The Great Grid Upgrade

Grimsby to Walpole

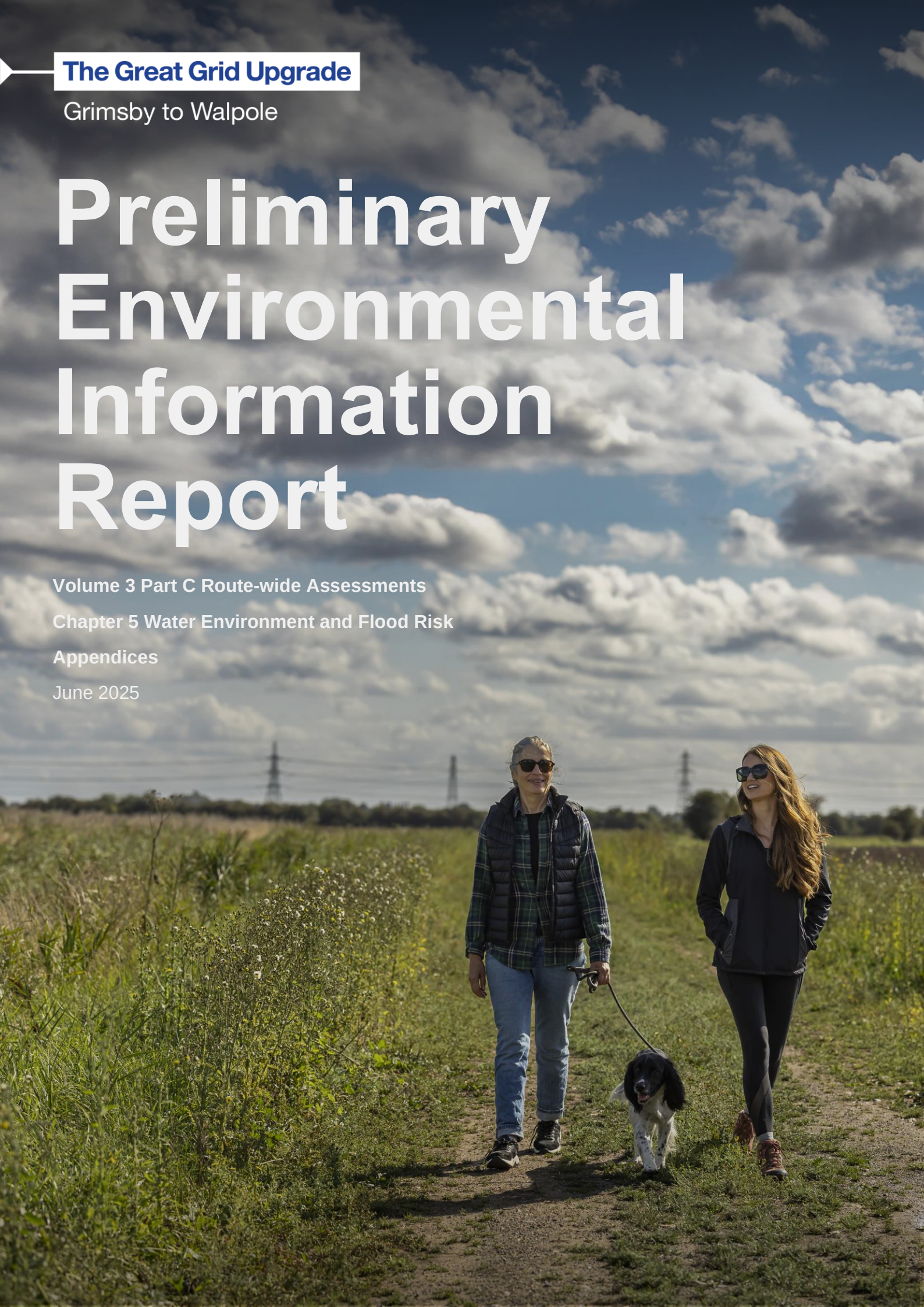
Preliminary Environmental Information Report

Volume 3 Part C Route-wide Assessments

Chapter 5 Water Environment and Flood Risk

Appendices

June 2025



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5A. Preliminary Flood Risk Assessment

nationalgrid

Contents

5A. Preliminary Flood Risk Assessment

5A.1 Introduction

Background

5A.1.1 This preliminary Flood Risk Assessment (Preliminary FRA) has been prepared by WSP on behalf of National Grid Electricity Transmission plc (National Grid) and is intended to give consultees an understanding of the potential flood risk in relation to the Grimsby to Walpole Project (the Project).

5A.1.2 The proposal by National Grid is to reinforce the transmission network with a new 400 kilovolt (kV) electricity transmission line over a distance of approximately 140 km starting from a new 400 kV substation west of the town of Grimsby in North East Lincolnshire and ending at a new 400 kV substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District. The Project also includes the construction two new 400 kV Lincolnshire Connection Substations located south-west of Mablethorpe in East Lindsey, up to two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District and the decommissioning (in full or part) of the existing Grimsby West Substation.

5A.1.3 The Project is a Nationally Significant Infrastructure Project (NSIP), as defined under Section 16 of the Planning Act 2008 (PA 2008) (Ref 1) because it comprises a new electricity line above ground with a length of more than 2 km and with an operating voltage of above 132 kV.

5A.1.4 The Preliminary FRA has been prepared to inform statutory consultation under Section 42 of the PA 2008 ahead of a subsequent application for a Development Consent Order (DCO) to the Secretary of State. It forms Appendix 5A to the **Preliminary Environmental Information (PEI) Report Volume 2 Part C Chapter 5 Water Environment and Flood Risk** and is to be read in conjunction with the following chapters:

i. **PEI Report Volume 2 Part A Introduction**;

ii. **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**; and

iii. **PEI Report Volume 2 Part C Chapter 5 Water Environment and Flood Risk**.

5A.1.5 A description of the Study Area adopted for the purposes of this assessment is provided in the Study Area sub-section of section 5A.3 of this report. A description of the Project and the associated proposed new permanent infrastructure is found in Project Description, sub section of section 5A.3 of this report, with further details provided in **PEI Report Volume 2 Part A Chapter 5 Project Description**.

5A.1.6 For the purpose of reporting in the PEI Report, the Project has been split into seven Sections, based largely on the different project components, as detailed in section 5A.3.2. This Preliminary FRA has been prepared on a route-wide basis and considers all seven Sections of the Project that sit within the Study Area.

5A.1.7 Further details on the assessment of the preliminary likely significant effects associated with the individual Sections of the Project on the Water Environment are found in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**.

Scope and Methodology

Scope

5A.1.8 The Preliminary FRA comprises a preliminary assessment of the risk of flooding within the Study Area posed to, and arising from, the Project during the construction and operation phases. The scope has also been informed through consultation and engagement with relevant consultees. A summary of the stakeholder engagement undertaken to date is provided in **PEI Report Volume 3 Part A Appendix 4D Summary of Stakeholder Engagement**.

5A.1.9 Subject to gaining development consent in 2028, the construction phase 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 substations and overhead line) would continue through to 2033 (four years). Please refer to **PEI Report Volume 2 Part A Chapter 5 Project Description** for further details on the construction phase.

5A.1.10 The National Policy Statement (NPS) for Electricity Networks Infrastructure (Ref 2) states that nationally significant electricity networks, such as the Project, are likely to have an ongoing function that will be subject to maintenance and reinforcement works prior to replacement at the end of their lifespan. There are currently no specific plans to decommission the Project, with the exception of the proposed decommissioning (in full or part) of the existing Grimsby West Substation. 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. For the purposes of this assessment, it has been assumed that the Project would have a design life of at least 80 years given the life expectancy of the materials required for the Project is up to approximately 80 years.

5A.1.11 As proposed in the Scoping Report (Ref 3) decommissioning has been scoped out of the environmental assessment as there are no specific plans to decommission the Project as a whole. This approach was agreed as part of the Scoping Opinion (Ref 4).

