The Great Grid Upgrade

Grimsby to Walpole

# Supplementary Preliminary Environmental Information Report: Section 5 New Weston Marsh Substations A and B

**Volume 2 Part A Introduction and Overview**

**Chapter 5 Project Description**

November 2025

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# Contents

# Grimsby to Walpole
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# 5. Project Description

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# 5. Project Description

## 5.1 Introduction

5.1.1 This chapter of the Supplementary Preliminary Environmental Information (PEI) Report provides a description of the Grimsby to Walpole Project (the 'Project'). It contains broadly the same information as the Grimsby to Walpole PEI Report Volume 2 Part A Chapter 5 Project Description, published as part of the June 2025 PEI Report (Ref 1) produced for the Stage 2 Consultation, which was completed between 11 June and 6 August 2025.

5.1.2 The Project Description has however been updated to reflect the development of a more detailed design for Section 5 of the Project (now referred to as New Weston Marsh Substations A and B) since publication of the June 2025 PEI Report. This update is required given the June 2025 PEI Report contained less design information for Section 5 than for other sections of the Project. This chapter now aligns the level of information and design parameters provided for Section 5, with that provided for the other sections of the Project in the June 2025 PEI Report. Further design information relating specifically to Section 5 is also included within **PEI Report Volume 2 Part B Chapter 1 Overview of the Section and Description of the Project**.

5.1.3 The more specific information on design parameters within Section 5 has been developed by National Grid by engaging further with generators who are contracted to connect in the Weston Marsh area, alongside conducting further technical environmental assessment and design work (engineering studies). This process is described within **Supplementary PEI Report Volume 2 Part A Chapter 3 Main Alternatives** and the **Weston Marsh Siting Study Report**, and has confirmed the need for two new substations and associated infrastructure within the Weston Marsh Area (noting the need for up to two substations was assessed within the June 2025 PEI Report).

5.1.4 The Project is a proposal by National Grid Electricity Transmission plc ('National Grid') to build the following principal components:

i. approximately 140 km of new 400 kV overhead transmission line.

ii. 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 full, or part[1]. The extent of decommissioning will be determined and reported in the Environmental Statement (ES).

iii. two new 400 kV Lincolnshire Connection substations located south west of Mablethorpe in East Lindsey (referred to as Lincolnshire Connection Substation A and Lincolnshire Connection Substation B).

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

iv. two new 400 kV Weston Marsh substations in the vicinity of the Spalding Tee-Point in South Holland District (referred to as the new Weston Marsh Substation A and new Weston Marsh Substation B, connected by approximately 3.05 km of underground cables).

v. 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").

vi. 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.

5.1.5 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 environmental mitigation, compensation and enhancement, including biodiversity net gain (BNG).

5.1.6 As set out in **Supplementary PEI Report Volume 2 Part A Chapter 1 Introduction** (and reflecting the position in the June 2025 PEI Report Volume 2 Part A Chapter 1 Introduction (Ref 1)), this Supplementary PEI Report has been informed by the EIA Scoping Opinion (Ref 2) published by the Secretary of State in September 2024. The comments received on the description of the Project in the EIA Scoping Opinion have been taken account in the production of the June 2025 PEI Report Volume 2 Part A Chapter 1 Introduction, and subsequently this chapter. An explanation of how the comments have been addressed or will be addressed in the ES is included in **Supplementary PEI Report Volume 3 Part A Appendix 4A Planning Inspectorate Scoping Opinion Responses**, which includes minor updates to the equivalent Appendix of the June 2025 PEI Report, to reflect the inclusion of underground cables within Section 5 of the Project.

5.1.7 This chapter should be read in conjunction with the following chapters of this Supplementary PEI Report which provide further details on the Project. These chapters broadly align with the equivalent chapters submitted as part of the June 2025 PEI Report, with updated information included on Section 5:

i. **Supplementary PEI Report Volume 2 Part A Chapter 1 Introduction**;

ii. **Supplementary PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context**;

iii. **Supplementary PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**;

iv. **Supplementary PEI Report Volume 2 Part A Chapter 4 Approach to Preliminary Environmental Information**; and

v. **Supplementary PEI Report Volume 2 Part B Chapters 1 Overview of the Section and Description of the Project**

5.1.8 This chapter is supported by the following figures:

i. **Supplementary PEI Report Volume 2 Part A Figure 5.1 Proposed Project Design**;

ii. **Supplementary PEI Report Volume 2 Part A Figure 5.2 Temporary Construction Works**;

iii. **Supplementary PEI Report Volume 2 Part A Figure 5.3 Construction Traffic Routes;** and

iv. **Supplementary PEI Report Volume 2 Part A Figure 5.4 Third Party Works**.

5.1.9 These figures are consistent with those submitted in the June 2025 PEI Report, however they now include the more detailed design information for Section 5 of the Project.

5.1.10 This chapter is supported by the following appendices:

i. **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice (CoCP)**;

ii. **Supplementary PEI Report Volume 3 Part A Appendix 5B Indicative Pylon Schedule**;

iii. **Supplementary PEI Report Volume 3 Part A Appendix 5C Indicative Bridge and Culvert Schedule**; and

iv. **Supplementary PEI Report Volume 3 Part A Appendix 4A Planning Inspectorate Scoping Opinion Responses**.

5.1.11 **Supplementary PEI Report Volume 3 Part A Appendix 5B Indicative Pylon Schedule**, **Supplementary PEI Report Volume 3 Part A Appendix 5C Indicative Bridge and Culvert Schedule** and **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice (CoCP)** are broadly consistent with those submitted in the June 2025 PEI Report (Ref 1), however they have been updated to reflect the development of a more detailed design for Section 5 of the Project. These updates are clearly identified within the appendices.

## 5.2 Geographic Overview

5.2.1 The Project is located in the Humber, East Midlands, East of England and East Anglia regions of England. The Project is located in an area that is predominately rural, with large parts of land under arable farming use. The towns of Grimsby, Wainfleet All Saints, Skegness, Louth, Wisbech, Long Sutton, Spalding and Boston are located within 5 km of the Project. There are also multiple villages and individual properties near the Project.

## Route Sections

5.2.2 As described in **Supplementary PEI Report Volume 2 Part A Chapter 1 Introduction**, the Project has been broken down into seven sections based largely on the different project components. The seven sections are described below and presented on **Supplementary PEI Report Volume 2 Part A Figure 1.1 Draft Order Limits**.

i. Section 1 New Grimsby West Substation;

ii. Section 2 New Grimsby West Substation to New Lincolnshire Connection Substation A;

iii. Section 3 New Lincolnshire Connection Substations A and B;

iv. Section 4 New Lincolnshire Connection Substation B to New Weston Marsh Substations A and B (formerly referred to in the June 2025 PEI Report as the 'New Lincolnshire Connection Substation B to Refined Weston Marsh Substation Siting Zone');

v. Section 5 New Weston Marsh Substations A and B (formerly referred to in the June 2025 PEI Report as the 'Refined Weston Marsh Substation Siting Zone');

vi. Section 6 New Weston Marsh Substations A and B to New Walpole B Substation (formerly referred to in the June 2025 PEI Report as the 'Refined Weston Marsh Substation Siting Zone to New Walpole B Substation'); and

vii. Section 7 New Walpole B Substation.

5.2.3 **Table 5.1** outlines details of each of the sections that the Project is split into. The table reflects that within June 2025 PEI Report Volume 2 Part A Chapter 5 Project Description (Ref 1), however it now provides updated information on Section 5 that has been developed since publication of the June 2025 PEI Report.

Table 5.1 Description of the Project, from north to south, by Route Section

| Route Section Name | Local Authority | County Authority | Approximate Section Length (km)[2]/Draft Order Limits area (ha) | Geographic Description (Start and End) | Principal Project Infrastructure within the Section |
|---|---|---|---|---|---|
| Section 1 – New Grimsby West Substation | North East Lincolnshire<br>West Lindsey | Lincolnshire | 85.6 ha | Start: approximately 1.2 km south west of Healing and 2.2 km north east of Aylesby.<br>End: approximately 0.27 km west of Wybers Wood | New Grimsby West Substation.<br>Modification of existing 400 kV overhead line, known as 4KG, (including removal of five no. existing pylons and two no. existing gantries, temporary diversion including five no. new temporary pylons, three no. new pylons and four no. gantries).<br>Small section of the new 400 kV overhead line to Lincolnshire Connection Substation A comprising one pylon. |
| Section 2 – New Grimsby West Substation to New Lincolnshire Connection Substation A | North East Lincolnshire<br>East Lindsey | Lincolnshire | 38.98 km<br>695.5 ha | Start: approximately 0.5 km west of Wybers Wood to the north of Rye Lane.<br>End: approximately 2 km south of Strubby Airfield. | New 400 kV overhead line comprising 115 no. pylons. |

[2] Measurement based on centre line of the route corridor

| Route Section Name | Local Authority | County Authority | Approximate Section Length (km)[2]/Draft Order Limits area (ha) | Geographic Description (Start and End) | Principal Project Infrastructure within the Section |
|---|---|---|---|---|---|
| Section 3 – New Lincolnshire Connection Substations A and B (including the overhead line between them) | East Lindsey | Lincolnshire | 178.5 ha | Start: approximately 2.4 km east of Aby and 490 m south west of Galley Hill Farm.<br>End: approximately 730 m north east of Bilsby. | New Lincolnshire Connection Substation A (LCS A).<br>New Lincolnshire Connection Substation B (LCS B).<br>New section of 400 kV overhead line connecting the new LCS A to the new LCS B, comprising 23 no. pylons |
| Section 4 – New Lincolnshire Connection Substation B to New Weston Marsh Substations A and B | East Lindsey<br>Boston<br>South Holland | Lincolnshire | 66.25 km<br>1121.2 ha | Start: approximately 1.35 km east of Bilsby and approximately 125 m north east of River Welland.<br>End: approximately 2.66 km east of Surfleet Seas End. | New section of 400 kV overhead line comprising 194 no. pylons. |
| Section 5 – New Weston Marsh Substations A and B | South Holland | Lincolnshire | 5.9 km<br>362.5ha | Start: approximately 0.1 km north of the River Welland and 2.5 km east of Surfleet Seas End.<br>End: approximately 0.65 km north west of Weston. | New Weston Marsh Substation A and new Weston Marsh Substation B.<br>Permanent removal of a section of existing 4ZM overhead line route and two sections of existing 2WS overhead line route to allow the substations to connect into the existing overhead line routes in Section 5.<br>A continuation of the new section of 400 kV overhead line from the Route Section break between Section 4 and Section 5 at the River Welland, connecting the new LCS B |

