within the draft Order Limits.

Temporary Public Right of Way Management

8.3.17 Public Rights of Way (PRoWs) affected by the works will be assessed to identify whether it is preferable to divert away from the affected area or have control measures put in place, such as manned gates, to segregate PRoW users from the construction works. The safest option for both PRoW users and construction workers would be considered at each location.

8.3.18 Any potential temporary closures or diversions will be detailed in the DCO application. Any required temporary diversions would be clearly marked at both ends with signage explaining the diversion and the duration of the diversion.

Substation Access

New Weston Marsh Substation A

8.3.19 The most appropriate route to access the new Weston Marsh Substation A is via the A16 and along the A151 via the Springfields Roundabout, which is the main traffic route with suitable space for construction traffic. From the "A" road, the substation access will be via Stone Gate Road and Marsh Road, with a new bellmouth sited

approximately 2.45 km along Marsh Road, north of the Stone Gate Road junction. Access is proposed off Marsh Road and is approximately 400 m long. It is envisaged that road improvements would be required between the "A" road and substation location to allow construction traffic passage to the site. The temporary access road to the substation would become a permanent access following construction.

8.3.20 It is not envisaged that AILs will be required to access Weston Marsh Substation A.

New Weston Marsh Substation B

8.3.21 The most appropriate route to access the new Weston Marsh Substation B is via the A16 and along the A151 via the Springfields Roundabout, which is the main traffic route with suitable space for construction traffic. From the "A" road, the substation access will be via Stone Gate Road and Marsh Road, with a new bellmouth sited approximately 200 m along Marsh Road, north of Stone Gate Road junction. Access is proposed off Marsh Road and is approximately 160 m long. It is envisaged that road improvements would be required between the "A" road and substation location to allow construction traffic passage to the site. The road improvements will be coordinated with improvements for the new Weston Marsh Substation A. The temporary access road to the substation would become a permanent access following construction.

8.3.22 It is not envisaged that AILs will be required to access Weston Marsh Substation B.

8.4 Temporary Compounds

8.4.1 Temporary construction compounds are required to support the construction of the Project. These have a variety of uses which may include, but are not limited to:

- material loading/unloading;
- material storage;
- vehicle parking;
- fencing and lighting;
- siting of construction cabins/modular offices;
- siting of welfare facilities;
- electricity supplies from local grid where feasible (alternatively fueled generators or other generation sources will be used);
- fuel and lubricants storage; and
- to complete construction activity.

8.4.2 Main compounds, approximately 2.6 ha to 4.0 ha, are proposed at each of the substation locations to facilitate substation construction, with main and satellite compounds strategically placed close to the works areas for the construction of the overhead line, particularly near the main road network, such as the SRN.

8.4.3 The proposed main overhead line compounds are approximately 5 ha (200 m by 250 m), comprising essential facilities such as welfare, office space, material laydown and storage and a car park.

8.4.4 The proposed satellite compounds are approximately 1.4 ha (130 m by 110 m), suitable for laying down and storage of some material, and a welfare area with a small car park.

8.4.5 All compounds are proposed to be serviced with electricity, clean water and foul water, either by connection to the main services or remote facilities such as generators, water tankers and septic tanks.

8.4.6 To enable the installation of the pylons and overhead lines, compounds are proposed at the following locations:

- one main compound and two satellite compounds between the new Grimsby West Substation and the new Lincolnshire Connection Substation A (LCS A);
- three main compounds and one satellite compound between Lincolnshire Connection Substation B (LCS B) and the new Weston Marsh Substation A; and
- two satellite compounds between the new Weston Marsh Substation A and the new Walpole B Substation.

8.4.7 Subject to the approval of the proposed applications for Weston Marsh Substation A under the Town and Country Planning Act (TCPA) 1990 and associated overhead line works under Section 37 of the Electricity Act 1989, a combined overhead line and substation construction compound may be used to better facilitate the proposed construction works in the area adjacent to the substation. This main compound is considered as one of the three proposed main compounds for overhead line construction between LCS B and Weston Marsh Substation A as noted above.

8.4.8 Siting of the compounds has been informed by the location of project elements, the specific construction needs that each compound is required to serve, and proximity to the SRN. The compound locations seek to avoid or reduce the potential for environmental and socio-economic adverse effects whilst being close to a bellmouth with access to a PAR. This reduces travel distances for greater efficiency and reduced construction effects.

8.5 Other Temporary Works Requirements

8.5.1 This section continues to describe the further considerations made by National Grid in developing the Draft Order Limits associated with the proposed alignment and substation sitings presented in Chapter 7. This includes accommodating:

- other temporary works such as pylon working areas, pulling positions, protection strategies for crossings of sensitive features and temporary overhead line drainage areas;
- works to third party overhead line assets;
- access for maintenance of the overhead line;
- areas for environmental mitigation and biodiversity net gain (BNG)
- overhead line limits of deviation; and
- underground cable swathe.

8.5.2 This section then summarises how these features inform the scale and location of the outermost boundary for the Project, known as the draft Order Limits. Eventually, the

Order limits will define all the land require to construct, operate and maintain the Project.

Pylon Working Areas

8.5.3 Pylon working areas would typically be 60 m by 60 m for a suspension pylon and 70m by 70m for a tension pylon. They would either be stone laid on geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. Soil stabilisation[5] techniques could be considered subject to local conditions. Further detail on pylon working areas and construction methodology can be found in **Supplementary PEI Report Volume 2 Part A Chapter 5 Project Description**.