5A.1.12 The Preliminary FRA has been produced to facilitate comment from stakeholders on the emerging design and aims to define the scope of any additional assessment required to be undertaken as the Project progresses. It will be further developed in line with emerging design information and ongoing stakeholder consultation to form a FRA which is to be submitted as part of an Environmental Statement (ES) in support of the DCO application.

Methodology

5A.1.13 The Preliminary FRA follows a source-pathway-receptor led approach to the assessment of flood risk. Sources are defined as the potential source of flood risk to be assessed, such as direct rainfall, watercourses, the sea, groundwater or infrastructure. Pathways define the means by which the source of flood risk can

impact potential receptors. A specific combination of sources and pathways is referred to as a flood mechanism, such as tidal overtopping of sea defences as a result of high tides and storm surge. Receptors comprise those persons or assets that could be vulnerable to the flood mechanisms identified.

5A.1.14 The source pathway receptor led approach included establishing the Study Area as the extent of the draft Order Limits and the Refined Weston Marsh Substation Siting Zone (hereafter referred to as the Refined Siting Zone) plus a 500 m buffer around this boundary. With the study area established an assessment of all sources of flooding was carried out which identified those that required further assessment. Assessment was then undertaken of the risk of flooding posed to, and arising from the Project within the Study Area. Preliminary mitigation measures were identified which are expected to be required to manage the risk of flooding.

5A.1.15 With due consideration of the temporary nature of many of the elements of the Project, which are only required during the construction phase, and the outline nature of design work currently undertaken, the approach taken in the Preliminary FRA is considered to be proportionate to the risk and appropriate to the scale, nature and location of the Project.

Sources of Information

5A.1.16 The Preliminary FRA has been prepared in accordance with the Overarching NPS for Energy (EN-1) (NPS EN-1) (Ref 5) and NPS for Electricity Networks Infrastructure (EN-5) (NPS EN-5) (Ref 2).

5A.1.17 Reference has also been made to the National Planning Policy Framework (NPPF) (Ref 6) and the associated Flood Risk and Coastal Change Planning Practice Guidance (PPG) (Ref 7) for additional guidance where relevant.

5A.1.18 The emerging outcomes of ongoing pre-application consultation with key flood risk stakeholders, namely the Environment Agency along with the various Local Planning Authorities (LPAs), Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs) operating within the Study Area, are referenced as appropriate throughout.

Terminology

5A.1.19 This Preliminary FRA expresses the probability associated with a given flood event in terms of annual probability, which is the inverse of the annual return period. For example, a flood event with a return period of 1 in 100 years can be expressed as having a 1 per cent annual probability (i.e. a flood event that has a 1 per cent chance of occurring in any given year) as detailed in paragraph 002 of the Flood Risk and Coastal Change PPG (Ref 7).

5A.1.20 **Table 5A.1** summarises the annual probabilities associated with the flood events used to define each Flood Zone as given by the Environment Agency's Flood Map for Planning (Ref 8) and detailed in Paragraph 078 of the Flood Risk and Coastal Change PPG (Ref 7).

Table 5A.1 Flood zone definitions

Flood Zone	Probability of Flooding	Definition
Flood Zone 1	Low	Land having a less than 0.1% annual probability of river or sea flooding.
Flood Zone 2	Medium	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Flood Zone 3a	High	Land having a 1% or greater annual probability of river flooding; or land having a 0.5% or greater annual probability of sea flooding.
Flood Zone 3b	Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters.

5A.1.21 **Table 5A.2** summarises the annual probabilities associated with the flood events used to define the risk of flooding as given by the Environment Agency's Risk of Flooding from Rivers and Sea and Risk of Flooding from Surface Water mapping (Ref 9).

Table 5A.2 Long-term flood Risk mapping definitions

Probability of Flooding	Definition
Very Low	Land having a less than 0.1% annual probability of flooding.
Low	Land having between a 0.1% and 1% annual probability of flooding.
Medium	Land having between a 1% and 3.3% annual probability of flooding.
High	Land having a 3.3% or greater annual probability of flooding.

Structure

5A.1.22 This Preliminary FRA is structured as follows:

i. section 5A.2 (Legislation and Policy Framework) establishes the planning policy context for the Preliminary FRA and the subsequent FRA;

ii. section 5A.3 (Study Area and Project Description) provides an overview of the Study Area and a description of the Project;

iii. section 5A.4 (Flood Risk Screening) considers the potential risk from all sources of flooding prevailing across the Study Area and identifies those that require further assessment;

iv. section 5A.5 (Flood Risk Assessment) presents a preliminary assessment of the risk of flooding posed to, and arising from, the Project within the Study Area

associated with those risks identified in section 5A.4 as requiring further assessment;

v. section 5A.6 (Flood Risk Management) presents a preliminary identification of the mitigation measures that are expected be required to manage the risks of flooding assessed in section 5A.5;

vi. section 5A.7 (Planning Requirements) discusses the requirements of the Sequential Test and the Exception Test in relation to the Project; and

vii. section 5A.8 (Conclusion) summarises the key findings and conclusions arising from the Preliminary FRA.

5A.2 Legislation and Policy Framework

Introduction

5A.2.1 The following section sets out the relevant regulatory and planning policy context for the Project with respect to flood risk. It is structured in hierarchical order, from national policy to local guidance, and is to be read in conjunction with **PEI Report Volume 2 Part A Chapter 2 Legislative, Regulatory and Planning Policy Context, PEI Report Volume 3 Part A Appendix 2B National and Regional Planning Policy** and **PEI Report Volume 3 Part A Appendix 2Cii Local Plan Policy: Route-wide**.

National Planning Policy and Guidance

National Policy Statements

Introduction

5A.2.2 Section 104 of the PA 2008 (Ref 1) identifies the role that NPSs play in the decision-making process when considering applications for development consent, with Section 104(2) stating that:

'In deciding the application, the SoS must have regard to -

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

[…]

d) any other matters which the Secretary of State thinks are both important and relevant to the Secretary of State's decision'

5A.2.3 The Preliminary FRA has therefore been prepared in accordance with the requirements of the PA 2008 and the following NPSs:

i. Overarching NPS for Energy (EN-1) (NPS EN-1) (Adopted 2024) (Ref 5); and

ii. NPS for Electricity Networks Infrastructure (EN-5) (NPS EN-5) (Adopted 2024) (Ref 2).

5A.2.4 NPS for Energy EN-1 sets out national planning policy for NSIPs in the energy sector, with NPS EN-5 providing technology specific policy for electricity transmission

and distribution. Where the respective NPSs do not provide sufficient detail to inform the Preliminary FRA, reference is made to the NPPF and the Flood Risk and Coastal Change PPG (Ref 7) as set out in the respective sections below.

5A.2.5 Section 5.8 of NPS EN-1 considers the generic flood risk impacts that arise from the development of all types of infrastructure covered by the energy NPSs. Section 4.10 details how the effects of climate change should be taken into account to ensure that new energy infrastructure is sufficiently resilient to the anticipated impacts of climate change.

5A.2.6 Section 2.3 of NPS EN-5 details how electricity network infrastructure should consider climate change adaptation and resilience within the design of new schemes. Section 2.3 details that applicants should set out to what extent the proposed development is expected to be vulnerable and how it has been designed to be resilient to flooding.

5A.2.7 The minimum requirements for the assessment of flood risk in relation to the Project given by NPS EN-1 and EN-5 are summarised in **Table 5A.3** below. This is not an exhaustive list, but a summary of key applicable points.

Table 5A.3 Minimum FRA requirements

Category	Source	Requirement
Application	NPS EN-1 (5.8.13)	The application should be supported by an appropriate FRA.
Assessment	NPS EN-1 (5.8.14 and 5.8.15)	This assessment should identify and assess the risks of all forms of flooding to and from the project and demonstrate how these flood risks will be managed, taking climate change into account.
		The FRA should be proportionate to the risk and appropriate to the scale, nature and location of the Project.
		The FRA should be undertaken by competent people, as early as possible in the process of preparing the proposal.
		The FRA should be supported by appropriate data and information, including historical information on previous events.
		The FRA should consider and quantify the different types of flooding (whether from natural and human sources and including joint and cumulative effects) and include information on flood likelihood, speed-of-onset, depth, velocity, hazard and duration.
		The FRA should consider the effects of a range of flooding events, including extreme events, on people, property, the natural and historic environment, and river and coastal processes.