| Route Section Name | Local Authority | County Authority | Approximate Section Length (km)[2]/Draft Order Limits area (ha) | Geographic Description (Start and End) | Principal Project Infrastructure within the Section |
|---|---|---|---|---|---|
| | | | | | to the new Weston Marsh Substation A, comprising five no. pylons.<br>Repurposing a section of the existing 2WS overhead line route to form part of a new section of 400 kV overhead line over the Route Section break between Section 5 and Section 6, connecting the new Weston Marsh Substation A to the new Walpole B Substation, comprising 13 no. pylons.<br>New section of underground cables, approximately 3.05 km in length, connecting the new Weston Marsh Substation A to the new Weston Marsh Substation B (noting the distance between the two substations is 1.4 km).<br>Minor modifications to existing 400 kV overhead lines known as 4ZM and 2WS. |

| Route Section Name | Local Authority | County Authority | Approximate Section Length (km)[2]/Draft Order Limits area (ha) | Geographic Description (Start and End) | Principal Project Infrastructure within the Section |
|---|---|---|---|---|---|
| Section 6 – New Weston Marsh Substations A and B to New Walpole B Substation | South Holland<br>Fenland | Lincolnshire<br>Cambridgeshire | 27.36 km<br>477.4 ha | Start: approximately 600 m west of Weston and1.3 km north east of West Walton.<br>End: approximately 1.4 km north west of Walton Highway. | New section of 400 kV overhead line comprising 81 no. pylons. |
| Section 7 – New Walpole B Substation | Kings Lynn and Norfolk | Norfolk | 0.56 km<br>101.3 ha | Start: approximately 1.5 km north east of West Walton and approximately 1.2 km north west of Walton Highway, End: approximately 0.95 km north of Walton Highway. | New Walpole B Substation.<br>1 no. Cable Sealing End (CSE) Compound.<br>Approximately 0.6 km of new 400 kV underground cable connecting the CSE to the new Walpole B Substation.<br>Two no. pylons on the new overhead line route from the new Weston Marsh Substation A, and two new overhead line gantries within the new Walpole B substation.<br>Modifications to existing 400 kV overhead line known as 4ZM to connect to the new Walpole B substation, including the removal of two no. existing pylons, a temporary diversion requiring two no. new temporary pylons, installation of four no. new pylons and four no. new gantries (three within the new Walpole B substation, one within the CSE Compound). |

## 5.3 Project Design Approach

### Good Design Principles

5.3.1 The Project will be designed, constructed, operated and maintained in accordance with applicable health and safety legislation and regulations including the National Electricity Transmission System Security and Quality of Supply Standards (NETS SQSS), taking account of good design with regard to policies set out NPS EN-1 (Ref 3) and NPS EN-5 (Ref 4) as well as National Grid's approach to options appraisal and embedding mitigation in the design and construction of the Project.

5.3.2 The Project has been designed in line with the National Grid options appraisal as outlined in section 3.2 of **Supplementary PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**. The Project will also be designed to comply with existing National Grid standards and relevant external guidance and processes, such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (Ref 5) for reducing effects in relation to Electromagnetic fields (EMFs). These measures will mean that the design will meet the functions required.

5.3.3 The design of the Project has evolved in response to feedback received from the Stage 1 (non-statutory) consultation undertaken in 2024 (Ref 6). The design of Section 5 presented in this Supplementary PEI Report has also taken into account feedback received from the Stage 2 (statutory) consultation undertaken in June – August 2025, where specifically relevant to Section 5. The evolution of the Project design is presented in the June 2025 Design Development Report (Ref 7) and the **Supplementary Design Development Report for Section 5**, which has been published with this Supplementary PEI Report.

#### National Electricity Transmission System Security and Quality of Support Standards

5.3.4 The Project will comply with relevant design safety standards including the NETS SQSS (Ref 8) which sets out the criteria and methodology for planning and operating the National Electricity Transmission System. National Grid policies and processes, which contain details on design standards required to be met when designing, constructing, operating and maintaining assets, such as those proposed on the Project, will be adhered to.

#### Policy considerations

5.3.5 **Supplementary PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context** sets out the overarching policy relevant to the Project, including NPS EN-1 and NPS EN-5. Paragraph 4.7.1 of NPS EN-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.'*

5.3.6 Paragraph 4.7.2 goes onto state that:

> *'Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, including impacts on heritage, efficient in the use of natural resources, including land-use, and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible. It is acknowledged, however that the nature of energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.'*

5.3.7 A summary of the principal legislation and planning policy of relevance to the design of the Project is presented in the **Supplementary Grimsby to Walpole Design Development Report**.

## Other Design Considerations

### Approach to material assets and waste

5.3.8 The Project would require the use of new materials during construction such as galvanised steel for pylons, reinforced concrete for the foundations, insulator sets (typically glass or polymeric) and aluminium conductors. Further information regarding materials will be provided within the project description within the ES.

5.3.9 The material sources are unlikely to be identified until the detailed design stage of the Project, which would happen post-consent. The nature of the Project means that it is difficult to use secondary sources during construction of the Project, as this can affect the operation and the design life of the Project. However, National Grid has existing processes in place to source materials from sustainable sources and to use recycled materials where these do not compromise the required design standards and operational life of the Project. This includes the application of the six principles as defined in BS 8001:2017 (Ref 9) to manage resources more effectively and to ultimately eliminate waste.

5.3.10 Resource efficiency will include measures to reduce the use of resources on the Project including total waste generated, use of materials, use of fresh water and energy use. In addition, measures to increase material reuse and waste recycling rates, and the consideration of the use of secondary aggregate, and the use of modular and off-site building methods, will form part of the resource efficiency planning.

5.3.11 Temporary materials such as aggregate for access routes and site compounds, works cabins and security fencing would be required during construction. Where practicable, temporary materials would be sourced from other construction projects within the region and reused at other construction projects after completion of the Project.

5.3.12 Waste materials would be produced by the Project. The contractor would be required to produce a Materials and Waste Management Plan (MWMP) prior to construction (commitment GG21 detailed in **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice**). This would set out the measures to reduce the generation of waste in the first place and appropriate measures to reuse and recycle materials where practicable. It would also identify appropriate waste facilities to dispose of materials.

5.3.13 Soil may need to be removed from site in certain circumstances, such as where the soil was found to be contaminated, in which case, the soils would be managed in an appropriate manner, as set out in the good practice measures within **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice** and the future MWMP.

### Approach to energy consumption

5.3.14 The Project would consume energy during manufacture and construction. The Project will consider a range of measures to reduce energy consumption during construction, such as the use of energy efficient plant and tools. The Project will aim to use local grid connections for temporary site power, where viable. Where not viable an alternative sustainable option should be used, such as appropriately sized alternatively fuelled or hybrid generators, where practicable.

5.3.15 A Construction Traffic Management Plan for the Project will set out measures to reduce journeys, such as car sharing and using public transport where practicable. It will also set out commitments regarding using electric vehicles or vehicles conforming with emission standards ratings (see commitment CC02 detailed in **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice**).

5.3.16 Energy consumption during maintenance and operation would be limited to the energy required to operate the Project. National Grid also has existing processes in place to monitor its energy consumption across the network. If consented, the operational energy requirements would be managed as part of the wider network operation.

5.3.17 The measures outlined above would reduce the energy consumption of the Project during both construction and operation, in line with the good design principles.

### Design resilience to climate change

5.3.18 The Project is needed to support the UK's net zero target by reinforcing the electricity transmission network along the East Coast and facilitating the connection of planned offshore wind generation, interconnectors with other countries and other sources of electricity, allowing clean green energy to be carried on the network. Therefore, the Project would contribute to supporting the UK's Net Zero transition. The need for the Project is further outlined in **Supplementary PEI Report Volume 2 Part A Chapter 1 Introduction**.

5.3.19 In terms of vulnerability of the Project to climate change, overhead lines are designed to withstand extreme weather conditions. The resilience of National Grid infrastructure to the effects of climate change are under continuous review and where relevant will result in appropriate updates to policy, procedure and design standards. The vulnerability of the Project (all permanent assets) to future flooding is considered as part of the June 2025 PEI Report Volume 3 Part C Appendix 5A Preliminary Flood Risk Assessment (Ref 1) and the **Supplementary PEI Report Volume 3 Part C Appendix 5A Preliminary Flood Risk Assessment**.

5.3.20 The Project description within the ES for the Project will detail likely construction materials. This will be supported by an estimate of the greenhouse gas emissions associated with the construction phase of the Project, comparing this against UK emissions to determine if the Project is likely to have a material impact on the ability of the Government to meet its carbon reduction targets. The assessment would also look to identify potential opportunities to save carbon.

## Environmental Mitigation Measures

5.3.21 Three types of mitigation have been assumed to be incorporated into the Project and the preliminary assessment. These are embedded, control and management and additional mitigation measures.

### Embedded mitigation measures

5.3.22 Environmental appraisal has been an integral part of the Project design process since conception, which has meant that the Project has sought to avoid environmentally sensitive features as far as reasonably possible.

5.3.23 National Grid has also embedded mitigation measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation of the Project.

5.3.24 Embedded mitigation measures are those that are intrinsic to and built into the design of the Project. **Table 5.2** outlines the embedded mitigation measures that have been incorporated into the Project to date.