Pylon Stringing Positions

8.5.4 For each angle, terminal or in line tension pylon, an indicative pylon stringing position is also defined. These are broadly uniform in shape, although a bespoke design is applied for each pylon, based on its angle and any constraining features that may restrict stringing activities. Stringing positions are displayed as 'bowtie' shaped zones, extending from the pylon centre point. This extends to a distance of 180m from the pylon centre point, at a 1:3 ratio for an average assumed maximum height for most towers of 60m (most towers will be lower than 60m in height, but this assumption ensures sufficient space is provided even where slightly larger towers may be required). These zones may be larger where there are changes in the direction of the overhead line to provided sufficient room and the correct angle for positioning of equipment. These zones define the area in which the pulling of conductors will take place, as described in the general methodology set out below. Other than the siting of plant and equipment in these zones, no physical development, such as the construction of a hardstanding, is proposed to take place, unless defined for other reasons.

8.5.5 The general methodology adopted in relation to pylon stringing comprises the following:

- The conductors are usually installed from tension pylon to tension pylon along intermediate suspension pylons, often termed a 'section', with machine sites required at either end of the section.
- The machine sites for conductor stringing would normally be located within the pylon conductor pulling positions, sited on earthed interlocking panels laid directly onto the ground surface reducing disturbance to the underlying soils.
- A conductor pulling position would be established at each end of the section with a pulling machine ('puller') and empty steel reels to accept pilot wires at one end. At the other end of the section the full conductor drums would be arranged in close proximity to the tensioning machine ('tensioner').

[5] Soil stabilisation refers to the techniques and methods used to alter the physical properties of soil, making it more suitable for construction or other purposes. Soil stabilisation is commonly used in road construction, foundation work, and other civil engineering projects to ensure a stable and working area and typically to reduce the volume of stone required (which would otherwise be needed to provide the same stability).

- The conductors would be delivered to pulling positions on large cable drums. Depending on the conductor type and length of section to be strung, a typical completed drum could weigh up to 8 T, although larger and heavier drums are possible depending on the supplier and the length of conductor. The drums containing the conductors would typically be delivered to the construction compound, or satellite compound, first, and would be distributed from there.
- Light pilot wires (sometimes referred to as pilot bonds) would be laid at ground level (and over temporary scaffolding protecting assets such as roads and railway lines) along the length of the section between the pulling positions. Some vegetation management, including removal as a worst case, would be required. The pilot wires would be lifted and fed through running wheels on the cross arms of all the pylons in the section, and then fed around the puller or tensioner at the pulling position. The light pilot wires are used to pull through heavier, stronger pilot wires which are in turn used to pull conductors through from their drums. The tensioning machine would keep the wires off the ground and prevent the conductors running freely when the pulling machine pulls the pilot wire. When the conductor is fully 'run out', it would be fastened at its finished tension and height above ground by linespersons working from platforms on the tension pylons which are suspended beneath the crossarms. The conductors would be connected to the suspension insulators at any intermediate suspension pylons along the stringing section. Additional fittings, such as spacers, vibration dampers and arcing horns would also be fitted.
- To counterbalance the out of balance loading at the tension pylons at the end of a conductor stringing section, it is normal to install temporary backstays or concrete blocks for safety of installation. The temporary backstays or concrete blocks would be removed as the conductor stringing process starts on the next section. Temporary backstays might also be required at other locations such as connecting new conductor to existing conductor, temporary diversions, and temporary spans.
- This process continues along the overhead line route, stringing section after section until conductors have been installed throughout the route. At this point the individual conductor lengths are connected together by clamping a short length of conductor between each, hanging below the cross arms of each of the tension pylons between sections. These short lengths of conductor are known as 'jumpers'.
- A drone/helicopter may also be utilised in the construction of the overhead line, typically for the process of running out the pilot bond along the stringing section and/or transportation of equipment to the Project site.

8.5.6 Animations summarising how National Grid builds its projects are available on the Project website.

Crossing Protection Strategies

8.5.7 Temporary scaffolding netting would be installed during construction where required as a safety measure to protect assets which would be crossed by the proposed 400 kV overhead line, such as roads, railways, existing distribution network overhead lines (where not already moved underground) and potentially hedgerows.

8.5.8 During conductor stringing this netting will protect against dropping of conductors or and any of the associated equipment due to equipment malfunction. Temporary

closures of some affected assets, such as roads, may be required during these works to install the protective netting, or may be implemented instead of installing scaffolding.

8.5.9 Alternative methods are available where the use of scaffold towers is not technically viable or where their use would give rise to particularly significant effects, such as catenary support systems, where feasible.

Underground Cable Swathe

8.5.10 The underground cable connection would typically comprise of nine transmission cables per circuit, and two circuits, giving 18 cables in total. Each cable would be approximately 150 mm in diameter and buried within a series of three cables per trench excavated to a minimum depth of 1.4 m. They would be surrounded by an additional layer of cement bound sand to provide a thermally resistant barrier, and then topped with protective warning tile tape which protects the cables from accidental excavation.

8.5.11 A permanent easement of 50 m is assumed for open cut installation, and 180 m for trenchless installation. This would be reduced to consider sensitive features or may increase subject to site conditions.

8.5.12 Depending on the cable manufacturer and availability of cable lengths, joint bays would be required every 500 m to 1 km. At these locations, above ground link boxes would be required. The dimensions, frequency and specific locations of the link boxes would be confirmed through detailed design, however, where practicable, they would be located near field boundaries.

8.5.13 Prior to construction, surveys would be carried out and trial holes used to investigate ground conditions and identify potential constraints.