Category	Source	Requirement
Policy	NPS EN-1 (5.8.36)	The Project should be in line with any relevant national and local flood risk management strategy.
Climate Change	NPS EN-1 (5.8.15)	The FRA should take the impacts of climate change into account, across a range of climate scenarios, clearly stating the development lifetime over which the assessment has been made.
	NPS EN-5 (2.3.2)	The applicants should set out to what extent the Project is expected to be vulnerable to climate change and the measures incorporated to ensure that it would be resilient to flooding, particularly for substations that are vital to the network; and especially in light of changes to groundwater levels resulting from climate change.
The Sequential Test and The Exception Test	NPS EN-1 (5.8.36 and 5.8.21)	The Sequential Test must be applied and satisfied as part of site selection, taking all sources of flood risk and climate change into account.
	NPS EN-1 (5.8.9, 5.8.10 and 5.8.11)	If, following application of the Sequential Test, it is not possible for the Project to be located in areas of lower flood risk, the Exception Test can be applied as defined in the Flood Risk and Coastal Change PPG (Ref 7). Both elements of the Exception Test should be satisfied for the Project to be consented.
On-site Flood Risk	NPS EN-1 (5.8.15 and 5.8.36)	The Project should be designed and constructed to remain safe and operational during its lifetime, with appropriate mitigation and management measures detailed in the FRA.
		The FRA should consider the vulnerability of those using the site, including arrangements for safe access and escape. Safe access and escape routes must be identified where required, as part of an agreed emergency plan, and any residual risk must be safely managed over the lifetime of the Project.
	NPS EN-1 (5.8.29 and 5.8.36)	The sequential approach should be applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk. Vulnerable aspects of the Project should be located on parts of the site at lower risk and residual risk of flooding.
	NPS EN-1 (5.8.36)	Land that is likely to be needed for present or future flood risk management infrastructure should be appropriately safeguarded from development to the extent that development would not prevent or hinder its construction, operation or maintenance.

Category	Source	Requirement
Off-site Flood Risk	NPS EN-1 (5.8.15 and 5.8.36 and 5.8.42)	The FRA must consider the risk of flooding arising from the Project in addition to the risk of flooding to the Project. The Project must be designed and constructed to remain safe and operational without increasing flood risk elsewhere over its intended design life. Exceptionally, where an increase in flood risk elsewhere cannot be avoided or wholly mitigated the Secretary of State may grant consent subject to present and future flood risk being mitigated to an acceptable extent.
	NPS EN-1 (5.8.41	If the Project has to be located in Flood Zone 3b for operational reasons, it should not result in a net loss of floodplain storage or impede water flows.
	NPS EN-1 (5.8.30 and 5.8.31)	If the Project could result in an increase in flood risk elsewhere through the loss of flood storage, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided. Where it is not possible to provide compensatory storage on site, it may be acceptable to provide it off-site if it is hydraulically and hydrologically linked. If the Project may cause the deflection or constriction of flood flow routes, these will need to be safely managed within the site.
Opportunities	NPS EN-1 (5.8.15)	The FRA should identify and secure opportunities to reduce the causes and impacts of flooding overall, making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management. The FRA should also identify and secure opportunities to reduce the causes and impacts of flooding overall during the construction phase.
	NPS EN-1 (5.8.29)	Applicants for development consent should seek opportunities to use open space for multiple purposes such as amenity, wildlife habitat and flood storage uses. Opportunities should be taken to lower flood risk by reducing the built footprint of previously developed sites and using Sustainable Drainage Systems (SuDS).
Residual Risk	NPS EN-1 (5.8.15)	The FRA should include the assessment of the residual risk after appropriate measures have been taken into account and demonstrate that these risks can be safely managed.
		The FRA should consider both the potential adverse and beneficial effects of flood risk management infrastructure, including raised defences, flow channels, flood storage areas and other artificial features, together with the consequences of their failure and exceedance.

Category	Source	Requirement
Surface Water Drainage	NPS EN-1 (5.8.15)	The FRA must consider how the ability of water to soak into the ground may change with development, along with details of how the proposed layout of the Project may affect drainage systems.
	NPS EN-1 (5.8.36)	SuDS must be used unless there is clear evidence that their use would be inappropriate.
	NPS EN-1 (5.8.26)	Site layout and surface water drainage systems should cope with events that exceed the design capacity of the system, so that excess water can be safely stored on or conveyed from the site without adverse impacts.
	NPS EN-1 (5.8.27)	The surface water drainage arrangements for the Project should, accounting for the predicted impacts of climate change throughout the development's lifetime, be such that the volumes and peak flow rates of surface water leaving the site are no greater than the rates prior to the Project, unless specific off-site arrangements are made and result in the same net effect.
	NPS EN-1 (5.8.37)	Approval for the Project's drainage system, including during the construction period, will form part of the development consent issued by the Secretary of State and must comply with any National Standards published by Ministers under paragraph 5(1) of Schedule 3 to the Flood and Water Management Act 2010 (FWMA 2010).
	NPS EN-1 (5.8.38)	Provision for appropriate operation and maintenance of any SuDS throughout the Project's lifetime must be made. Where this is secured through the adoption of any SuDS features, any necessary access rights to property will need to be granted.

National Planning Policy Framework

5A.2.8 The NPPF acts as guidance for LPAs and decision makers when drawing up local development plans and determining individual planning applications.

5A.2.9 Although the NPPF and the associated Flood Risk and Coastal Change PPG (Ref 7) are not directly applicable to NSIPs, they provide relevant additional guidance on a range of issues in relation to flood risk and both documents are referenced in paragraph 5.8.16 of the Overarching NPS for Energy (Ref 5). NPPF and Flood Risk and Coastal Change PPG provide the definition of flood zones, flood risk vulnerability classifications, flood risk compatibility, the requirements for FRAs, the application of the Sequential Test and the Exception Test and appropriate allowances for the anticipated effects of climate change.

5A.2.10 Paragraph 078 of the Flood Risk and Coastal Change PPG (Ref 7) defines the flood zones given by the Environment Agency's Flood Map for Planning as presented in

Table 5A.1. Annex 3 of the NPPF details the classification of flood risk vulnerability by development type, within Paragraph 079 of the Flood Risk and Coastal Change PPG (Ref 7) summarising the compatibility of flood risk vulnerability with flood zones. Further information on the classification of flood risk vulnerability and flood zone compatibility in relation to the various elements of the Project is provided in section 5A.3 of this Preliminary FRA.

5A.2.11 Paragraph 175 of the NPPF states that '[t]*he sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk).*'

5A.2.12 Paragraph 177 of the NPPF states that '[h]*aving applied the sequential test, if it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed'.* Paragraph 178 states that, '[t]*o pass the exception test it should be demonstrated that:*

a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and

b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.'

5A.2.13 Paragraph 181 of the NPPF requires that new development should not increase flood risk elsewhere, and that opportunities should be sought to reduce flood risk, where possible. It states that '[d]*evelopment should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:*

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'

5A.2.14 Paragraph 049 of the Flood Risk and Coastal Change PPG (Ref 7) states that "[w]*here flood storage from any source of flooding is to be lost as a result of development, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of the development, should be provided*." Paragraph 049 also states that '[t]*he loss of floodplain storage is less likely to be a concern in areas benefitting from appropriate flood risk management infrastructure or where the source of flood risk is solely tidal*.'

5A.2.15 There is a presumption for the use of SuDS within any development, except in rare instances that it can be demonstrated that SuDS principles cannot be feasibly incorporated within a development, as agreed with the planning authority.

5A.2.16 Paragraph 182 of the NPPF states that '[a]*pplications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:*

a) take account of advice from the Lead Local Flood Authority;

b) have appropriate proposed minimum operational standards; and

c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.'