Table 5.2 Embedded mitigation measures

| Embedded Measure | Benefits |
|---|---|
| Sensitive Routeing and Siting to develop the draft overhead line and underground cable alignment, siting of substations and draft Order Limits. | Avoids and reduces, as far as practicable, impacts on identified receptors, in line with the National Policy Statements EN-1 (section 5.10) (Ref 3) and EN-5 (section 2.10) (Ref 4) as well as the Holford Rules (Rule 1 and 2) (Ref 10) and the Horlock Rules (section III) (Ref 11). |
| The Project will be designed in accordance with National Grid design standards and would be compliant with the guidelines and policies relating to Electromagnetic Fields (EMF) stated in NPS EN-5 (Paragraphs 2.9.44 to 2.9.58) (Ref 4), including the ICNIRP guidelines (Ref 5). | Compliance with these guidelines and policies mean that the Project has already designed out potential effects from EMF to a level to meet health and safety standards. |
| The Project will be designed to comply with design safety standards including NETS SQSS and the suite of National Grid policies and processes which contains details on design standards required to be met when designing, constructing and operating its projects. | Existing National Grid policies and processes identify potential safety risks during construction and operation (and maintenance) which are designed out at each stage of project development. |
| Pylon fittings | Pylon fittings, such as insulators, dampers, spacers and clamps, are designed and procured in accordance with a series of National Grid Technical Specifications and must be type registered (rigorously tested) |

| Embedded Measure | Benefits |
|---|---|
| | to ensure the fitting conforms to the specification. These processes reduce the potential for audible noise and tones to occur from all types of fittings, including insulators. Where noise does occur, it is likely to be localised and of short duration. If this is due to a fault, action can be taken to rectify it. Where noise from fittings does occur which results in a complaint, appropriate action can be taken to seek to remedy the cause of the noise, usually through cleaning or replacing the relevant fitting. |
| The design includes strategically located temporary haul roads along the Project alignment to support construction of the Project. | Reduce the effects of construction traffic movements by avoiding receptors and sensitive routes on local roads. |
| Utilising existing watercourse crossing points as far as practicable | Where possible the design of the temporary haul roads has sought to utilise existing bridges and culverts. |
| Large or sensitive watercourses, for example those designated as main river, and those with Water Framework Directive (WFD) status, would be crossed by the temporary haul road using temporary clear span bridges. | Reduce the effects on watercourses, their banks, and water quality as a result of the installation and removal of temporary works (i.e. culverts) within the watercourse. |
| Siting of the proposed infrastructure within the draft Order Limits to minimise potential impacts sensitive receptors | Individual pylons and temporary haul roads have been designed to avoid direct and indirect impacts on sensitive receptors (including residential properties, businesses, designated sites and heritage assets) as far as possible. |
| Application of stand-off distances | Appropriate stand-off distances of 50 m or 100 m, where practicable, have been applied to sensitive receptors (including designated sites, priority habitats, heritage assets, residential properties and watercourse) to avoid direct effects where practicable. |

5.3.25 The design of the Project will be continually reviewed in line with assessment work and consultation feedback as it progresses to detailed design. The environmental assessment will continue to influence the design and mitigation measures may be embedded into the design to help avoid and reduce significant effects arising from the Project. **Table 5.2** will be updated in the ES to document any further embedded mitigation measures that have been developed and that are considered as part of the ES.

### Control mitigation measures

5.3.26 Control measures comprising management activities and techniques would be implemented throughout construction of the Project to limit impacts through adherence to good site practices. These are outlined in **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice** (each mitigation has been assigned a specific reference and these are referenced in each topic specific chapter). An updated version will be submitted as part of the application for development consent.

### Additional mitigation

5.3.27 Additional mitigation comprises over and above embedded and standard mitigation measures to reduce environmental effects. This would include, but not be limited to, landscape and visual mitigation such as tree planting and the creation of replacement habitat areas where required.

### Biodiversity net gain

5.3.28 The Environment Act 2021 includes a requirement for NSIPs to deliver at least 10 per cent BNG, which the Government has stated will be introduced from May 2026. Paragraph 4.6.1 of NPS EN-1 (Department for Energy Security and Net Zero) (Ref 3) also states that '*Although achieving biodiversity net gain is not an obligation on applicants, Schedule 15 of the Environment Act 2021 contains provision, which when commenced, mean the Secretary of State may not grant an application for a Development Consent Order unless satisfied that a biodiversity gain objective is met in relation to the onshore development in England to which the application relates*'.

5.3.29 National Grid has committed to 10 per cent Net Gain in environmental value, including as a minimum 10 per cent BNG across all its construction projects. While the 10 per cent target for the Project is not currently mandated for NSIPs until introduced by the Government, National Grid has set out commitments to deliver BNG within its Environmental Action Plan (Ref 12).

5.3.30 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.

## 5.4 Application of the Rochdale Envelope

5.4.1 Planning Inspectorate's Advice Note Nine (Ref 13) provides guidance regarding the degree of flexibility that may be considered appropriate within an application for development consent under the Planning Act 2008. The advice note acknowledges that there may be parameters of a project's design that are not yet fixed and, therefore, it may be necessary for the ES to assess likely worst-case scenario to ensure that the likely significant effects of the Project have been assessed.

5.4.2 Within this Supplementary PEI Report, the description of the Project reflects what is currently known. However, as the Project evolves, sufficient flexibility within the design would be allowed, to provide the future design and build Main Works Contractor(s) with sufficient scope for value engineering through innovative design. As such, the Project design presented in the ES and the accompanying assessment, will reflect the need for this flexibility and the requirements of Planning Inspectorate's

Advice Note Nine (Ref 13) to ensure that the likely significant effects of the Project are assessed on the basis of a reasonable worst-case scenario.

5.4.3 The preliminary assessment of significant effects in this Supplementary PEI Report is based on the description of the design, construction, operation (and maintenance) of the project presented in this Chapter and in **Supplementary PEI Report Volume 2 Part B Chapter 1 Introduction.** Consideration has been given to the potential for variation in some individual components of the Project.

## 5.5 Proposed Infrastructure

### Draft Order Limits

5.5.1 The draft Order Limits are defined as the maximum extent of land within which the Project may be undertaken, as defined for Sections 1-4 and 6-7 in the June 2025 PEI Report, and for Section 5, within this Supplementary PEI Report. They include both permanent and temporary land required to construct, operate and maintain the Project. The draft Order Limits for Sections 1-4 and 6-7 of the Project have not changed from those presented in the June 2025 PEI Report. Within this Supplementary PEI Report, the draft Order Limits for Section 5 have now been defined through the further design work undertaken since publication of the June 2025 PEI Report, as described in section 5.1 of this chapter. The draft Order Limits for the full Project, now including the draft Order Limits for Section 5, are illustrated on **Supplementary PEI Report Volume 2 Part A Figure 1.1 Draft Order Limits**.

### Limits of Deviation

5.5.2 As recognised by the Planning Inspectorate's Advice Note Nine (Ref 13), a necessary and proportionate degree of flexibility needs to be incorporated into the design of development so that unforeseen issues encountered after a development has been consented can be addressed. For example: previously unidentified poor ground conditions, or the identification of significant unrecorded archaeological remains which may require a pylon to be re-sited. Therefore, to allow for this necessary and proportionate degree of flexibility, limits of deviation (LoD) have been developed for the Project components which will ultimately be detailed in the Development Consent Order (DCO). The LoDs will provide a maximum distance or measurement of variation within which every component of the Project would be located.

5.5.3 In respect of a 400 kV overhead line and underground cables, LoDs will be applied horizontally and vertically.

#### Overhead Line

##### Horizontal

5.5.4 The horizontal LoD is in general 100 m (50 m either side of the centre line). In certain locations this has been reduced to less than 100 m to avoid a particular receptor and, in some locations, the LoD is wider to allow for additional flexibility at this stage. Where the width of 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 centre of the pylon could move approximately 20 m either side of the centreline subject to topography and local conditions. The proposed horizontal LoD for the Project, including the updated LoD for Section 5, are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.1 Proposed Project Design**.

5.5.5 There is no fixed limit on the movement of a pylon along the centreline of the proposed route i.e. pylons can move up and down the centreline (longitudinal LoD). While there is no fixed limit, in practical terms the movement of pylons along the centreline is constrained by a combination of the span distance between adjacent pylons and maintaining the necessary ground clearances without exceeding the vertical LoD described below.

#### Vertical

5.5.6 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. Crossings of the River Nene would require bespoke pylons due to the increased clearance requirements above the river and therefore require a larger vertical LoD to maintain an appropriate level of design flexibility to ensure clearance requirements are achieved.

### Underground Cables

#### Horizontal

5.5.7 For the underground cables proposed as part of the Project, the horizontal LoD is, in general, approximately 27m for double circuit installation (13.5 m either side of the total construction swathe) and approximately 31m for single circuit installation (15.5 m either side of the total construction swathe). This provides total construction swathe widths with LoD of 80m for double circuit installation and 50m for single circuit installation.

#### Vertical

5.5.8 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.

## Overhead Line

5.5.9 This section provides a general description of the proposed overhead lines. A more detailed description of the overhead lines associated with Section 5 of the Project is contained in **Supplementary PEI Report Volume 2 Part B Chapter 1 Overview of the Section and Description of the Project** (with descriptions of the overhead lines associated with the remaining Sections of the Project detailed the June 2025 PEI Report Volume 2 Part B Sections 1-7 Chapter 1 Overview of the Section and Description of the Project (Ref 1)).

5.5.10 The overhead line would comprise conductors supported by pylons. A typical pylon operating at 400 kV is approximately 50 m in height, however the proposed height of each pylon would depend on the specifics of each location such as topography, land use and crossings (e.g. including other electricity networks, watercourses and other obstacles). Indicative pylon heights will be provided within the ES and will be limited by a vertical LoD to be defined through the development of the Project. A typical span distance between pylons is approximately 350 m. In broad terms there are typically three pylons for every kilometre of overhead line.

5.5.11 **Table 5.3** presents the range of new pylons heights per each section of the Project. Indicative pylon heights will be provided within the ES and will be limited by a vertical LoD to be defined through the development of the Project. **Table 5.3** largely reflects the equivalent within June 2025 PEI Report Volume 2 Part A Chapter 5 Project Description (Ref 1), however it now includes updated information in relation to pylons within Section 5, that has been developed since publication of the June 2025 PEI Report.

Table 5.3 Range of pylon heights per Route Section

| Route Section | Average Height above ground level (m) | Minimum Height (up to) (m) | Maximum Height[3] above ground level (up to) (m) (including LoD) |
|---|---|---|---|
| Section 1 New Grimsby West Substation | 50 | 49 | 51 |
| Section 2 New Grimsby West Substation to New Lincolnshire Connection Substation A | 51 | 40 | 66 |
| Section 3 New Lincolnshire Connection Substation A and B (including the overhead line between them) | 54 | 49 | 66 |
| Section 4 New Lincolnshire Connection Substation B to New Weston Marsh Substations A and B | 55 | 49 | 75[4] |

[3] This is the maximum height of custom pylons within each Route Section including the LoD.