8.5.14 Working areas would be identified for winch and cable pulling arrangements.

8.5.15 During construction, trenches and joint bays would be excavated along the proposed route, into which the underground cables would be installed and jointing activities carried out.

8.5.16 Additional areas would be required around the trenches for haul roads and access paths, and soil storage. Safety fencing and/or barriers would be installed on the outer edges of the construction swathe.

8.5.17 Once the cables are in place, backfilling would follow.

8.5.18 The cable is then tested, commissioned, and energised.

8.5.19 Where the cables need to be at a greater depth to avoid existing constraints, horizontal directional drilling (HDD) would be utilised. Launch and reception pits would be excavated and the cable ducts installed; this would mean a wider separation of the cables and a wider cable swathe, secured with fencing.

Drainage Areas

8.5.20 An outline sustainable drainage system (SuDS) drainage strategy has been designed, taking account of the reduced natural drainage as a result of the temporary construction impermeable areas, such as haul roads and stone working areas. The drainage design is based on a very conservative impermeable area. Drainage

strategies are not being provided for pylon foundations and bases on the assumption the area will be less than 50 m^2.

8.5.21 The SuDS basins are proposed to be three sequential filtration basins in order to manage sediment pollution. At this stage, it is assumed all SuDS will outfall to an existing watercourse however, infiltration testing will be undertaken to confirm this assumption. If the infiltration rate is good the basins will very likely be smaller than those currently proposed.

8.6 Third Party Works

8.6.1 Prior to the construction of the Project, several existing overhead and underground third-party services would need to be diverted, removed, undergrounded, or protected in order to mitigate impacts of the Project. This is largely where they interface with the Project, for example, with proposed new overhead line crossings, along PARs or at bellmouth locations. The scale of the works for third parties would be significantly less than the construction of the new overhead line works, as it is envisaged there will be minimal adjustments to existing services.

8.6.2 The required mitigation methods and duration of mitigation works (permanent or temporary) need to be confirmed with the asset owners prior to any works being carried out.

8.6.3 Within Section 5, no existing distribution network operator (DNO) 132 kV overhead lines and pylons are present.

8.6.4 For the removal, undergrounding and diversion of existing DNO 33 kV or 11 kV overhead lines and pylons or existing wood pole telecommunications infrastructure, typical vehicles and equipment might include a loader crane, and an excavator or equivalent.

8.6.5 Within the Draft Order Limits, land is provided for third party overhead line asset mitigation/clearance. For 66 kV and below, typically connected to a wooden pole, a 25 m working width is provided.

8.6.6 The need for any cathodic protection to existing metallic pipelines, to reduce the risk of induced voltage from the overhead lines, will be determined at future design stages. Should this be required, typical vehicles and equipment might include a loader crane, excavator or equivalent.

8.7 Access Strategies for Maintenance

8.7.1 The National Grid overhead line would typically be subject to annual inspection from the ground by foot patrol, small van, or by air using a drone or helicopter to check for visible faults or signs of wear. Access would also be required for regular maintenance activities and vegetation management.

8.7.2 Access for these activities would be located along operation and maintenance access routes which have been defined for each pylon. Temporary interlocking track mat panels may be required along these routes during maintenance activities, but these inspection activities would not take place until after the Project has been commissioned.

8.8 Environmental Mitigation Areas

Additional Mitigation

8.8.1 Areas of temporary habitat loss would be reinstated, wherever practicable, following the completion of construction. Such reinstatement would be returned to the type of habitat affected wherever possible. An Outline Landscape and Environmental Mitigation Plan (LEMP) will be produced, which will set out the measures to protect existing vegetation and details regarding reinstatement and additional planting. The LEMP will form part of the Environmental Statement submitted as part of the DCO application.

8.8.2 Areas of permanent habitat loss would be calculated and considered during the Biodiversity Net Gain (BNG) assessment (see Biodiversity Net Gain subheading below).

8.8.3 Areas of planting have been included around each of the substation locations. This has been included in the design to reduce the visual effects and would also help with integration of the substations into the surrounding landscapes. Detailed mitigation plans for the substations will be presented in the Environmental Statement. This will include proposals for planting including indicative species mixes and will be presented as part of the Outline LEMP.

8.8.4 National Grid is committed to deliver the mitigation measures identified to avoid and reduce the likely significant effects that would be experienced during implementation of the Project. Currently identified mitigation measures are described in the **Supplementary PEI Report Volume 2 Part B**.

Biodiversity Net Gain

8.8.5 National Grid will seek to implement habitat enhancement and creation through delivery of BNG.

8.8.6 BNG is a way of making sure the habitat for wildlife is in a measurably better state than it was before development. It requires a minimum 10% gain calculated using the Government's Biodiversity Metric. BNG must be managed, monitored and reported on to the Local Planning Authority for 30 years.

8.8.7 National Grid has committed to 10% Net Gain in environmental value, including as a minimum 10% biodiversity net gain across all its construction projects (Ref 13). While the 10% target for the Project is not currently mandated for Nationally Significant Infrastructure Projects until introduced by the Government, National Grid has set out commitments to deliver BNG within its Environmental Action Plan.

8.8.8 Therefore, National Grid is working with appointed technical specialists, environmental organisations and landowners to identify potential opportunities for delivering areas of BNG, and where practicable also linked to wider environmental gains such as recreation improvement.