5A.2.17 Paragraph 056 of the Flood Risk and Coastal Change PPG (Ref 7) states that '[w]*here possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:*

1. *into the ground (infiltration);*
2. *to a surface water body;*
3. *to a surface water sewer, highway drain, or another drainage system;*
4. *to a combined sewer.'*

Climate Change

5A.2.18 NPS for Energy (EN-1) and NPS for Electricity Networks Infrastructure (EN-5) provide advice on accounting for climate change, identifying that developments should be resilient and adaptive to the latest applicable climate change projections.

5A.2.19 The Environment Agency's climate change guidance (Ref 10) is to be used to determine appropriate climate change allowances for the FRA. The guidance provides allowances for the projected increases in peak river flow, peak rainfall intensity, sea level rise, and offshore wind speed and extreme wave height. Further details on the climate change allowances applicable to each element of the Project are provided in **Table 5A.13**.

Peak river flow

5A.2.20 The Environment Agency's allowances for peak river flow detail the anticipated changes to peak flow by sub-catchments of river basin districts known as management catchments.

5A.2.21 The range of climate change allowances for peak river flow given by the Environment Agency's guidance is based on percentiles which describe the proportion of possible scenarios that fall below a given allowance level and are defined as:

i. the 'central' allowance is based on the 50th percentile;

ii. the 'higher central' allowance is based on the 70th percentile; and

iii. the 'upper end' allowance is based on the 95th percentile.

5A.2.22 The allowances are provided for three epochs which are to be applied as appropriate given the intended design life of a given development:

i. the ‘2020s’, covering the period 2015 to 2039;

ii. the ‘2050s’, covering the period 2040 to 2069; and

iii. the ‘2080s’, covering the period 2070 to 2115.

5A.2.23 The latest allowances for peak river flow for the management catchments in which the Project is located are summarised in **Table 5A.4**.

Table 5A.4 Climate change allowances (peak river flow)

Allowance Category	Allowances for Peak River Flow (per cent)		
	The ‘2020s’ (2015-2039)	The ‘2050s’ (2040-2069)	The ‘2080s’ (2070-2115)
Louth Grimsby and Ancholme Management Catchment			
Central	4	-1	4
Higher central	9	5	12
Upper end	21	19	33
Witham Management Catchment			
Central	9	8	21
Higher central	14	15	32
Upper end	27	32	57
Welland Management Catchment			
Central	5	4	17
Higher central	10	10	28
Upper end	22	26	53
Nene Management Catchment			
Central	-2	-7	4
Higher central	4	0	13
Upper end	18	17	36
North West Norfolk Management Catchment			
Central	13	11	23
Higher central	18	18	33
Upper end	30	34	57

5A.2.24 The Environment Agency's climate change guidance advises that allowances should be applied based on the vulnerability of a given development using the following criteria:

i. 'In flood zones 2 or 3a for:

- *essential infrastructure – use the higher central allowance*
- *highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)*
- *more vulnerable – use the central allowance*
- *less vulnerable – use the central allowance*
- *water compatible – use the central allowance.*

ii. In flood zone 3b for:

- *essential infrastructure – use the higher central allowance*
- *highly vulnerable – development should not be permitted*
- *more vulnerable – development should not be permitted*
- *less vulnerable – development should not be permitted*
- *water compatible – use the central allowance*'

5A.2.25 The Environment Agency's climate change guidance provides advice on the application of allowances for peak river flow in the assessment of off-site impacts and in the calculation of floodplain compensation, stating that developments should '[u]*se the:*

i. central allowance for most cases

ii. higher central allowance when the affected area contains essential infrastructure'

Peak rainfall intensity

5A.2.26 The Environment Agency's climate change allowances (Ref 10) for peak rainfall intensity are required to be used for the design of surface water drainage infrastructure and for the assessment of surface water flood risk in small catchments with an area of less than five square km.

5A.2.27 The range of allowances for peak rainfall intensity given by the Environment Agency's guidance is based on percentiles which describe the proportion of possible scenarios that fall below a given allowance level and are defined as:

i. The 'central' allowance is based on the 50th percentile; and

ii. The 'upper end' allowance is based on the 95th percentile.

5A.2.28 The allowances are provided for two epochs which are to be applied as appropriate given the intended design life of a given development:

i. The '2050s', for development with a lifetime up to 2060; and

ii. The '2070s', for development with a lifetime between 2061 and 2125.

5A.2.29 The latest allowances for peak rainfall intensity for the management catchments in which the Project is located are summarised in **Table 5A.5**.

Table 5A.5 Climate change allowances (peak rainfall intensity)

Allowance Category	Allowances for Peak Rainfall Intensity (per cent)			
	3.3 % annual rainfall exceedance event		1% annual exceedance rainfall event	
	The '2050s' (-2060)	The '2070s' (2061-2125)	The '2050s' (-2060)	The '2070s' (2061-2125)
Louth Grimsby and Ancholme Management Catchment				
Central	20	25	20	25
Upper end	35	35	40	40
Witham Management Catchment				
Central	20	25	20	25
Upper end	35	35	40	40
Welland Management Catchment				
Central	20	25	20	25
Upper end	35	35	40	40
Nene Management Catchment				
Central	20	25	20	25
Upper end	35	35	40	40
North West Norfolk Management Catchment				
Central	20	20	20	25
Upper end	35	35	40	40

5A.2.30 The Environment Agency's climate change guidance provides advice on the application of allowances for peak rainfall intensity for developments with an expected lifetime beyond 2100, stating that '[f]*or flood risk assessments and strategic flood risk assessments assess the upper end allowances. You must do this for both the 1% and 3.3% annual exceedance probability events for the 2070s epoch (2061 to 2125). Design your development so that for the upper end allowance in the 1% annual exceedance probability event:*

i. there is no increase in flood risk elsewhere

ii. your development will be safe from surface water flooding'

Sea level rise

5A.2.31 The Environment Agency's allowances for sea level rise (Ref 10) are required to be used for the assessment of tidal flood risk and are provided for each river basin district based on the following percentiles:

i. The ‘higher central’ allowance is based on the 70th percentile; and

ii. The ‘upper end’ allowance is based on the 95th percentile.

5A.2.32 The allowances are provided for four epochs which are to be applied as appropriate given the intended design life of a given development:

i. 2000-2035;

ii. 2036-2065;

iii. 2066-2095; and

iv. 2096-2125.

5A.2.33 The latest allowances for sea level rise for the river basin districts in which the Project is located are summarised in **Table 5A.6**.

Table 5A.6 Climate change allowances (sea level rise)

Allowance Category	Allowances for Sea Level Rise (mm)[1]				
	2000-2035	2036-2065	2066-2095	2096-2125	2000-2125 (cumulative rise
Humber River Basin District					
Higher central	5.5 (193)	8.4 (252)	11.1 (333)	12.4 (372)	1.15
Upper end	6.7 (235)	11 (330)	15.3 (459)	17.6 (528)	1.55
Anglian River Basin District					
Higher central	5.8 (203)	8.7 (261)	11.6 (348)	13 (390)	1.20
Upper end	7 (245)	11.3 (339)	15.8 (474)	18.1 (543)	1.60

Local Planning Policy and Guidance

Local Planning Authorities

5A.2.34 The Project is located within nine LPA areas:

i. Lincolnshire County Council;

ii. Cambridgeshire County Council;

iii. Norfolk County Council;

iv. North East Lincolnshire Council;

v. East Lindsey District Council;

[1] Total sea level rise for each epoch shown in brackets

vi. Boston Borough Council;

vii. South Holland District Council;

viii. Fenland District Council; and

ix. King's Lynn and West Norfolk District Council.

5A.2.35 As an NSIP, the application for development consent in respect of the Project will be determined by the SoS rather than the LPAs. However, LPAs are statutory consultees in the DCO process and local planning policies of relevance to the assessment of flood risk in relation to the Project are summarised in **Table 5A.7** below. These are considered to be in general accordance with the national policies set out in section 5A.2.