[4] This custom pylon height is where the Project crosses the A1121, railway and South Foot Drain (which is navigable).

| Route Section | Average Height above ground level (m) | Minimum Height (up to) (m) | Maximum Height[3] above ground level (up to) (m) (including LoD) |
|---|---|---|---|
| Section 5 New Weston Marsh Substations A and B | 52 | 43 | 72[5] |
| Section 6 New Weston Marsh Substations A and B to New Walpole B Substation | 56 | 46 | 111[6] |
| Section 7 New Walpole B Substation | 55 | 52 | 63 |

5.5.12 Pylons are in general either: suspension pylons, from which the conductor is simply suspended, or tension (angled) pylons, which are more robust structures that hold conductors in tension where the alignment of an overhead line changes direction or to maintain tension in long straight sections of the route. An example of a suspension pylon and a tension pylon are illustrated on **Image 5.2**. In some locations, such as on the overhead line entries to the proposed substations, terminal pylons are required. **Supplementary PEI Report Volume 3 Part A Appendix 5B Indicative Pylon Schedule** sets out which pylons are proposed to be suspension and those which are proposed to be tension pylons.

5.5.13 The tallest structures within the substation compound would be the overhead line gantries, which are typically steel or concrete structures used as a connection point for the downleads which connect between the terminal pylons of overhead lines and equipment within the substation. They are approximately 15 m high (with technical deviation).

5.5.14 The conductors are connected to the pylon by an insulator assembly consisting of a set of insulators (components made from a material with a high resistance to the flow of electric current such as glass or polymeric) and steel fittings and conductor clamps. Additional fittings, such as spacers and vibration dampers, would be fitted to the conductors. Spacers prevent the conductors from touching each other and vibration dampers prevent oscillations from the conductors from reaching the insulator fittings and minimise effects of fatigue loading. Arcing horns would also be required, which are required to protect insulators from damage due to dangerous electrical conditions, such as over-voltages due to electrical faults or lightning strikes.

5.5.15 The main components of an overhead line are shown in **Image 5.1**, which shows a typical steel lattice suspension pylon**. Image 5.2** shows a typical suspension pylon alongside a typical tension pylon.

[5] This custom pylon height is where the Project crosses the River Welland

[6] This custom pylon height is where the Project crosses the River Nene.

Image 5.1 Components of a Typical Transmission Connection

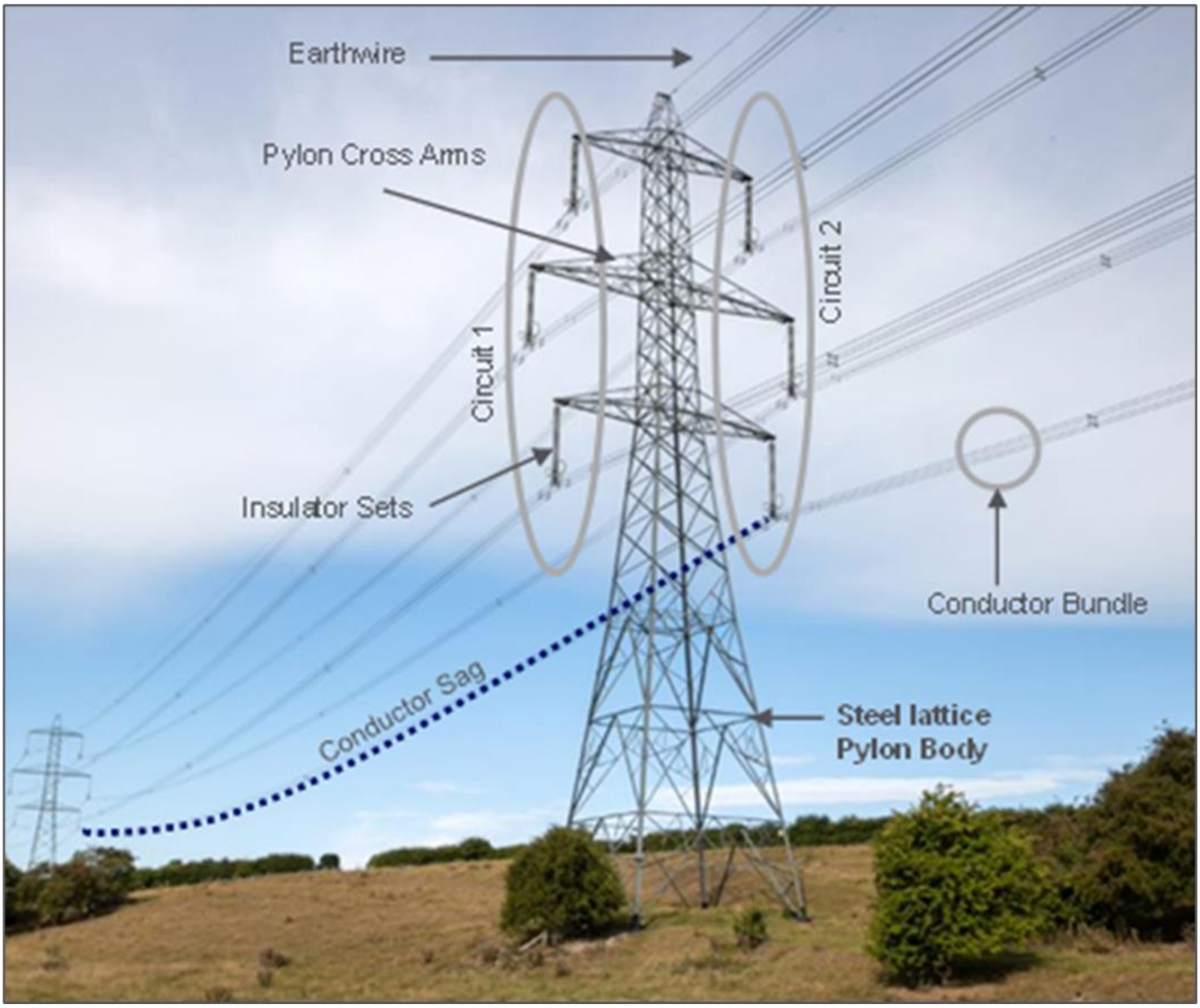


Image 5.2 Typical Suspension Pylon (left) and Typical Tension Pylon (right)

### Proposed pylons

5.5.16 The proposed pylons for the Project would comprise of steel lattice with three crossarms on either side of a central body.

5.5.17 Alternative pylon designs may also be considered, where mitigation (e.g. for landscape and visual effects) is required. Alternative pylon types have been considered as the design of the Project has evolved and therefore low height pylons have been proposed for a specific section of the overhead line route within Section 2 to minimise impacts on the Lincolnshire Wolds National Landscape (Area of Outstanding Natural Beauty). **Image 5.3** shows a low height pylon.

Image 5.3 Low Height Pylon

## Proposed Conductors and Insulators

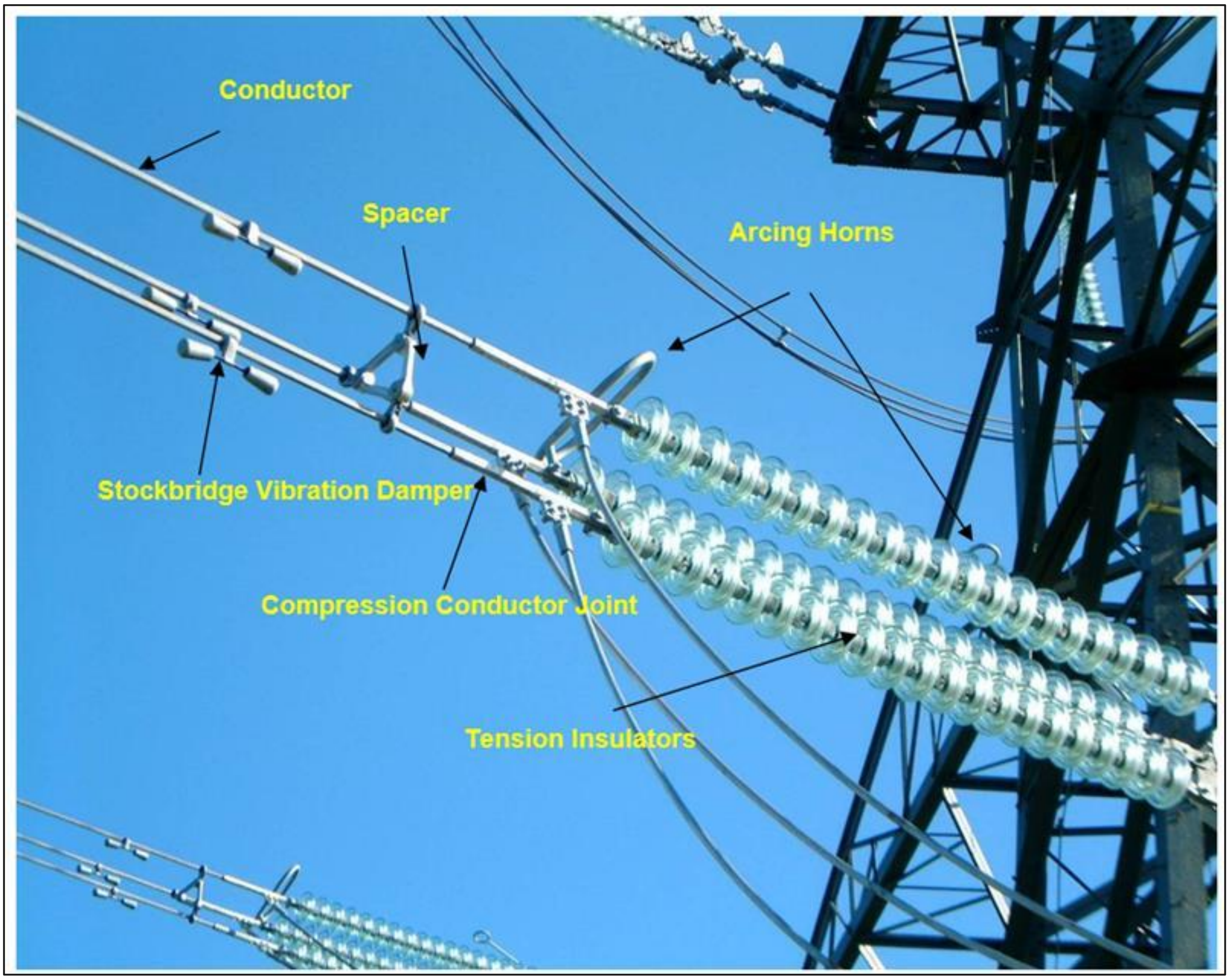
5.5.18 The conductor type is expected to be triple Araucaria comprising three conductors per bundle, and a total of 18 conductors per pylon which carry the electrical current along the overhead line route.

5.5.19 The overhead line would also be installed with an earthwire, typically consisting of a smaller single conductor which runs along the peaks of the pylons. The earthwire provides an electrical connection between the pylons to provide protection against lightning and distribution of fault currents. The earthwire may also contain a fibre optic cable which allows for telecommunication signals to be communicated along the overhead line route.