8.9 Draft Order Limits Development

Limits of Deviation

8.9.1 As acknowledged by the Planning Inspectorate's Advice Note Nine (Ref 14) a necessary and proportionate degree of flexibility needs to be incorporated into the design of a development so that unforeseen issues encountered after a development has been consented can be addressed. To allow for this proportionate degree of flexibility, limits of deviation (LoD) have been developed for the Project components which will be specified in the DCO. The LoDs will provide a maximum distance or measurement of variation within which every component of the Project would be located. LoDs will be applied both horizontally and vertically for the Project.

8.9.2 For the overhead line, the horizontal LoD is, in general, 100 m (50 m either side of the centre line of the overhead line). In some exceptional circumstances, the LoD is decreased to less than 100 m to avoid a particular receptor. Where the LoD is 100 m the extent of movement of any pylon is limited by the span length and conductor swing. At a maximum span length, the conductors would require a swing distance of around 30 m, resulting in a potential lateral movement from the centreline of approximately 20 m either side, subject to topography and local conditions. There is no limit placed on the placement of a pylon along the centreline (longitudinal LoD); however, movement would be limited by the need to maintain appropriate span length between pylons.

8.9.3 The upwards vertical LoD for a typical standard lattice pylon is approximately 6 m which would allow for two extension panels (typically 3 m per extension panel but this varies between pylon types). This is to provide design flexibility to ensure that vertical clearance distances can be maintained. While bespoke pylons are required in some instances elsewhere on the Project (for instance to meet increased clearance requirements at the River Nene in Section 6), resulting in a larger vertical LoD, there are no bespoke pylons currently proposed within Section 5.

8.9.4 For underground cables, the horizontal LoD is, in general, approximately 27 m for double circuit installation (13.5 m either side of the total construction swathe) and approximately 31 m for single circuit installation (15.5 m either side of the total construction swathe). This provides total construction swathe widths with LoD of 80 m for double circuit installation and 50 m for single circuit installation. The swathes presented therefore include the LoD alongside sufficient room and flexibility for all other associated construction activities.

8.9.5 There is no limit placed on the maximum depth of below ground works. Whilst a standard below ground LoD is not proposed, the Project would never go deeper than necessary for technical or environmental reasons as this would add engineering operational complexity and cost.

Land Ownership

8.9.6 During the development of the Draft Order Limits, careful consideration is given to the design of both temporary and permanent land take, ensuring the Draft Order Limits are aligned with identified land ownership boundaries. Wherever feasible, access works are planned along field boundaries or make use of existing tracks to minimise disruption to landowners and avoid unnecessary division of land.

Draft Order Limits

8.9.7 The Draft Order Limits, presented on the **Weston Marsh Targeted Consultation Plans**, outline the geographical extent of land affected by a proposed development and includes land needed for the Project, such as:

- main development area, including permanent and temporary works;
- access routes and visibility splays;
- environmental mitigation, landscaping and some areas that are capable of delivering BNG (subject to BNG strategy); and
- third party mitigation.

8.9.8 The final Order Limits pursuant to the DCO will define the extent of land proposed to be acquired, as described in the Book of Reference, whilst also defining the geographical scope of environmental and stakeholder impacts to ensure they are considered and mitigated as appropriate.

8.9.9 Multiple disciplines including (but not limited to) engineering, traffic and transport, ecology, landscape and visual all feed into justifying the land required to construct, mitigate and maintain the Project.

8.9.10 From a technical perspective, and generally described in the sections above, the Project considers the following parameters in the defining of the land take required for the temporary works (unless otherwise stated as permanent) (approximate figures):

- overhead line lateral LoD (50 m either side of the centre line of the overhead line, with a total of 100 m);
- underground cable lateral LoD for double circuit installation (13.5 m either side of the total construction swathe) and for single circuit installation (15.5 m either side of the total construction swathe);
- pylon stringing positions (180 m ‘bow tie’ shaped zones for the pulling of conductors; sized to be approximately 3 x the height of the pylon);
- pylon working areas (60 m x 60 m rectangle hard standing area, increasing to up to 80m x 80 m, dependent on pylon type);
    - Within Section 5, note that temporary masts, proposed to facilitate the temporary diversions of the overhead line, show an additional appended area to the dimensions noted above to allow for back stays that extend approximately 80m x 120m from the mast centre point.
- construction compounds (130 m x 110 m land take area for a satellite compound and 200 m x 250 m for a main compound, subject to landform and constraining features);
- permanent operational and maintenance access for pylons (6 m width access route);
- third party overhead line asset mitigation (for 66kV and below, a 25 m swathe working width is provided, and for 132kV and above, a 200 m working width is provided).

- third party access (below 132 kV a 4 m width access route and for 132 kV a 12.5 m wide access route);
- construction (haul road) accesses (21 m swathe to allow for haul road construction, soil storage and drainage);
- bellmouths & visibility splays (60 m wide junction access at the highway edge; visibility splays individually sized subject to road conditions); and
- drainage design (SuDS, outfall pipes and outfall points all individually sized subject to site specifics).

8.9.11 Following the collation of all the proposed land take, a natural outer edge of the Project starts to become defined. This outer edge of the land take required is generally followed in defining the Draft Order Limits. On some occasions, minimal buffers are applied to the parameters above (between 5 m and 20 m) to allow a small margin of additional flexibility. Additionally, on some occasions, natural rounding-off of land parcels and unviable 'slithers' of land which are enclosed by the surrounding Order Limits are also included within the Draft Order Limits, from a practical standpoint.

8.9.12 At some of the substation locations the Draft Order Limits extend to the nearest field boundaries, beyond the typical parameters set out above. This is to include added flexibility during the construction process and allow safe working if the overhead line and substation elements are being constructed at the same time.