Table 5A.7 Local planning policy summary

Policy Document	Reference	Title and Description
Lincolnshire County Council		
Minerals and Waste Local Plan: Core Strategy and Development Management Policies (Ref 11)	DM1	Presumption in Favour of Sustainable Development - ensures a proactive, sustainable approach to approving development proposals, favouring those that align with local and national frameworks unless significant adverse impacts or specific restrictions apply.
	DM2	Climate Change - emphasises sustainable practices in proposals for minerals and waste management developments, aiming to reduce carbon footprints, minimize waste to landfill, promote renewable energy, enhance biodiversity, and ensure efficient use of resources while optimizing location choices to reduce transportation impacts.
	DM3	Quality of Life and Amenity - requires that minerals and waste developments avoid unacceptable impacts on nearby residents and sensitive areas, such as noise, dust, traffic, or environmental hazards, and ensures waste developments enhance the area's character. Where significant concerns cannot be mitigated, permission will be refused.
	DM15	Flooding and Flood Risk - requires minerals and waste developments to avoid increasing flooding risks to the site and surrounding areas, account for climate change-induced flooding, and actively reduce flood risks during and after operations; proposals causing significant off-site flooding risks will be refused/
	DM16	Water Resources - planning permission will be granted for minerals and waste developments where they would not have an unacceptable impact on surface or ground waters and due regard is given to water conservation and efficiency.

Policy Document	Reference	Title and Description
	DM17	Cumulative Impacts - planning permission will be granted for minerals and waste developments where the cumulative impact would not result in significant adverse impacts on the environment of an area or on the amenity of a local community, either in relation to the collective effect of different impacts of an individual proposal, or in relation to the effects of a number of developments occurring either concurrently or successively.
Cambridgeshire County Council		
Cambridgeshire and Peterborough Minerals and Waste Local Plan (Ref 12)	1	Sustainable Development and Climate Change - mineral and waste proposals must align with sustainable development principles, proactively address climate change impacts, and demonstrate measures for emissions reduction, adaptation, and resilience over their lifecycle.
	17	Design - Mineral and waste management developments must prioritize high-quality, efficient, and adaptable design that enhances local character, amenity, and environmental sustainability. Permission will be refused for development of poor design that fails to take the opportunities available to achieve this.
	22	Flood and Water Management - mineral and waste management development must ensure no significant adverse impact on water resources or flooding risks through detailed assessments, mitigation measures, and compliance with local flood and water policies.
Norfolk County Council		
Core Strategy and Minerals and Waste Development Management Policies Development Plan Document (Ref 13)	CS13	Climate Change and Renewable Energy Generation - minerals and waste developments are encouraged to generate renewable energy on-site, meeting a 10% minimum where practicable, while addressing flood risks, climate change impacts, and providing evidence for exceptions.
	CS14	Environmental Protection - developments in Norfolk must protect and enhance natural and built environments, mitigate impacts on key resources, landscapes, biodiversity, heritage, and residential amenities, and avoid adverse effects on the Breckland Special Protection Area (SPA).
	DM1	Nature Conservation - development harming locally designated nature conservation, geodiversity sites, or biodiversity must include sufficient mitigation, compensation, and long-term management to address adverse impacts and enhance conservation efforts.

Policy Document	Reference	Title and Description
	DM2	Core River Valleys – development in Core River Valleys is permitted only if it enhances the landscape or biodiversity, maintains floodplain functionality, and ensures long-term environmental benefits through assessments and restoration, particularly for mineral extraction.
	DM3	Groundwater and Surface Water - requires proposals to comply with groundwater protection standards, ensure no adverse impacts on water resources, and submit necessary risk assessments, especially for mineral extraction in Zones 2 and 3. Sites for waste management facilities will not be permitted in Groundwater Protection Zone 1.
	DM4	Flood Risk - Norfolk district councils' Strategic Flood Risk Assessments (SFRAs) inform decisions on mineral extraction and waste management, requiring compliance with PPS 25, Sequential and Exception Tests, and Flood Risk Assessments to prioritize lower flood-risk areas and prevent increased flood risk as a result of mineral extraction and waste management sites.
North East Lincolnshire Council		
North East Lincolnshire's Local Plan 2013 to 2032 (Ref 14)	6	Infrastructure - The Council aims to ensure sustainable community development by supporting infrastructure and service improvements, requiring developers to provide necessary contributions, safeguarding existing facilities, and maintaining commercial viability through collaboration and flexibility.
	22	Good Design in New Developments - the Council requires all developments to maintain a high standard of sustainable design, informed by the site's context and principles such as resource efficiency, climate resilience, sustainable transport, heritage protection, and social inclusion, while aligning with relevant local design guidance and promoting public art and responsible advertising.
	31	Renewable and Low Carbon Infrastructure - the Council aims to achieve at least 75 MW of renewable energy capacity by 2032, supporting projects that minimise adverse impacts while ensuring public benefits, considering factors such as landscapes, biodiversity, local amenity, and infrastructure, and addressing decommissioning and community consultation requirements for sustainable development.
	33	Flood Risk - states that development proposals should adhere to the requirements of the flood risk sequential

Policy Document	Reference	Title and Description
		test and, if necessary, the exception test. The regeneration benefits of development in areas of high flood risk should also be considered.
	34	Water Management - emphasizes sustainable water management in development proposals by ensuring efficient use and adequate supplies, addressing impacts on water quality and infrastructure, and protecting groundwater resources throughout the construction and operational phase of development.
West Lindsey District Council		
Central Lincolnshire Local Plan (Ref 15)	S12	Water Efficiency and Sustainable Water Management - promotes water efficiency by implementing permeable surfaces, green roofs/walls, and rainwater harvesting systems in developments to minimize environmental impacts.
	S16	Wider Energy Infrastructure - supports the transition to a net zero carbon future by supporting proposals for essential energy infrastructure, provided proposals minimise harm through careful location and design choices.
	S20	Resilient and Adaptable Design - requires developments to incorporate heat resilience measures, such as reducing overheating and using green roofs, while ensuring designs are adaptable to future needs, including flexibility for extensions, home working, and infrastructure to support sustainable living.
	S21	Flood Risk and Water Resources - ensures development proposals address flood risk by incorporating resilience measures, sustainable drainage systems, and maintaining access to watercourses, while also safeguarding water resources and supporting efficient, sustainable water management.
	S59	Green and Blue Infrastructure Network - ensures the protection, enhancement, and integration of Central Lincolnshire's green and blue infrastructure, requiring developments to contribute positively while mitigating unavoidable adverse impacts.
South East Lincolnshire Council		
South East Lincolnshire Local Plan 2011-2036 (Ref 16)	2	Development Management - requires that development proposals meet sustainable development standards by considering factors such as design quality, environmental impact, infrastructure capacity, sustainable drainage and flood risk, and resource use.

Policy Document	Reference	Title and Description
	3	Design of New Development - promotes high-quality, inclusive, and locally sensitive design in new developments, ensuring they enhance the area's character, accessibility, sustainability, and safety while integrating heritage, environmental, and community considerations.
	4	Approach to Flood Risk - ensures that development in flood-risk areas is carefully assessed, requiring site-specific flood risk evaluations, mitigation measures, and SuDS while restricting high-risk uses to protect people and infrastructure.
	30	Pollution - ensures development does not cause unacceptable pollution or environmental harm, requiring assessments, mitigation, and suitability for safe use before approval.
	31	Climate Change and Renewable and Low Carbon Energy - emphasizes addressing climate change through high-quality design, flood mitigation, water resource protection, biodiversity enhancement, and reduced travel needs, while also supporting renewable and low-carbon energy developments that avoid significant harm to visual, residential, natural, and heritage environments, ensuring sustainable development.
East Lindsey District Council		
East Lindsey Local Plan Core Strategy (Ref 17)	SP2	Sustainable Development - promotes sustainable development by ensuring planning applications align with local and national policies, encouraging collaborative solutions, and prioritising economic, social, and environmental benefits while balancing potential adverse impacts.
	SP10	Design - encourages sustainable, well-designed developments that enhance the district’s character, prioritize safety, accessibility, and environmental protection, and incorporate sustainable features, efficient resource use, and adaptability for future generations.
	SP16	Inland Flood Risk - states that all new development must show how they propose to provide adequate surface water disposal, including avoiding impacting on surface water flow routes or ordinary watercourses. Development in areas of inland flood risk must incorporate flood mitigation measures in their design.
	SP17	Coastal East Lindsey - prioritises sustainable development in Coastal East Lindsey by supporting economic growth, tourism diversification, flood defence