5.5.20 Insulators can be made of different types of material, but the most common industry standard is either glass or polymeric.

5.5.21 Suspension pylons would typically have a single insulator string hanging vertically downwards from each crossarm end to carry the conductor bundle, giving six sets of suspensions insulators on each suspension pylon. A tension pylon would typically have one insulator string per conductor in each conductor bundle attached to the end of each cross arm (i.e. three insulator strings for a conductor bundle consisting of three conductors). For one circuit on one side of the pylon, this gives a total of 18 sets of tension insulators (nine sets facing along one direction of the overhead line route, and nine sets facing the opposite direction). Across both circuits there would be a total of 36 sets of tension insulators per tension pylon. Tension insulators are oriented roughly horizontally outwards from the crossarm ends and accommodate the longitudinal force of the tension of the conductors. Conductor fittings are shown in **Image 5.4**.

Image 5.4 Indicative Conductor Fittings




## Substations

5.5.22 The Project proposes to include six new 400 kV substations. For the purpose of the preliminary environmental assessment, it has been assumed that all six substations would be Air Insulated Switchgear (AIS) substations. AIS substations use air as the insultation medium for electrical equipment meaning that equipment is predominantly located outdoors.

5.5.23 The six new 400 kV substations are referred to as:

i. New Grimsby West;

ii. New Lincolnshire Connection Substation A;

iii. New Lincolnshire Connection Substation B;

iv. New Weston Marsh Substation A;

v. New Weston Marsh Substation B; and;

vi. New Walpole B Substation.

5.5.24 A more detailed description of the substations associated with the Project is contained in Chapter 1 of the June 2025 PEI Report Volume 2 Part B Chapter 1 Overview of the Section and Description of the Project Sections 1, 3 and 7 (Ref 1) and **Supplementary PEI Report Volume 2 Part B Chapter 1 Overview of the Section and Description of the Project**.

### New Grimsby West Substation

5.5.25 The proposed new Grimsby West Substation would be located west of Wybers Wood and is the northern most connection of the Project in Section 1. The total footprint of the proposed new Grimsby West Substation would be approximately 10.2 ha, including a 5 m buffer around the fence line, with dimensions for the main compound of approximately 522 m by 185 m (approximately 9.7 ha), plus a 106 m by 52 m (approximately 0.5 ha) extra area near the entrance for ancillary equipment and car parking. The existing Grimsby West Substation is approximately 3.3 ha. Within the proposed new Grimsby West Substation there would be a range of specialist electrical equipment. The maximum height for High Voltage (HV) plant and buildings within the proposed New Grimsby West Substation is 12.5 m, and the maximum height for gantries, which connect the new and modified overhead lines to it, is assumed to be 15 m. The new Grimsby West Substation would be accessed via the existing substation road of Aylesby Road. An overview of the proposed new Grimsby West Substation design is provided in the June 2025 PEI Report Volume 2 Part B Section 1 Figure 1.3 Permanent and Operational Features (Ref 1). The existing substation would be decommissioned, in all, or part. The extent of decommissioning will be determined and reported in the ES.

### New Lincolnshire Connection Substation A

5.5.26 The proposed new Lincolnshire Connection Substation A (LCS A) would be located south east of Rye Lane and east of Mother Wood and would be located in Section 3. The total footprint of the proposed new LCS A Substation would be approximately 8.5 ha including a 5 m buffer around the fence line, with dimensions for the main compound of approximately 485 m by 178 m, (approximately 8.5 ha), plus a 30 m by 7 m (approximately 0.02 ha) extra area near the entrance for ancillary equipment and car parking. The maximum height for HV plant and buildings within the substation is 12.5 m and the maximum height for gantries, which connects the new overhead line, is assumed to be 15 m. The new LCS A would be accessed via a new road approximately 52 m long from Rye Lane to the north of the substation. An overview of the substation design is provided in the June 2025 PEI Report Volume 2 Part B Section 3 Figure 1.3 Permanent and Operational Features.

### New Lincolnshire Connection Substation B

5.5.27 The proposed new Lincolnshire Connection Substation B (LCS B) would be located adjacent to the A1111 and north east of Bilsby and would be located in Section 3.

The total footprint of the proposed new LCS B Substation would be approximately 9.6 ha, including a 5 m buffer around the fence, with dimensions for the main compound of approximately 522.5 m by 178 m, (approximately 9.3 ha), plus a 85 m by 40 m (approximately 0.3 ha) extra area near the entrance for ancillary equipment and car parking. The maximum height for HV plant and buildings within the substation is 12.5 m, and the maximum height for gantries, which connects the new overhead line to it, is assumed to be 15 m. The new LCS B would be accessed via a new road approximately 150 m long from Sutton Road to the west of the substation. An overview of the substation design is provided in the June 2025 PEI Report Volume 2 Part B Section 3 Figure 1.3 Permanent and Operational Features (Ref 1).

### New Weston Marsh Substation A

5.5.28 The proposed new Weston Marsh Substation A would be located to the east of Surfleet Seas End and the River Welland, north of Weston and would be located in Section 5. The total footprint of the proposed new Weston Marsh Substation A would be approximately 10.6 ha, including a 5 m buffer around the fence line, with dimensions for the main compound of approximately 523 m by 185 m, (approximately 9.7 ha), plus a 110 m by 50 m (approximately 0.6 ha) extra area near the entrance for ancillary equipment and car parking and 50 m by 55 m (approximately 0.3 ha) along the southern fence line for an overhead line gantry and high voltage plant. The maximum height for HV plant and buildings within the substation is 12.5 m, and the maximum height for gantries, which connects the new overhead line to it, is assumed to be 15 m. The new Weston Marsh Substation A would be accessed via the existing Marsh Road to the north west of the substation. An overview of the substation design is provided in **Supplementary PEI Report Volume 2 Part B Figure 1.3 Permanent and Operational Features**.

### New Weston Marsh Substation B

5.5.29 The proposed new Weston Marsh Substation B would be located east of the River Welland and north of Weston (south of new Weston Marsh Substation A) and would be located in Section 5. The total footprint of the proposed new Weston Marsh Substation B would be approximately 8.4 ha, including a 5 m buffer around the fence, with dimensions for the main compound of approximately 387 m by 185 m, (approximately 7.2 ha), plus a 184 m by 50 m (approximately 1.2 ha) extra area near the entrance for ancillary equipment and car parking. The maximum height for HV plant and buildings within the substation is 12.5 m, and the maximum height for gantries, which connects the new overhead line to it, is assumed to be 15 m. The New Weston Marsh Substation B would be accessed via the existing Stone Gate road to the south of the substation. An overview of the substation design is provided in **Supplementary PEI Report Volume 2 Part B Figure 1.3 Permanent and Operational Features**.

### New Walpole B Substation

5.5.30 The proposed New Walpole B Substation would be west of West Drove North and is the southernmost connection point, located in Section 7. The proposed New Walpole B Substation would be located within a secured fenced compound. The total footprint of the proposed New Walpole B Substation would be 15.4 ha, including a 5 m buffer around the fence line, with dimensions for the main compound of approximately 793 m x 190 m (approximately 15 ha), plus a 90 m x 41 m (approximately 0.4 ha) extra area near the entrance for ancillary equipment and car parking. A CSE compound of approximately 56 m by 52 m is also required close to the alignment of the existing 4ZM overhead line, which would connect one of the existing overhead line routes onto a short run of new 400 kV single circuit underground cable into the Walpole B substation. Within the proposed New Walpole B Substation there would be a range of specialist electrical equipment. The maximum height for HV plant and buildings within the substation is 12.5 m, and the maximum height for gantries, which connect the new and modified overhead lines to it, is assumed to be 15 m. The New Walpole B Substation would be accessed via a new road connected to West Drove North to the south of the substation. An overview of the substation design is provided in the June 2025 PEI Report Volume 2 Part B Section 7 Figure 1.3 Permanent and Operational Features (Ref 1).

### Underground Cables

5.5.31 This section provides a general description of the proposed underground cables. A more detailed description of the underground cables associated with Section 5 of the Project is contained in **Supplementary PEI Report Volume 2 Part B Chapter 1 Introduction**.

5.5.32 Underground cable systems would comprise two main components – the cable and connectors. Each of the two main components that make up an underground cable system has a design life of between 40 and 50 years. Connectors can be cable joints, which connect a cable to another cable, or overhead line connectors in a substation. Cables consist of an electrical conductor in the centre, which is usually copper or aluminium, surrounded by insulating material and sheaths of protective metal and plastic. For this high capacity double circuit route, the underground cable connection would typically comprise nine transmission cables per circuit, and two circuits in total (meaning 18 individual cables would be required).

5.5.33 Where conditions allow, cables are normally installed in excavated trenches. A cement-bound sand mix is used as backfill to protect the cables and help dissipate any heat generated by the cables in operation.

## 5.6 Construction

5.6.1 This section describes how the infrastructure described above would typically be constructed and installed. A preliminary CoCP has been produced and is included in **Supplementary PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice**. The topic chapters included in **Supplementary PEI Report Volume 2 Part B** and **Part C** have taken account of the control and management measures which are set out in the preliminary CoCP when undertaking the preliminary assessment.

### Construction Programme

5.6.2 Subject to gaining development consent in 2028, it is anticipated that access and construction of the Project would commence in 2029, starting with enabling works including site clearance activities, the installation of construction compounds and access roads. It is expected the main construction works (construction of overhead line, substations and underground cable) would continue through to 2033 (four years). Reinstatement would be required following the construction period over a period of up to two years.

5.6.3 The construction schedule will be developed as the Project progresses and will take account of seasonal constraints such as protected species breeding or hibernation seasons; reducing impacts associated with working within flood zones and network outage availability.

5.6.4 The nature of the Project is such that construction activities at each of the substations would occur for much of the four year period, albeit peak construction traffic movements are anticipated during construction of the substation platforms. Activities involved in overhead line construction are transient in nature and would move along the length of the overhead line route over time. Therefore, the works in any given area along the overhead line route would be of much shorter duration than those for the substations, which largely set the overall construction programme. Further details on the phasing of the Project programme will be set out in the ES

5.6.5 An indicative construction programme for the Project is presented in **Table 5.4**. The table reflects that also included within the June 2025 PEI Report Volume 2 Part A Chapter 5 Project Description (Ref 1).