9. Next Steps

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9.1 Introduction

9.1.1 The feedback from the Stage 1 consultation together with further technical and environmental work led to the development of the proposed alignment for the Project which was the subject of Stage 2 consultation between 11 June and 6 August 2025.

9.1.2 The feedback relevant to Section 5 (Weston Marsh) received during the Stage 1 consultation and June 2025 Stage 2 consultation has been carefully reviewed and considered. Engagement with generators contracted to connect in the Weston Marsh area and further technical and environmental work, has led to the development of the proposed alignment within Section 5, which is the subject of the Weston Marsh Targeted Consultation. National Grid considered and appraised design change requests in Section 5 originating from both Stage 1 consultation and the June 2025 Stage 2 consultation, however no changes to the design in Section 5 were made as a result of these requests.

9.2 Next Steps

9.2.1 The Project continues to be the subject of ongoing consultation with stakeholders and members of the public.

9.2.2 National Grid undertook Stage 2 consultation on its proposals between 11 June and 6 August 2025 and is undertaking the Weston Marsh Targeted Consultation between 18 November 2025 and 16 December 2025. This follows on from additional design work that has been completed for this Section following the June 2025 Stage 2 consultation.

9.2.3 All feedback submitted during the June 2025 Stage 2 consultation, relevant to Section 5, has been considered as part of the Section 5 design that is the subject of the Weston Marsh Targeted Consultation. All feedback from the June 2025 Stage 2 consultation relating to the wider Project, along with all feedback from the Weston Marsh Targeted Consultation, will be reviewed and considered in further design development of the Project, where practicable, prior to the DCO application submission.

9.2.4 Further detailed assessments and studies will continue along the proposed alignment, including technical and environmental assessments and ongoing survey works. The outcomes of this work, together with consideration of feedback from the June 2025 Stage 2 consultation and Weston Marsh Targeted Consultation, may further inform and refine the design where practicable, including proposed locations of permanent and temporary infrastructure.

9.2.5 Ongoing environmental impact assessments will therefore continue to inform further design development and the mitigation measures required, and this progress and assessment will be presented in the Environmental Statement which will form part of the DCO application submission.

9.2.6 National Grid expects to apply to the Planning Inspectorate for a DCO in 2027. Once submitted, the Planning Inspectorate will assess whether the application will be

accepted within the statutory determination period of 28 days. If accepted, the pre-examination phase will commence before an examination begins in which members of the public (Ref 15), local authorities and others can participate.

Appendix A - Local Planning Policy of Relevance to Good Design (Section 5)

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Table A.1 is provided to outline local planning policies relating to good design that are relevant to Section 5. These policies will continue to be reviewed throughout the evolution of the Project design. For completeness, where a policy relating to good design has been identified, the entire policy text has been included in **Table A.1**. Other topic specific design considerations within local planning policy are set out in **Preliminary Environmental Information (PEI) Report Volume 2 Part A Chapter 2 Legislative Regulatory and Planning Policy Context**. The local planning policy documents applicable to Section 5 are listed below:

Section 5: Refined Weston Marsh Substation Siting Zone

- Lincolnshire County Council
  - Lincolnshire Minerals and Waste Local Plan: Core Strategy and Development Management Policies, adopted in 2016 (Ref 16) and Minerals and Waste Site Locations, adopted 2017 (Ref 17) – No policies of relevance to the Project design; and
  - A new Lincolnshire Minerals and Waste Development Local Plan is being prepared and includes a preferred approach to the future planning of minerals and waste in Lincolnshire covering policies and a series of mineral aggregate sites to meet future requirements. A consultation on the preferred approach was undertaken between 30th July and 24th September 2024 (Ref 18) – No policies of relevance to the Project design.
- South East Lincolnshire (covering South Holland District Council and Boston Borough Council)
  - South East Lincolnshire Local Plan (South Holland District Council and Boston Borough Council joint plan), adopted 2019. (Ref 19).

Table A.1 Local Planning Policy of Relevance to Good Design, relevant to Section 5

Local Policy Document	Policy Reference	Policy Text
South East Lincolnshire Local Plan 2011-2036 (Adopted March 2019) (Ref 19)	Policy 3: Design of New Development	*"All development will create distinctive places through the use of high quality and inclusive design and layout and, where appropriate, make innovative use of local traditional styles and materials. Design which is inappropriate to the local area, or which fails to maximise opportunities for improving the character and quality of an area, will not be acceptable.* *Development proposals will demonstrate how the following issues, where they are relevant to the proposal, will be secured:* 1. *creating a sense of place by complementing and enhancing designated and non designated heritage assets; historic street patterns; respecting the density, scale, visual closure, landmarks, views, massing of neighbouring buildings and the surrounding area;* 2. *distinguishing between private and public space;* 3. *the landscape character of the location;* 4. *accessibility by a choice of travel modes including the provision of public transport, public rights of way and cycle ways;* 5. *the provision of facilities for the storage of refuse/recycling bins, storage and/or parking of bicycles and layout of car parking;* 6. *the lighting of public places;* 7. *ensuring public spaces are accessible to all;* 8. *crime prevention and community safety;* 9. *the orientation of buildings on the site to enable the best use of decentralised and renewable low-carbon energy technologies for the lifetime of the development;* 10. *the appropriate treatment of facades to public places, including shop frontages to avoid visual intrusion by advertising, other signage, security shutters, meter boxes and other service and communication infrastructure;* 11. *residential amenity;* 12. *the mitigation of flood risk through flood-resistant and flood-resilient design and sustainable drainage systems (SuDS);*