Policy Document	Reference	Title and Description
		improvements, community facilities, and adequate flood mitigation measures
	SP27	Renewable and Low Carbon Energy - supports renewable and low-carbon energy developments, balancing their benefits with acceptable impacts on residential amenity, landscapes, heritage, biodiversity, the economy, and infrastructure, while prioritizing sustainability and public interest.
Fenland District Council		
Fenland Local Plan (Ref 18)	LP1	A Presumption in Favour of Sustainable Development - emphasises delivering sustainable development in Fenland by supporting proposals that align with the Local Plan and the National Planning Policy Framework, fostering economic, social, and environmental benefits while addressing adverse impacts and material considerations.
	LP14	Responding to Climate Change and Managing the Risk of Flooding in Fenland - requires developments to actively minimise resource consumption, incorporate renewable energy and water-saving measures. Renewable energy proposals will be assessed on various factors and supported where they benefit local communities or address fuel poverty. Planning permission decisions for development sites will be informed by flood risk assessments, updated local and national policy, drainage strategies, SuDs, and relevant studies, with an emphasis on reducing flood risk and improving water management.
	LP16	Delivering and Protecting High Quality Environments across the District - ensures high-quality environments across the district by requiring new development proposals to protect heritage, biodiversity, natural features, local character, amenity, and riverside settings while incorporating sustainable practices, safety, and adaptability.
King's Lynn and West Norfolk District Council		
Kings Lynn and West Norfolk Local Plan Site Allocations and Development Management Policies (Ref 19)	DM1	A Presumption in Favour of Sustainable Development – adopts a positive approach to sustainable development, approving planning applications in line with local and national policies unless material considerations or adverse impacts outweigh the benefits.
	DM15	Environment, Design and Amenity - prioritises protecting and enhancing environmental, heritage, and cultural amenities by ensuring development proposals meet high-

Policy Document	Reference	Title and Description
		quality design standards, minimise adverse impacts, and provide safe access and adequate parking.
	DM18	Coastal Flood Hazard Zone (Hunstanton to Dersingham) - restricts certain developments in the Coastal Flood Risk Hazard Zone, ensuring replacement dwellings and extensions meet strict flood resilience criteria, limiting seasonal occupancy, and preventing changes that increase flood risk vulnerability.
	DM21	Sites in Areas of Flood Risk - requires developments in flood risk areas to submit a site specific Flood Risk Assessment ensuring safety, climate resilience, flood risk reduction, and compatibility with heritage and environmental standards.
King's Lynn and West Norfolk Borough Council Local Development Framework - Core Strategy (Ref 20)	CS01	Spatial Strategy – development priorities within the borough include supporting regeneration and development aspirations, encouraging economic growth and inward investment, improving accessibility to services, protect and enhance heritage, cultural and environmental assets, and adopt sustainable communities.
	CS07	Development in Coastal Areas – the Council will seek to balance the sensitive nature of the coastal area of West Norfolk with the national and international designations including the Area of Outstanding Natural Beauty for wildlife, landscape and heritage with the need for economic and social development of the area and the effects of climate change.
	CS08	Sustainable Development – promotes high-quality, sustainable design that protects heritage, optimizes land use, enhances community well-being, improves energy efficiency, reduces emissions, and encourages green spaces and accessibility.
	CS12	Environmental Assets - aims to protect and enhance green infrastructure, historic environments, landscape character, biodiversity, and geodiversity while ensuring development reinforces the area's ecological and cultural qualities.

Other Statutory Bodies

The Environment Agency

5A.2.36 The Environment Agency is the lead statutory body responsible for the protection of the water environment and is a statutory consultee to the DCO process. It is also responsible for flood defence and drainage in relation to main rivers along with estuarine and coastal areas.

5A.2.37 The Environment Agency produces regional management plans and policies including Catchment Flood Management Plans (CFMPs) and Shoreline Management Plans (SMPs) (Ref 21 and Ref 26).

Catchment Flood Management Plans (CFMPs)

5A.2.38 CFMPs consider inland flooding from all potential sources of flooding within a given river basin district with the aim of helping the Environment Agency and other flood risk stakeholders plan for the effective management of flood risk.

5A.2.39 The Study Area traverses the Anglian river basin district and the Humber river basin district. The relevant policies from the associated CFMPs are summarised in **Table 5A.8** with reference to the following policy options:

i. *'Policy 1 - Areas of little or no flood risk where we will continue to monitor and advise;*

ii. *Policy 2 - Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions;*

iii. *Policy 3 - Areas of low to moderate flood risk where we are generally managing existing flood risk effectively;*

iv. *Policy 4 - Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change;*

v. *Policy 5 - Areas of moderate to high flood risk where we can generally take further action to reduce flood risk; and*

vi. *Policy 6 - Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.'*

Table 5A.8 Catchment flood management plan policy summary

Catchment Flood Management Plan	Sub-Area	Policy
Humber River Basin District		
Grimsby and Ancholme (Ref 21)	Immingham, Grimsby, and Buck Beck	4
Louth Coastal[2] (Ref 22)	Waithe Beck, Louthe Upstream and Saleby	6
	Lowlands North	4
	Middle Reaches	3
	Lowlands South	3
	Mablethorpe, Chapel St Leonards/Ingoldmells and Skegness	4

[2] The Louth Coastal CFMP falls within both the Anglian river basin district and the Humber river basin district and is restated in Table 5A.8 for completeness

Catchment Flood Management Plan	Sub-Area	Policy
Anglian River Basin District		
Louth Coastal[2] (Ref 22)	Waithe Beck, Louthe Upstream and Saleby	6
	Lowlands North	4
	Middle Reaches	3
	Lowlands South	3
	Mablethorpe, Chapel St Leaonards/Ingoldmells and Skegness	4
River Witham (Ref 23)	The Fens	4
	Boston	5
River Welland (Ref 24)	Fenland	4
	Spalding	4
River Nene (Ref 25)	The Fens	4
Great Ouse (Ref 26)	The Fens	4

Shoreline Management Plans (SMPs)

5A.2.40 SMPs help deliver the objectives of the National Flood and Coastal Risk Management Strategy for England (Ref 27). SMPs are living documents updated by coastal groups which include the Environment Agency, local authorities and other coastal management stakeholders. They aim to inform investment decisions relating to coastal management such as the construction and maintenance of flood defences, the implementation of adaption plans, and the creation of coastal habitats.

5A.2.41 SMPs are adopted by local authorities and used to designate Coastal Change Management Areas (CCMAs) and to inform local plans and development decisions. The management approaches given by SMPs have been approved by the Environment Agency under its strategic overview for coastal flood and erosion risk management.

5A.2.42 The Flamborough Head to Gibraltar Point SMP (SMP3) (Ref 28) and the Gibraltar Point to Hunstanton SMP (SMP4) (Ref 29) cover the areas of coastline to the east of the Study Area. The relevant policies are summarised in **Table 5A.9** with reference to the following management approaches:

i. HL1 - Hold the line (maintain/replace):

'Where protection is currently provided by coastal defence structures or managed beaches, and the intention is to retain a defence along approximately the current alignment. This will involve replacing defences when needed. Defence type, method and standard of protection may be modified over time.'

ii. HL3 – Hold the line (repair not replace):

'Where protection is currently provided by coastal defence structures that might be maintained or repaired if funding allows, but not replaced if they fail or reach the end of their design life.'

iii. HL6 - Hold the line (local activity only):

'Where the overall intention is for a natural shoreline, not to encourage new defences. In some areas, where specified in the Shoreline Management Plan, works to repair or construct short stretches of defence to provide localised protection (such as to a slipway, access point or isolated properties) may be considered by the Local Planning Authority. All works require relevant permissions.'