Table 5.4 Indicative construction programme

| | 2029 | | | | 2030 | | | | 2031 | | | | 2032 | | | | 2033 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ACTIVITY** | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| **Overhead Line** | | | | | | | | | | | | | | | | | | | | |
| Enabling Works | ■ | ■ | ■ | | | | | | | | | | | | | | | | | |
| Access Works | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | |
| Foundations | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | |
| Pylon Construction | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | |
| Stringing | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | |
| Outage Works for Substation Line Entries | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | | | | |
| Commisioning and Demobilisation | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| **Substations** | | | | | | | | | | | | | | | | | | | | |
| Mobilisation (including haul road) | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | |
| Build Up Platform (including drainage) | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | |
| Equipment Bases | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | |
| Operational Building Construction | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | |
| High Voltage Plant Installation | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | |
| Low Voltage Cabling Installation | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | |
| Transformer Installation | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | |
| Mechanical and Engineering Installation (Building) | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | |
| Protection and Controls Installation | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | |
| Low Voltage Cabling Termination | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | |
| Stage 1 Commissioning | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | |
| Stage 2 Commissioning | | | | | | | | | | | | | | | | ■ | ■ | ■ | | |
| Demobilise/Reinstate | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | | | |
| Commissioning Complete | | | | | | | | | | | | | | | | | ■ | ■ | | |

## Construction Workforce

5.6.6 It is anticipated the peak construction workforce for the Project would be approximately 500 in 2029/30 for overhead line works and 700 in 2029/30 for substation works. The number of workers will be reviewed as part of the ongoing design work and any final updates will be presented in the ES.

## Construction Working Hours

5.6.7 The proposed core construction working hours are:

i. Monday to Friday 07:00 – 19:00; and

ii. Saturdays, Sundays, Bank Holidays and other Public Holidays 08:00 – 17:00.

5.6.8 The core construction working hours would exclude start up and close down activities which would take up to one hour before or after the core construction working hours.

5.6.9 Some construction activities may take place outside of the proposed core working hours referred to above, to minimise disruption to the public. Examples of these works, may include, but are not limited to the following:

i. the jointing of underground cables for third party services, with the exception of cable cutting which would only take place during the core working hours;

ii. the installation and removal of conductors, pilot wires and associated protection across highways, railway lines, existing overhead lines or watercourses;

iii. the continuation of operations commenced during the core working hours to a point at which they can be safely paused;

iv. any highway works requested by the relevant highway authority as necessary to be undertaken outside of core working hours (where possible);

v. oil processing of transformers or reactors in substation sites;

vi. the testing or commissioning of any electrical plant installed as part of the authorised development;

vii. the completion of works delayed or held up by severe weather conditions which disrupted or interrupted normal construction activities;

viii. security monitoring and surveys;

ix. trenchless crossing operations;

x. deliveries of abnormal indivisible loads (AILs), for example the cable drums which may be outside the core working hours; and

xi. large concrete pours that cannot be reasonably completed within the core working hours.

## Construction Compounds

5.6.10 Construction activities would begin with the preparation and installation of construction compounds. A typical layout of a construction compound would typically include the following:

i. security gate house;

ii. plant and construction vehicle parking;

iii. site office parking area;

iv. site offices and welfare facilities;

v. fencing;

vi. safety/security lighting;

vii. laydown area;

viii. storage area;

ix. wheel wash;

x. collection, storage and disposal of surface water, in addition to water from within the compound including grey and foul water;

xi. soil bund;

xii. spoil storage area;

xiii. power supplies (where feasible to do so alternatively fuelled generators would be used and/or a local grid connection); and

xiv. fuel storage.

5.6.11 Smaller satellite compounds would be required at specific working areas along the route to ensure provision of welfare, storage, and mess room facilities for site operatives.

5.6.12 The location of the proposed construction compounds (to the nearest town or to the nearest project infrastructure) are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.2 Temporary Construction Works** and shown in **Table 5.5**. The table reflects that included within the June 2025 PEI Report Volume 2 Part A Chapter 5 Project Description, however it now provides updated information on Section 5 that has become available since publication of the June 2025 PEI Report.

Table 5.5 Proposed construction compounds

| Compound Location (to nearest town/nearest project infrastructure) | Route Section | Compound Type |
|---|---|---|
| **Overhead Line Compounds** | | |
| South Reston | 2 | Main |
| Grainsby | 2 | Satellite |
| Laceby | 2 | Satellite |
| Burgh le Marsh | 4 | Main |
| Gosberton | 4 | Main |
| Northlands | 4 | Satellite |

| Compound Location (to nearest town/nearest project infrastructure) | Route Section | Compound Type |
|---|---|---|
| Whaplode St Catherine | 6 | Satellite |
| Four Gotes | 6 | Satellite |
| **Substation Compounds** | | |
| New Grimsby West | 1 | Substation |
| New LCS A | 3 | Substation |
| New LCS B | 3 | Substation |
| New Weston Marsh Substation A[7] | 5 | Substation |
| New Weston Marsh Substation B | 5 | Substation |
| Walpole B | 7 | Substation |

## Construction Access

### Construction traffic routes

5.6.13 Construction traffic would access the Project site using the existing highway network. Construction traffic routes is the term used to describe the public roads upon which construction vehicles would travel to site, having left the Strategic Road Network. The proposed construction traffic routes for the Project are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.3 Construction Traffic Routes**, including updated information on construction traffic routes for Section 5.

5.6.14 The construction traffic routes have been split down into Primary Access Routes (PARs). **Supplementary PEI Report Volume 2 Part B Chapter 9 Traffic and Movement** provides predicted volumes of traffic on each PAR during the construction of Section 5 (the June 2025 PEI Report Volume 2 Part B Sections 1-7 Chapter 9 Traffic and Movement provides predicted volumes of traffic on each PAR during the construction of the remaining Sections of the Project).

5.6.15 As this stage of the Project, it has been assumed that materials would be transported to/from the site via the highway network. However National Grid will continue to consider opportunities for use of alternative modes of transport (e.g. rail, water) during construction.

5.6.16 For the purposes of the preliminary assessments reported within the PEI, the use of road transport is considered a reasonable worst case scenario. Should alternative modes of transport be adopted by the Project, these will be subject to robust appraisal of their potential environmental impacts.

[7] Due to the phasing of construction activities, it may not be feasible to use the construction compound area immediately adjacent to the New Weston Marsh Substation A throughout the duration of the construction phase. Therefore, an additional area for this compound (located to immediately north of this), has been denoted to provide flexibility during construction.

5.6.17 The assessments reported within the ES will be based upon refined construction and logistics information and will be based upon the reasonable worst case scenario regarding the environmental effects of transport of materials to/from the site.

### Haul roads

5.6.18 Dedicated on-site access routes, referred to as haul roads, would be established within the draft Order Limits to facilitate movement of vehicles and plant along the length of the route during construction. Access points (junctions) from the existing highway network would facilitate access to construction compounds and on-site haul roads, these are referred to as bellmouths.

5.6.19 A two way on-site haul road would typically be 20 m wide, and would include temporary carriageways, soils storage, drainage and fencing. They would typically consist of stone laid on geotextile membrane. Other surfaces may also be used, comprising of interlocking temporary panels, depending on ground conditions and the duration and type of use. Soil stabilisation[8] techniques could be considered subject to local conditions.

5.6.20 The stone haul roads would be constructed using secondary or primary aggregates. The total amount of aggregate material that would be needed for the construction of the stone haul roads (including bellmouths) and pylon working areas will be determined through the development of the Project and reported in the ES. On completion of construction, the haul roads would be removed, and aggregates taken to an appropriate facility which could include recycling, or onward use, for example as secondary aggregate in the construction industry.

5.6.21 Culvert installations would be required for temporary haul roads to cross ditches and watercourses. The size and depth of a culvert is dependent upon the dimensions of the crossing, sensitivity, and importance of the watercourse. To maintain the flow of a watercourse during installation of the culvert, a pump would be used on-site. The Project would require 534 no. watercourse crossings (including drains and ditches), 474 of these would be by culvert and 19 no. would be by single span bridge. The locations of the proposed temporary culverts and single span bridges for the Project, including updated information on proposed locations for Section 5, are detailed in **Supplementary PEI Report Volume 3 Part A Appendix 5C Indicative Bridge and Culvert Schedule**.

5.6.22 Should culverts not be suitable for a particular crossing, due to either the sensitivity of the watercourse or engineering requirements, a temporary bridge would be installed.

5.6.23 Temporary bridges may need to accommodate a mobile crane, this would be subject to detailed design and would be assessed on a site-by-site basis. Most bridge crossings would be of a short span and flat deck construction; however, Bailey style bridges may also be used. All bridges would be clear span, and the foundations would be placed clear of the main channel of the watercourse, where feasible.

5.6.24 Once the foundations are in place the temporary bridge would be fitted. Although the installation method is dependent on the type of bridge being installed, a typical bridge would be delivered in sections. Each bridge component would be assembled on-site and lifted into position by crane. With the bridge in position, decking panels would be lifted and fixed into position. The location of the proposed temporary bridge crossings

[8] Soil stabilisation is the process of altering the physical or chemical properties of soil to enhance its engineering performance.

for the Project, including updated information on proposed crossings for Section 5, are detailed in **Supplementary PEI Report Volume 3 Part A Appendix 5C Indicative Bridge and Culvert Schedule**.

### Installation of bellmouths and the creation of visibility splays

5.6.25 Bellmouths would consist of either new or existing access junctions. Widening of existing accesses from the public highway may be required. There are 121 no. bellmouths proposed to provide access to construction works and there are 82 no. cross over points, where construction traffic would cross the public road, but would not be used for general access/egress of the site. The location of the proposed bellmouths for the Project, including updated information on proposed bellmouth locations for Section 5, are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.2 Temporary Construction Works**.

5.6.26 The installation of bellmouths may require realignment or protection of existing underground services and the creation of visibility splays to create a line of sight for the safe use of the bellmouth. Within the visibility splay, vegetation would need to be cut to a specified height, relocation of street furniture or visual obstacles removed depending on local conditions, the speed rating of the road and whether traffic management was in place.

### Highway widening

5.6.27 In certain locations works to the public highway may be required to install passing places, potential surfaces upgrades or carriageway widening required. Areas of potential highway improvements for the Project, including updated information on potential highway improvements for Section 5, are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.2 Temporary Construction Works**.