Local Policy Document	Policy Reference	Policy Text
		13. the use of locally sourced building materials, minimising the use of water and minimising land take, to protect best and most versatile soils; *14. the incorporation of existing hedgerows and trees and the provision of appropriate new landscaping to enhance biodiversity, green infrastructure, flood risk mitigation and urban cooling;* *15. the appropriate use or reuse of historic buildings.''*

Appendix B - Chapter 7 (Development of the Proposed Alignment and Substation Sitings) Inset Images

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The following images are full size versions of the proposed alignment and substation siting image insets in Chapter 7 of this report and include:

Image 7.1 Proposed siting of the new Weston Marsh Substation A

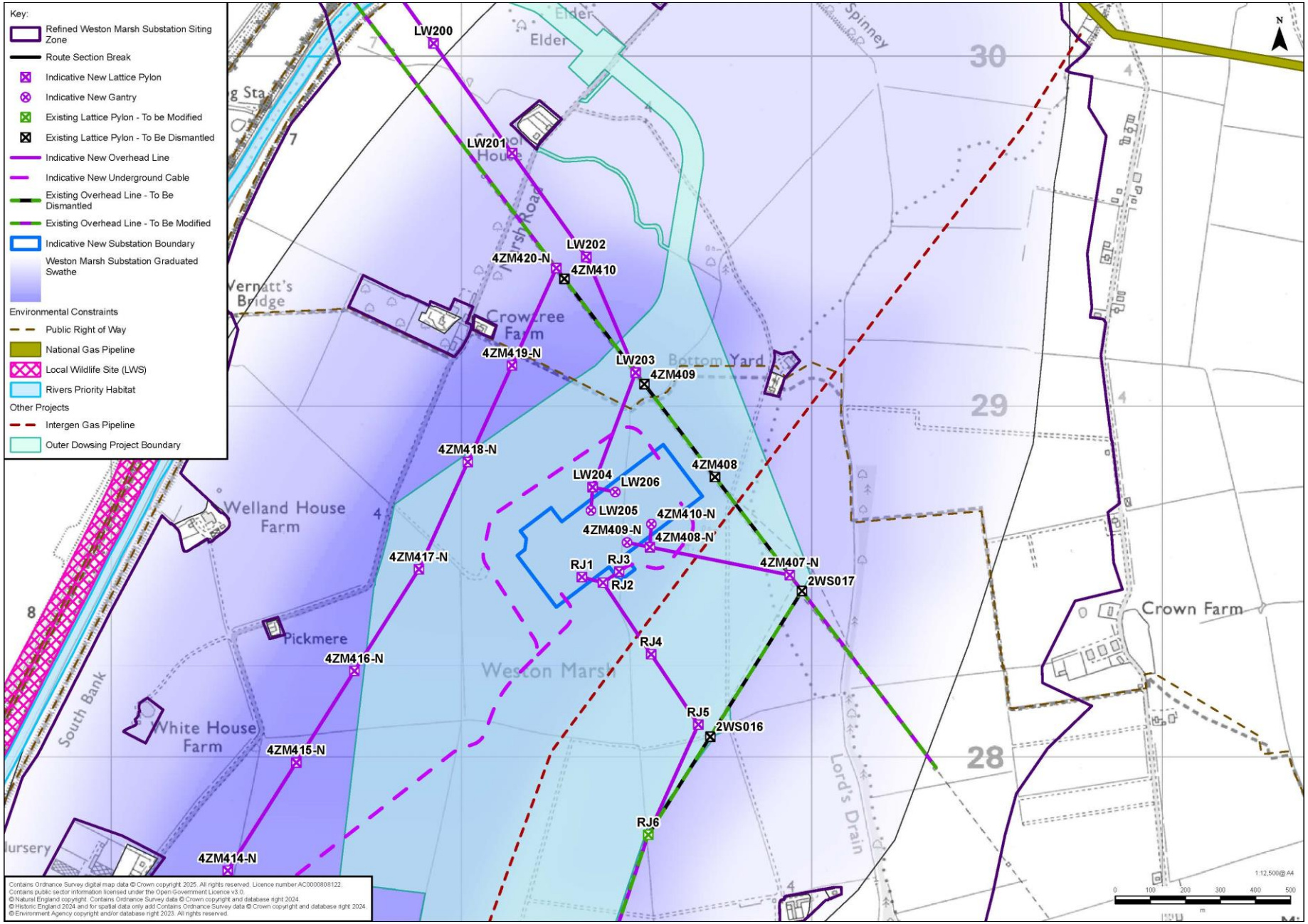


Image 7.2 Proposed siting of the new Weston Marsh Substation B

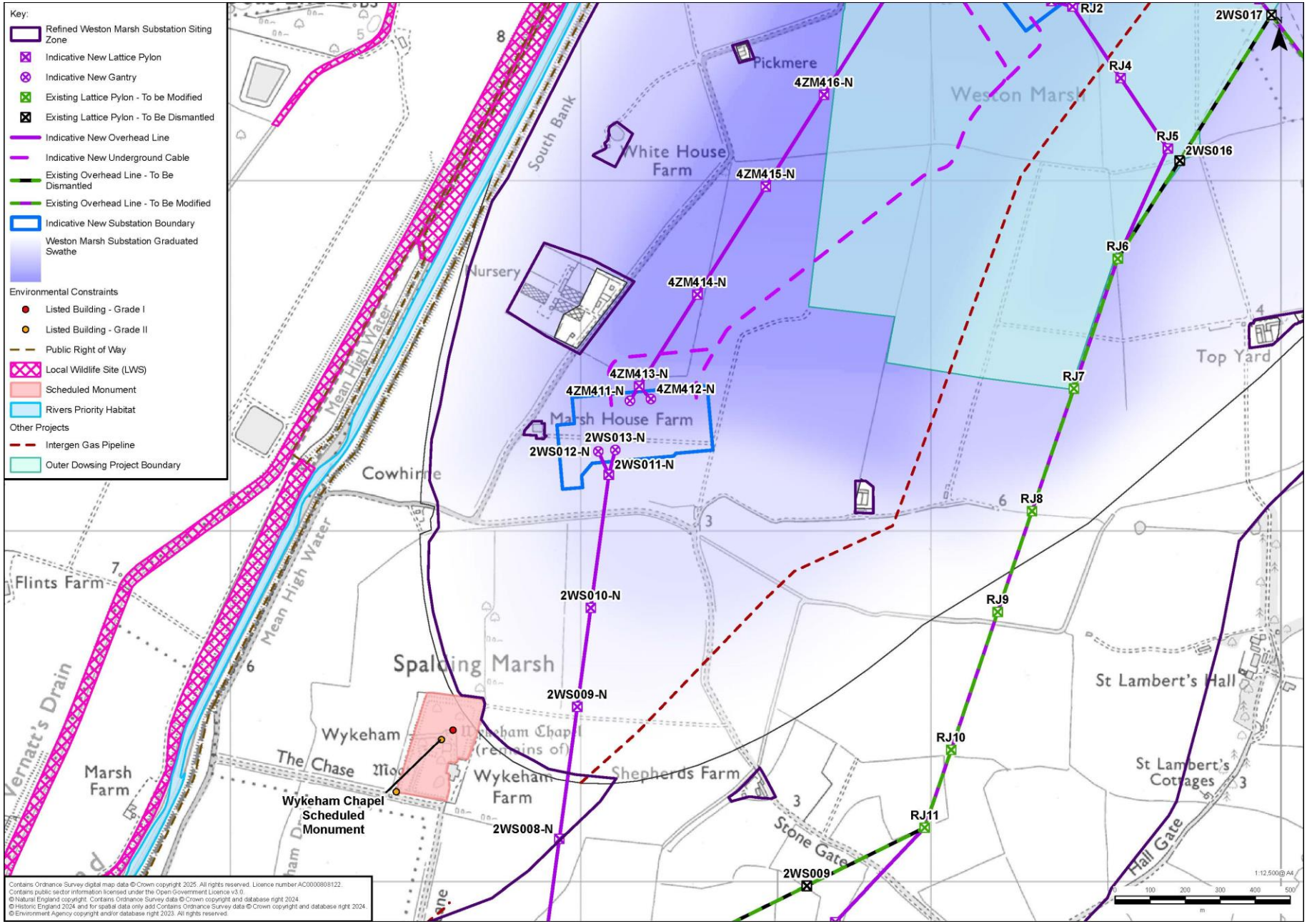


Image 7.3 Proposed overhead line alignment and underground cable alignments in Section 5