Table 5A.9 Shoreline Management Plan Policy summary

Shoreline Management Plan	Unit	Policy		
		2005-2025	2025-2055	2055-2105
Flamborough Head to Gibraltar Point (SMP3)	East Immingham to Cleethorpes (L)	HL1	HL1	HL1
	Humberston Fitties (M)	HL1	HL3	HL1
	South of Humberston Fitties to Theddlethorpe St Helen (N)	HL1	HL1	HL1
	Viking Gas Terminal (Mablethorpe) to southern end of Skegness (O)	HL1	HL1	Pending Agreement
	Seacroft to Gibraltar Point (P)	HL6	HL1	HL6
Gibraltar Point to Hunstanton (SMP4)	Gibraltar Point to Wolferton Creek (Policy Development Zone (PDZ) 1)	HL3	Pending Agreement	Pending Agreement

Flood Risk Activity Permits (FRAPs)

5A.2.43 The Environment Agency is responsible for regulating engineering works liable to affect main rivers through the issuing of Flood Risk Activities Permits (FRAPs) under the Environmental Permitting Regulations 2016 (Ref 30). Any works associated with the Project proposed within 8 metres (m) of the top of bank of a main river or within 8 m of the landward side of a flood defence, increasing to 16 m for a tidal main river, would require an application for a FRAP to be submitted to the Environment Agency for approval. Activities within the wider floodplain that are likely to divert or obstruct floodwaters, to damage any river control works or to affect drainage would also be subject to a FRAP.

5A.2.44 FRAPs are also required for electrical cable services crossing over a main river dependant on the vertical and horizontal clearance from the top of bank or flood defence for the cable and associated pylons respectively, the angle of the crossing, and the voltage of the cable in question.

5A.2.45 The specific requirements of the FRAP needed for this Project will be determined as the Project progresses beyond PEI Report stage.

Lead Local Flood Authorities

5A.2.46 LLFAs are defined as risk management authorities under the FWMA 2010 (Ref 31). They are responsible for the management of local flood risk which includes that posed from all sources except from main rivers and the sea. This is achieved through the process of developing Preliminary FRAs, Local Flood Risk Management Strategies (LFRMS), SFRAs, and Surface Water Management Plans (SWMPs).

5A.2.47 LLFAs are statutory consultees to the DCO process and advise on local requirements for the management of surface water that would be generated by the Project. They are also responsible for regulating engineering works likely to affect ordinary watercourses through issuing Ordinary Watercourse Consents (OWCs) outside of IDB areas under the Land Drainage Act 1991 (Ref 37). Ordinary watercourses include streams, drains, ditches and passages through which water flows that are not classified as a main river. OWCs would need to be applied for any proposed works associated with the Project which are liable to affect flows or levels in ordinary watercourses outside of IDB Districts.

5A.2.48 The Study Area traverses four LLFA areas:

i. North East Lincolnshire Council;

ii. Lincolnshire County Council;

iii. Cambridgeshire County Council; and

iv. Norfolk County Council.

5A.2.49 A summary of the requirements of each of the LLFAs is provided below.

North East Lincolnshire Council

5A.2.50 North East Lincolnshire Council's LFRMS (Ref 33) serves as an update to the previous strategy prepared in 2015 and sets out the council's approach for the management of flood risk from local sources.

5A.2.51 The LFRMS contains a high-level screening of the risk posed from both surface water and rivers and sea flooding using the Environment Agency's published flood risk mapping, supplemented by local knowledge, to identify key areas of flood risk across North East Lincolnshire. The LFRMS identifies 18 surface water flooding hotspots[3] and four river and sea flooding hotspots, with the Study Area shown to be within, or in proximity to, areas identified as being a surface water flooding hotspot.

5A.2.52 Potential management measures relating to individual hotspots are identified as part of the LFRMS and presented alongside potential funding options. Lincolnshire County Council

5A.2.53 Lincolnshire County Council's Preliminary FRA (Ref 34) was prepared in 2011 to provide a preliminary assessment of flood risk from local sources across the county, identify nationally significant flood risk areas, and to inform the development of its LFRMS. The Preliminary FRA did not identify any significant flood risk areas and there were no significant changes identified as part of a subsequent review undertaken in 2017.

[3] Flooding hotspots are key areas of flood risk in North East Lincolnshire from surface water, and rivers and sea.

5A.2.54 The Joint Lincolnshire Flood Risk and Water Management Strategy 2019-2050 (Ref 35) builds on the previous strategy prepared in 2012 and provides the basis for the management of flood risk within the county.

Cambridgeshire County Council

5A.2.55 Cambridgeshire County Council's LFRMS (Ref 32) is a revision of the previous strategy prepared in 2015. The LFRMS sets out the roles and responsibilities of flood risk management partners along with the principles for the management of flood risk within the county.

Norfolk County Council

5A.2.56 Norfolk County Council's LFRMS (Ref 36) was published in 2015 and subsequently reviewed in 2021 to ensure the policies remained consistent with emerging national flood risk strategies and policies.

5A.2.57 The LFRMS identifies that King's Lynn and West Norfolk is heavily reliant on existing flood defences to provide protection against flooding from multiple sources and is served by an extensive network of pumped drainage channels. Both the existing flood defences and the managed drainage network will require continual maintenance and investment to ensure protection in line with the anticipated impacts of climate change. It states that high levels of residual flood risk associated with the defended nature of the area highlight the importance of locating new development away from the most vulnerable areas and the need to assess the potential of development to increase flood risk elsewhere

5A.2.58 Policy UC10 and Policy UC11 of the LFRMS confirm that the LLFA would raise an objection to any developments that might lead to an increase in flood risk and would seek to secure the implementation of SuDS within new developments respectively.

5A.2.59 Policy OW3 of the LFRMS identifies that the LLFA will not grant OWC for proposals that lead to an increase in flood risk, an increase in blockage risk, an increase in erosion, a deterioration of water quality, or have a detrimental impact on morphology, protected species or designated sites.

5A.2.60 Policy OW4 of the LFRMS states that the LLFA would only approve an application to culvert a watercourse if there is no reasonably practicable alternative, or if the detrimental effects of culverting would be so minor that they would not justify a more costly alternative. In all cases, where it is appropriate to do so, adequate mitigation must be provided for damage caused. The LFRMS states that the LLFA would normally reject applications for culverting in areas identified as being:

i. in Flood Zones 2 or 3a/3b; and/or

ii. at risk of surface run-off flooding as indicated by the Environment Agency's updated flood map for surface water and/or other sources of flood risk modelling.

5A.2.61 Policy E5 of the LFRMS states that any proposed alterations to an ordinary watercourse shall mimic features of natural river morphology and hydrology wherever it is practicable, otherwise compensatory measures may be required.

Other Non-Statutory Bodies

Internal Drainage Boards

5A.2.62 IDBs are not statutory consultees to the DCO process but are designated as risk management authorities under the FWMA 2010 with responsibility for manging water levels in low-lying areas (Ref 31). The responsibilities of IDBs include the management of land drainage and flood defence works on ordinary watercourses in their areas along with the issuing of OWCs in accordance with the Land Drainage Act 1991 (Ref 37) and their own local byelaws.

5A.2.63 The Water Management Alliance (WMA) is a group of IDBs operating in South Lincolnshire, East Anglia and in the South East (UK). The WMA hold a vital role in coordinating work related to NSIPs on behalf of its members. For the Study Area the WMA covers the South Holland IDB and King's Lynn IDB.

5A.2.64 The Study Area traverses the areas of eight IDBs:

i. the North East Lindsey Drainage Board;

ii. the Lindsey Marsh Drainage Board;

iii. the Witham Fourth District IDB;

iv. the Black Sluice IDB;

v. the South Holland IDB;

vi. the Welland and Deepings IDB;

vii. the North Level IDB; and

viii. the King’s Lynn IDB.

5A.2.65 The byelaws associated with each of the IDBs operating within the Study Area are to be considered as the Project progresses to ensure that the emerging design is in accordance with the relevant policies. In particular, IDB byelaws set out additional requirements for OWCs above and beyond the requirements of Land Drainage Act 1991 (Ref 37), particularly with regard to specifying stand-off distances for permitting of activities around maintained watercourses and for permitting new surface water discharges.