## Topsoil Stripping

5.6.28 Topsoil may be required to be stripped from the bellmouths, access routes, site compounds and substation and pylon working areas. The topsoil would be stored carefully; typically in bunds on-site for later reinstatement in the same area (usually removed, stored, and reinstated in the same land parcel to avoid any cross contamination). Should the topsoil not be used on-site, then the topsoil would be taken off-site and disposal would be in accordance with the measures as set out in the MWMP. Temporary drainage would be installed as required, with environmental protection measures (such as silt fences or seeding of the storage bunds) installed where necessary.

## Drainage

5.6.29 Temporary drainage would be required during construction to manage rainfall runoff and water encountered during excavation, installation of working areas and compounds, where appropriate. The drainage design will include a variety of potential measures to address silt runoff. Construction sustainable drainage systems (SuDS) would be used if necessary and where appropriate.

## Vegetation Clearance Assumptions

5.6.30 Vegetation clearance may be undertaken prior to or during any of the activities identified above, this would be in accordance with any ecological requirements identified through the EIA and secured through a DCO requirement.

5.6.31 Vegetation clearance is required to ensure the Project can be safely constructed and operated. Vegetation clearance generally falls into four categories: removed, affected managed, potentially affected, and not affected. These areas will be shown on plans submitted as part of the application for the DCO and assessed within the relevant chapters of the ES.

i. For the purpose of the preliminary assessment within the June 2025 PEI Report and this Supplementary PEI Report, the following assumptions have been applied. Overhead line any vegetation within 20 m either side of the overhead line centreline would require removal;

ii. any vegetation between 20 m and 28 m of the overhead line centreline would be affected managed[9];

iii. any vegetation between 28 m and 50 m of the overhead line centreline would be potentially affected; and

iv. any vegetation beyond 50 m would not be affected.

### Construction access and working areas

5.6.32 Vegetation would be temporarily removed in the following areas of the Project:

i. in the span of the overhead line under the conductors (this would include an approximate 20 m strip along the overhead line alignment).

5.6.33 Vegetation would be permanently removed from the following areas of the Project:

i. within the substation extents;

ii. construction compounds;

iii. haul roads, including culverts;

iv. bellmouths and visibility splays;

v. pylon working areas;

vi. crossing protection working areas;

vii. bridge working areas;

viii. highway widening;

ix. trackway access and panel working areas;

x. operational, maintenance and third-party accesses;

xi. stringing areas and between crossing protection (for netting);

xii. proposed temporary drainage areas; and

[9] Management of vegetation for electrical clearances such as lopping or pruning.

xiii. third party works.

5.6.34 Vegetation would be affected managed in the following areas:

i. overhanging of accesses and bellmouths;

ii. trackway access and panel working areas;

iii. operational, maintenance and third-party accesses;

iv. stringing areas and between crossing protection (for netting);

v. proposed temporary drainage areas; and

vi. temporary fibre optic diversions.

5.6.35 Unless otherwise stated it is assumed that vegetation within the draft Order Limits (but outside one of the areas listed above) could be potentially affected when taking account of the flexibility afforded.

### Underground Cable

5.6.36 Any vegetation or crops up to 40 m either side of the proposed centreline of the cable (80 m width in total) may require removal before the topsoil is excavated and stored adjacent to proposed cable trench.

## Overhead Line Construction

5.6.37 The construction of the 400 kV overhead line for the Project would generally follow the sequence outlined below as work progresses along the length of the overhead line:

i. surveys including archaeological investigation;

ii. ground investigation;

iii. installation of bellmouths and creation of visibility splays;

iv. installation of stock proof fencing and gates or equivalent;

v. topsoil stripping, temporary drainage installation where required;

vi. installation of haul roads (including culverts and bridges) and demarcated pylon working areas;

vii. installation of pylon foundations (pad and column, mini pile, tube pile or bespoke);

viii. working area and layout of steelwork in preparation for erection;

ix. assembly (painting if required) and erection of steelwork;

x. installation of pylon signage including safety notice plate and anti-climbing devices;

xi. installation of crossing protection prior to stringing of conductors, including scaffolding;

xii. installation of insulator assemblies on suspension pylons;

xiii. establishment of machine sites for conductor stringing;

xiv. conductor and earthwire stringing;

xv. temporary earthing;

xvi. installation of tension insulator assemblies on tension and terminal pylons;

xvii. removal of construction equipment and reinstatement of ground and restoration of soils;

xviii. removal of haul roads and bellmouths; and

xix. removal of construction compounds and ground reinstatement.

5.6.38 Activities such as surveys, archaeological investigation, ground investigation, construction of bellmouths and haul roads could commence without the full construction compounds in place. Nominal office and welfare facilities would suffice for an initial period until the full construction compounds were available.

### Pylon working areas

5.6.39 Pylon working areas would typically be 60 m by 60 m for a suspension pylon and 70 m by 70 m for a tension pylon. They would either be stone laid on a geotextile, or formed of interlocking panels, depending on ground conditions and the duration and type of use. Soil stabilisation techniques could be considered subject to local conditions. The locations of the pylon working areas for the Project are shown on **Supplementary PEI Report Volume 3 Part A Figure 5.2 Temporary Construction Works**.

### Installation of pylon foundations (pad and column, mini pile or tube pile)

5.6.40 The foundations for the pylons would either be pad and column, mini pile or tube pile (or bespoke if required). The selection of foundation type would depend upon the ground conditions encountered.

### Assembly and erection of steelwork

5.6.41 The steelwork components would be brought to each pylon working area. The steelwork components would be bolted together on the ground. The pylon would be assembled in sections beginning from ground upwards, using a telehandler for the lower sections and a mobile crane for the upper sections.

### Crossing protection prior to stringing of conductors

5.6.42 Temporary scaffolding and nets would be installed during construction where required as a safety measure to protect assets such as roads, railways, and distribution network overhead lines (where not already moved underground) and could include hedgerows which would be crossed by the proposed 400 kV overhead line. This is required to protect these features during conductor stringing from the accidental dropping of conductors and any of the associated equipment. Temporary closures of some affected asset, such as roads, may be required during these works to install the protective netting, or indeed may be used instead of installing scaffolding.

5.6.43 The scaffolding would be transported to site using a lorry or tractor and trailer and assembled either side of the feature being protected. Alternative methods may be utilised dependant on local site conditions/restrictions, such as aerial catenary support systems, where feasible. The proposed locations for the Project, including updated information on proposed locations for Section 5, are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.2 Temporary Construction Works**.

### Installation of insulators

5.6.44 The insulators would be fastened to the cross arms of the pylons, with running wheels hung from the end of the insulators to carry the pilot wires in preparation for installing the conductors.

### Establishment of machine sites for conductor stringing

5.6.45 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.

5.6.46 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.

5.6.47 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 the other end of the section the full conductor drums would be arranged in close proximity to the tensioning machine ('tensioner'). The proposed locations for the Project, including updated information on proposed locations for Section 5, are shown on **Supplementary PEI Report Volume 2 Part A Figure 5.2 Temporary Construction Works**.

### Conductor stringing

5.6.48 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 8T, 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.

5.6.49 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 winch 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 winch 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. Additional fittings, such as spacers, vibration dampers and arcing horns would be fitted.

5.6.50 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. A drone/helicopter may be utilised in the construction of the overhead line, and/or transportation of equipment to the Project site.

### Dismantling of existing pylons

5.6.51 There is a requirement for the reconfiguration of existing 4KG overhead line to connect to the New Grimsby West Substation and for the existing 4ZM overhead line to connect to Walpole B Substation. For the 4KG overhead line this would require the removal of seven existing pylons and a temporary diversion involving five new temporary masts. For the 4ZM overhead line this would require the removal of two existing pylons and a temporary diversion requiring two new temporary masts.

5.6.52 There is also a requirement for the reconfiguring of the existing 4ZM and 2WS overhead lines, to connect to the new Weston Marsh Substation A and to the new Weston Marsh Substation B, and for the existing 2WS overhead line to be repurposed so as to connect into the new Walpole B Substation. For this configuration, sections of the existing 4ZM and 2WS overhead line routes would be removed. On the existing 4ZM overhead line route, this would require the removal of four existing pylons and a temporary diversion involving nine new temporary masts. On the existing 2WS overhead line route, this would require the removal of three existing pylons.

5.6.53 Fittings such as dampers and spacers would be removed from the conductors. The conductors would be cut into manageable lengths or would be winched onto drums in a reverse process to that described for construction. The conductor, fittings and insulator assemblies would be removed from the pylons and lowered to the ground.

5.6.54 Each pylon would most likely be dismantled by crane, with sections unbolted and lowered to the ground for further dismantling and removal from site. Depending on the access and space available, it may be possible to cut the pylon legs and then pull the pylon to the ground using a tractor. The pylon could be cut into sections on the ground. Unless there was a compelling need for removal of all the foundations, these would be removed to approximately 1.5 m deep, sufficient for safe agricultural use of the land and subsoil and topsoil reinstated. All waste would be removed from site and recycled in line with waste disposal regulations at the time.

## Substation Construction

5.6.55 The construction of the AIS substations would generally follow the sequence outlined below:

i. vegetation clearance and stripping of topsoil from the proposed permanent site area and any working areas (topsoil would be stored in bunds on-site, for reuse).

ii. set up of temporary access, construction compounds and temporary drainage (including temporary fencing, laying and compaction of granular material (and asphalt where required, proposed at the construction laydown areas), excavation of drainage attenuation features, installation of pipes).

iii. earthworks for construction of permanent site access and platform (including the forming of temporary soil bunds for storing excavated material). Where practicable, temporary and permanent access would be combined.

iv. civil engineering works to include permanent fencing, access, drainage and foundations (which may include piling of larger structure and/or equipment that is sensitive to ground settlement).

v. installation of structures (for e.g. gantries).

vi. installation of HV plant and cables.

vii. building works.

viii. overhead line conductor stringing works to install the downleads between terminal pylons and gantries.

ix. testing of equipment.

x. commissioning/energisation.

xi. reinstatement of working areas outside the permanent substation boundary (including environmental mitigation).

### Removal of parts of the existing Grimsby West Substation

5.6.56 The existing substation would be decommissioned, in full, or part. The extent of decommissioning will be determined and reported in the ES.

## Cable Sealing End Compounds

5.6.57 Where overhead conductors transition to underground cables (and vice versa), a CSE compound[10] is required (for example in Section 7). This would comprise HV equipment, including CSEs and gantry structures to enable the transition between underground cables and overhead line conductors.

5.6.58 A CSE compound is required at each interface between the new overhead line and the new underground cable. The typical construction sequence is to install a CSE compound required for the Project would be similar to construction sequence outlined for substations.