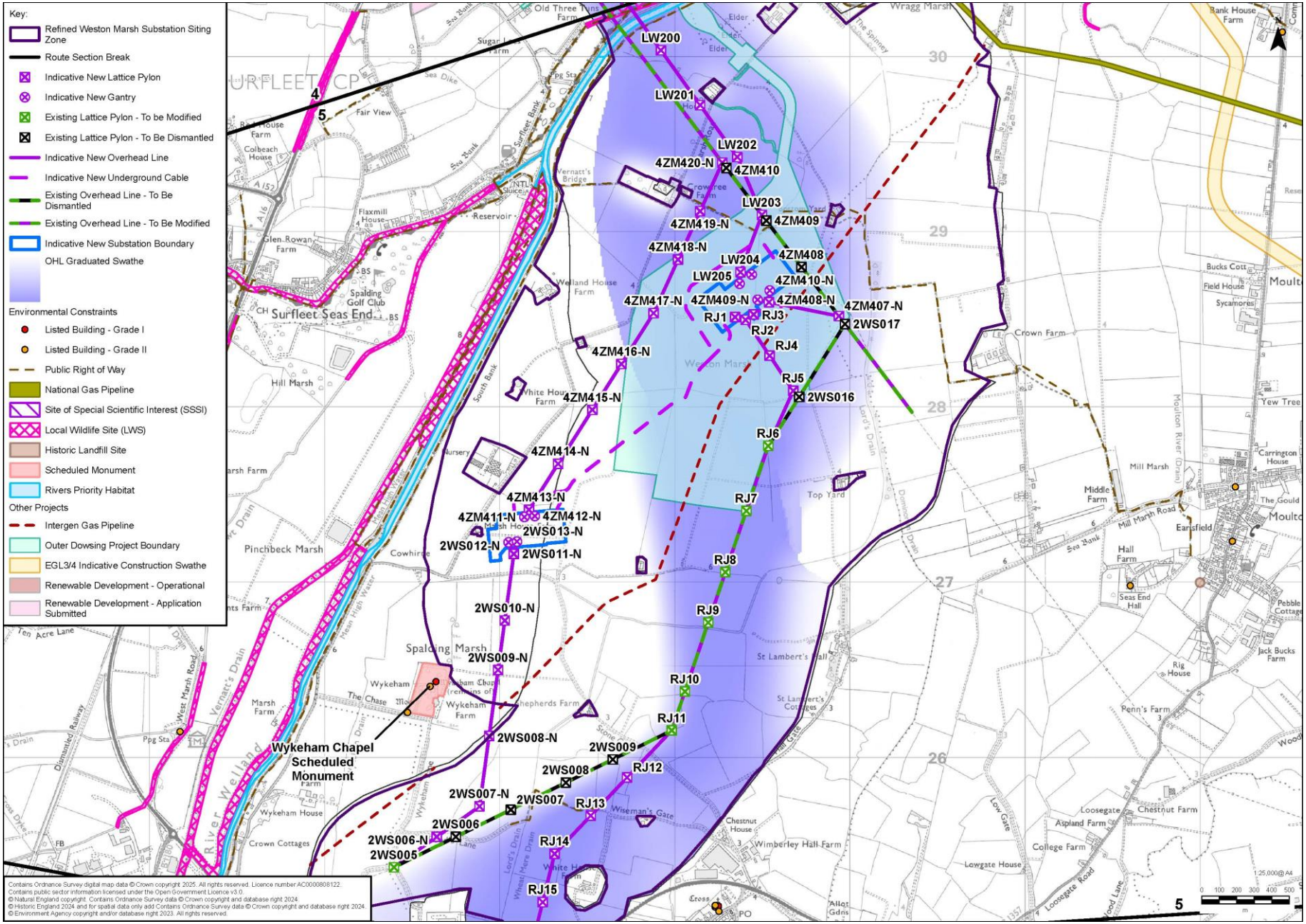
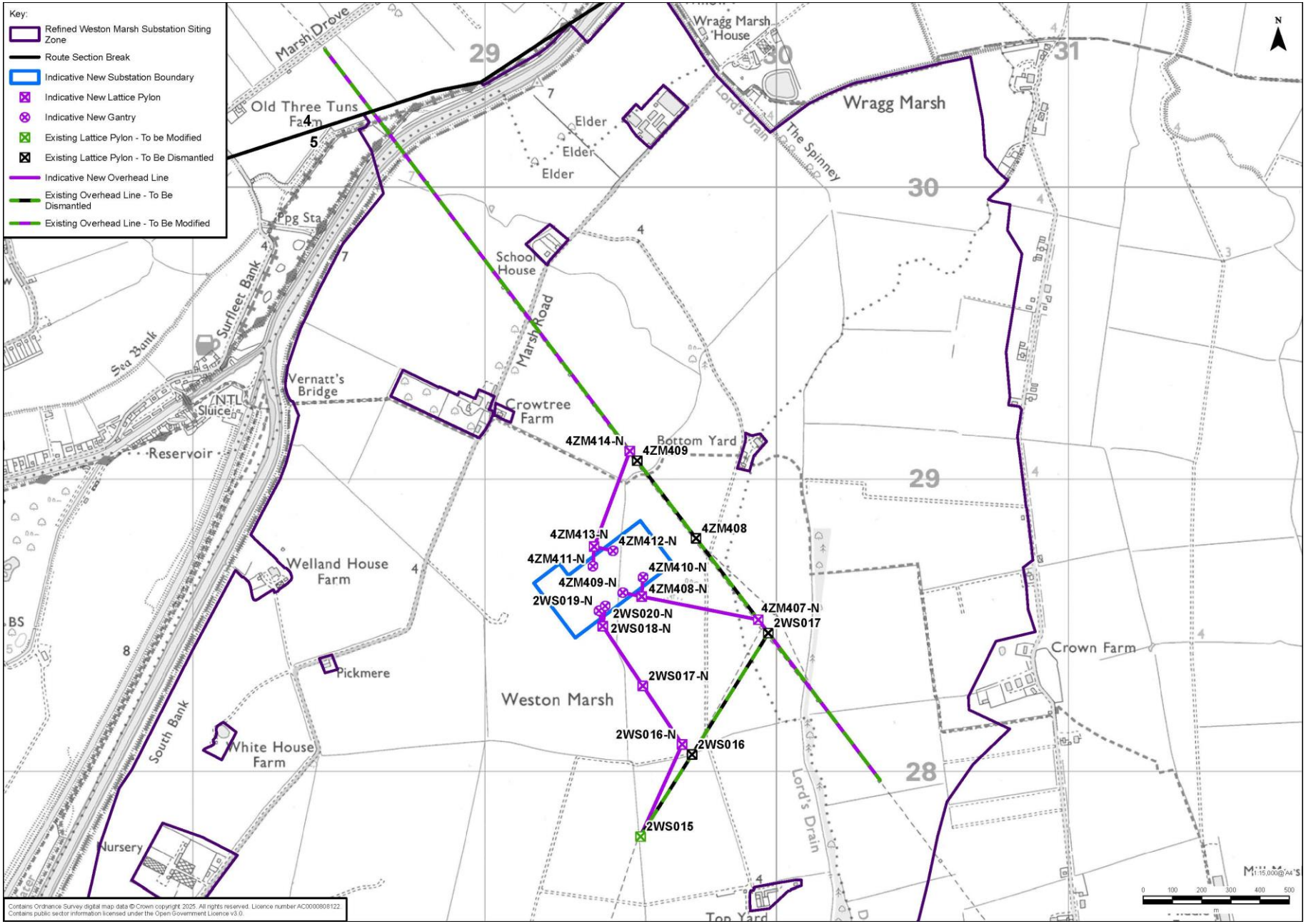


Image 7.6 Elements to be consented via Town and Country Planning Act 1990 and Section 37 of the Electricity Act 1989



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