5.6.59 For the preliminary assessment, it is assumed that piling is required for all CSE compounds. Percussive piling may be required in the CSE compounds. This will be confirmed through a programme of ground investigation which would inform the foundation design. Further details on the need for piling and specific locations will be set out within the ES.

## Underground Cables

5.6.60 Underground cables would typically comprise nine transmission cables per circuit, and two circuits in total. Each cable would be approximately 150 mm in diameter and buried within a series of three no. trenches 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 this is then topped with protective warning tile tape which protects the cables from accidental excavation. The cable depth would be approximately 0.5-1 m to the protective warning tile. For the preliminary assessment,

[10] A CSE is an area where overhead power lines connect to underground cables. The compound houses equipment that safely connects the overhead lines to the underground cables protecting the connection from weather and other environmental factors. It is normally a small, fenced area with electrical equipment inside.

a permanent easement[11] 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.

5.6.61 Depending on the cable manufacturer and availability of cable lengths, up to 2-3 joint bays would be required. At these locations, above ground link boxes would be required, The dimensions, frequency and specific locations of the link boxes are to be confirmed through detailed design, however, where practicable, they would be located near field boundaries.

### Third Party Services

5.6.62 To construct and operate the Project safely and efficiently, third party services such as water, gas, electricity, oil and telecommunication assets may require diversion, protection, assurance or removal. The specific mitigation methods for the modifications would need to be confirmed and agreed with the asset owner prior to any works being undertaken on their assets.

5.6.63 Examples of the typical mitigation works would include installation of protective crossings at interfaces with existing underground assets, modifications to cathodic protection system of existing pipelines where AC interface occurs and diversion of existing utility assets where required to facilitate the construction of the Project.

5.6.64 It is assumed that existing distribution network operator (DNO) and telecommunication overhead lines would be modified, by either diverting these underground or protecting them. The existing DNO overhead line assets identified for undergrounding and diversion are included within the draft Order Limits and form part of the Project. These proposed DNO undergrounding works for the Project, including updated information on works proposed in Section 5, are illustrated on **Supplementary PEI Report Volume 2 Part A Figure 5.4 Third Party Works**.

5.6.65 Third party mitigation works would most likely be undertaken by the asset owners prior to construction of the relevant section of the Project; however, the DCO would grant National Grid the power to undertake this work subject to agreement with the asset owner. Further details of the required third party mitigation works will be included within the ES.

### Removal of Construction Equipment and Site Reinstatement

5.6.66 Once the 400 kV overhead line is constructed, the haul roads and working areas at the pylon sites would be removed and the ground reinstated to the previous condition. Other surfaces would be reinstated, and any existing accesses utilised during construction would be restored to the condition they were in at the commencement of the works, unless agreed otherwise with the Local Planning Authority/landowner.

## 5.7 Operation

5.7.1 The operation of the Project includes the physical infrastructure as described in section 5.5.

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[11] Permanent easement is the width that the Applicant would require access rights over, in order to ensure maintenance and repair activities can be undertaken during operation of the Project.

5.7.2 During operation, the Project would reinforce the electricity transmission network in Lincolnshire, Cambridgeshire and Norfolk, and facilitate the connection of planned offshore wind generation, battery storage/solar, combined cycle gas turbines, interconnectors with other countries, increased distribution network capacity and subsea links to Scotland.

5.7.3 During operation, lighting would be required at the substation sites to allow for safe movement and the operation of equipment. Security lighting would also be required. All lighting would be designed in accordance with the appropriate design standards and National Grid technical specifications. For the purpose of the June 2025 and Supplementary PEI Report, it is assumed that the security lighting would be event activated (i.e. would not be continuous) and would be designed to be environmentally sensitive (e.g. directional and low light not exceeding 50 lux). Further information regarding substation lighting design will be provided within the project description within the ES.

5.7.4 The Project would be operated remotely in the same way as National Grid operates the rest of the network.

## 5.8 Maintenance

### Routine Maintenance

#### Overhead lines

5.8.1 The overhead line would be subject to annual inspection from the ground by foot patrol, small van, or by air using drone/helicopter to check for visible faults or signs of wear. The inspections would also indicate if plant/tree growth or third-party developments were at risk of affecting safety clearances. Inspections would provide input as to when refurbishment was required.

5.8.2 The overhead line could include fibre optic cables within the earthwire which allows for remote monitoring of circuits. Access for the fibre optic cables would usually be at the joint box positions located just above anticlimbing devices on certain pylons. The position and frequency of joint boxes would be subject to detailed design.

5.8.3 Access for vegetation management, telecommunications and fibre optic maintenance would be along operation and maintenance access routes as illustrated **Supplementary PEI Report Volume 2 Part A Figure 5.1 Proposed Project Design.** Temporary interlocking track mat panels may be required along these routes during maintenance activities.

#### Underground Cable

5.8.4 High voltage underground cables would be taken out of service periodically for routine maintenance and inspection in line with the required maintenance schedule.

#### Substations

5.8.5 The substations would typically be operated remotely. The substations would undergo regular visual checks. Regular maintenance of the substations would be undertaken and would involve electrical isolation of equipment before it is worked on. If the substation requires refurbishment or replacement works, vehicles would carry workers in and out of the site and suitable vehicles would be used to bring new materials and equipment to the site and to remove the old equipment.

## Repair and Refurbishment

5.8.6 The overhead line would be made up of a variety of materials including concrete and steel for the foundations, steelwork for the pylon structure, glass or polymer for the insulators, and aluminium for the conductors. All these materials have an expected lifespan which would vary depending on how the overhead line was used and where it is located. 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. The lifespan of the overhead line may be longer than the anticipated 80 years, depending on its condition, the environment to which it is exposed, refurbishments and transmission network requirements. Minor repairs or modifications may be required from time to time for local earthwire damage, addition of jumper weights, local conductor damage, broken insulator units, damaged or broken spacers, broken or damaged vibration dampers, and damaged or broken anti climbing devices. Minor repairs would be programmed locally by a maintenance team using pickup trucks and vans to access site along routes agreed with landowners. Access may require interlocking track mat panels.

5.8.7 Refurbishment work could involve:

i. replacement of pylons;

ii. replacement of conductors and earth wires;

iii. replacement of insulators and steelwork that holds the conductors and insulators in place;

iv. insulator fittings, conductor fittings, pylon signage;

v. painting or replacement of the pylon steelwork; and

vi. foundation repairs/upgrades.

5.8.8 Refurbishment would usually be undertaken in two stages because the overhead line has two circuits, one on each side of the pylon. This means that work can be undertaken on one side only, so that the other side can be kept ‘live’. Once all the work has been completed on the first side, the circuit would be re-energised, and the opposite side switched off, so that the work could be carried out on the other side.

5.8.9 The refurbishment works would require temporary access routes, a small compound and potentially scaffolding to protect roads and other features during the work.

5.8.10 Vans are used to carry workers in and out of site and trucks are used to bring new materials and equipment to site and remove old equipment. Temporary works including installation of access routes and installation of scaffolding to protect roads, railways and footpaths would be required as necessary for the overhead line refurbishment (similar to the initial construction requirements). During the lifetime of the substations, there may be a requirement to replace or refurbish certain components or pieces of equipment. This would usually involve delivery of new equipment to site, typically via standard HGVs or low loader HGVs, however some larger equipment may require specialised AIL delivery activities, which may require short-term road closures. When a cable repair is needed, the area where the fault is located would be accessed using a temporary access. A working area would be established, like that used for construction, and the ground would be excavated. If a cable needs to be replaced, then that section of the cable (between two joints) would need to be removed and new joints constructed. Staffing and vehicle requirements for maintenance activities would vary depending on the scale of the works.

## 5.9 Decommissioning

5.9.1 NPS EN-1 (Ref 3) paragraph 4.3.5 states that the ES should cover the decommissioning of a project, however decommissioning of electricity networks is not specifically covered in NPS EN-5 (Ref 4) which recognises that generally, nationally significant electricity networks are likely to have an ongoing function, but will be subject to maintenance, reinforcement works and for assets to be replaced when they come to the end of their lifespan. It is expected that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. To date, relatively few transmission projects have been decommissioned since the main expansion of such infrastructure in the 1950s and 1960. The cables and pylons for overhead transmission lines are replaced periodically, originally under National Grid’s permitted development rights.

5.9.2 As set out in NPS EN-5 (Ref 4) paragraph 2.1.4, nationally significant electricity networks are likely to have an ongoing function, that will be subject to maintenance and reinforcement works. Such assets would be replaced at the end of their lifespan.

5.9.3 Decommissioning would only be undertaken if there were substantial changes to how electricity is transmitted around the country or significant changes to the sources of generation and areas of demand. If the Project, or any part of it, is to be decommissioned, a written scheme of decommissioning would be submitted for approval by the relevant planning authorities at least six months prior to any decommissioning works. The decommissioning works would follow National Grid processes at the time for assessing and avoiding or reducing any environmental impacts and risks.

5.9.4 There are currently no specific plans to decommission the Project, with the exception of decommissioning of the existing Grimsby West Substation (in full or part). As such decommissioning has been scoped out of the assessment.

### Overhead Line

5.9.5 If the Project is required to be decommissioned sections of overhead line between the new substations would be removed. Fittings such as dampers and spacers would be removed from the conductors. The conductors would be cut into manageable lengths or would be winched onto drums in a reverse process to that described for construction. The conductor, fittings and insulator assemblies would be removed from the pylons and lowered to the ground.

5.9.6 Each pylon would most likely be dismantled by crane, with sections cut and lowered to the ground for further dismantling and removal from site. Depending on the access and space available, it may be possible to cut the pylon legs and then pull the pylon to the ground using a tractor. The pylon could be cut into sections on the ground. Unless there was a compelling need for removal of all the foundations, these would be removed to approximately 1.5 m deep, sufficient for safe agricultural use of the land and subsoil and topsoil reinstated. All waste would be removed from site and recycled in line with waste disposal regulations at the time.

## Substations

5.9.7 Typically, the above ground features of the substations would be removed (unless otherwise agreed). Any above ground buildings would be demolished and taken off-site for suitable disposal along with any other above ground features such as electrical equipment. Any temporary access tracks and working areas required would be removed and the site reinstated to an appropriate end use.

## Underground Cable

5.9.8 If the project is required to be decommissioned, the underground cables would be electrically isolated and disconnected at either end. The existing cable route would be assessed to evaluate if it is environmentally viable to excavate and remove. Any above ground hardware would be removed from the route and reinstated to ground level.

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