Other Technical Guidance

National Grid

Generic Electricity Substation Design Manual for Civil, Structural and Building Engineering

Site Drainage

5A.2.66 The preferred method for the estimation of design rainfall depths is the depth-duration-frequency model detailed in the Flood Estimation Handbook (FEH) (Ref 38) and that volumetric flow is to be calculated using the Wallingford Procedure or other established method.

5A.2.67 The use of SuDS as detailed in the Construction Industry Research and Information Association (CIRIA) SuDS Manual (C753) (Ref 39), described in below, are to be considered as appropriate. Surface water generated by access roads and parking areas should drain to adjacent stone surfacing.

5A.2.68 Additional detailed design requirements are provided in relation to the management of potential contaminants, minimum flow velocities, sampling chambers, penstocks, headwalls, access covers and vehicle loading.

Section 13 – Flood Defences for Electricity Substations

5A.2.69 The design of all new substations shall be informed by an FRA undertaken in accordance with the requirements of the Environment Agency and other relevant stakeholders, the NPPF (Ref 3) and associated planning guidance, and Engineering Technical Report (ETR) 138.

5A.2.70 If it is considered appropriate to locate a proposed substation in Flood Zone 2 or Flood Zone 3 (as defined in **Table 5A.1**) following the application of the Sequential Test and/or the Exception Test (Ref 2), National Grid's default position to provide resilience up to the 0.1 per cent annual probability flood event including appropriate allowances for climate change and uncertainty.

5A.2.71 Resilience is to be provided through the setting of finished ground levels within the substation, localised raising of critical equipment, and/or other flood defence techniques as appropriate. If the raising equipment is adopted as a proposed mitigation measure, it should be ensured that the maximum flood depth above finished ground levels should be no greater than 300 mm to facilitate access during a flood event for the purposes of maintenance.

5A.2.72 A typical allowance for uncertainty is given as 300 mm, however this requirement is to be reviewed should it prove to be decisive in option selection or proves to have a significant impact on capital costs.

5A.2.73 Substations should be designed to ensure that critical equipment is not at risk of surface water flooding during a 0.1 per cent annual probability storm event. The design of surface water drainage infrastructure serving new substations should ensure that there is no flooding on site or in operational areas during a 3.3 per cent annual probability storm event or a 1 per cent annual probability storm event respectively. Substations should be designed to prevent flooding of neighbouring third-party land during storm events that exceed the design storm scenario.

Energy Networks Association

Resilience to flooding of grid and primary substations

5A.2.74 Engineering Technical Report 138 (Ref 40) provides guidance to the energy industry on improving the resilience of substations to flooding in the context of ensuring ongoing supply to consumers. It provides a summary of the availability of flood risk information, outlines national planning requirements and flood defence schemes, details a systematic approach for the assessment of flood risk and the identification of appropriate mitigation measures, and provides guidance on the assessment of societal risk, available investment avenues and cost/benefit analysis.

5A.2.75 The report recommends that the assessment of predicted peak flood levels should include an allowance of 300 mm to account for uncertainties alongside a suitable allowance for climate change.

CIRIA

The SuDS Manual

5A.2.76 The SuDS Manual (C753) (Ref 39) represents current industry best practice guidance for the planning, design, construction, management, and maintenance of effective SuDS. The surface water drainage infrastructure required to deliver the Project should be designed in accordance with the requirements of The SuDS Manual where practicable.

DEFRA

Non-statutory standards for sustainable drainage systems

5A.2.77 The Non-Statutory Technical Standards for SuDS (Ref 41) is a national guidance document that provides a set of SuDS design standards for new developments, the principles of which are generally adopted as a requirement by LLFAs. The standards include restrictions on the peak rate and volume of run-off to be discharged from developments, along with the impact on surface water flood risk internal to the development and to neighbouring properties.

5A.3 Study Area and Project Description

Study Area

Introduction

5A.3.1 The extent of the draft Order Limits and the Refined Siting Zone plus a 500 m buffer around this boundary has been adopted as the Study Area for the purposes of this assessment, and for consistency with the assessment of the potential impacts of the Project on the wider Water Environment detailed in **PEI Report Volume 2 Part B Section 1-7 Chapter 6 Water Environment and Flood Risk**. The draft Order Limits are defined as the maximum extent of land within which the Project may be undertaken and includes both permanent and temporary land required to construct, operate and maintain the Project. The draft Order Limits are given on **PEI Report Volume 2 Part A Figure 1.1 Draft Order Limits and Refined Weston Marsh Substation Siting Zone**.

5A.3.2 The information presented in this section includes only that deemed to be of relevance to the assessment of flood risk in the context of the scope of the Preliminary FRA as defined in section 5A.2. A detailed description of the baseline conditions in relation to the wider Water Environment is found in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**.

Location and Land Use

5A.3.3 The Study Area traverses a length of approximately 140 km, from west of Grimsby in North East Lincolnshire to west of the village of Walpole St Andrew, north of the town

of Wisbech, in King's Lynn and West Norfolk District, as shown in **PEI Report Volume 2 Part B Sections 1-7 Figure 6.1 Water Environment Receptors and Study Area**. The Study Area generally follows the route of the adjacent coastline, extending in a south-easterly direction from Grimsby towards Skegness, before following the perimeter of the Wash (a large multiple estuary system running from south of Skegness to Hunstanton) towards Wisbech.

5A.3.4 The Study Area covers an area that is predominantly rural, with large parts of the 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 Study Area, with multiple villages and individual properties in the vicinity.

Topography

5A.3.5 The existing topography varies along the length of the Study Area, with a maximum existing ground level of approximately 40 m Above Ordnance Datum (AOD) in the north (to account for the access spurs in Section 2 New Grimsby West Substation to New Lincolnshire Connection Substation A) and minimum existing ground level of approximately 2 m AOD in the south. The Study Area is predominantly low-lying with minimal variation in topography.

Geology and Hydrogeology

5A.3.6 A summary of the geology and hydrogeology anticipated to underly the Study Area is given below. **PEI Report Volume 2 Part B Sections 1-7 Chapter 7 Geology and Hydrogeology** should be referenced alongside the text below.

5A.3.7 British Geological Survey (BGS) Geology 50K mapping (Ref 42) shows the bedrock geology within the Study Area to be comprised of three main categories. The northernmost region of the Study Area, between Grimsby and Skegness, is shown to be predominantly underlain by chalk comprised of the Burnham, Welton and Ferriby formations. As the Study Area turns south-west to the north-west of Skegness, the underlying bedrock is shown to comprise a mixture of sandstone, and interbedded mudstone and limestone, in the form of the Carstone, Claxby Ironstone, Tealby, Roach, and Spilsby formations. The southernmost part of the Study Area, between Friskney and Walpole St Andrew, is underlain by mudstone in the form of the Kimmeridge Clay, Ampthill Clay, West Walton and Oxford Clay formations.

5A.3.8 Superficial deposits within the Study Area are shown to consist predominantly of clay and silt in the form of Tidal Flat Deposits. Deposits of Till are shown to be present in the northernmost region of the Study Area, with pockets of Glaciofluvial and Lacustrine deposits found elsewhere throughout.

5A.3.9 The Department of Environment, Food and Rural Affairs' (DEFRA's) MAGiC mapping (Ref 43) shows the bedrock geology in the northern part of the Study Area, which is comprised of chalk associated with the Burnham, Welton and Ferriby formations, to be predominantly classified as a principal aquifer. The areas of sandstone and interbedded mudstone and limestone are classified as Secondary A and Secondary B aquifers, whilst the mudstone shown to underly the southernmost part of the Study Area is classified as unproductive strata. The superficial deposits shown to be present within the Study Area are predominantly classified as secondary (undifferentiated) aquifers, with secondary A and secondary B aquifers also shown to be present.

Hydrology and Drainage

5A.3.10 The Study Area traverses five Environment Agency management catchments with the Environment Agency's Statutory Main River Map (Ref 44), showing 22 main rivers to be present within the Study Area as listed below:

i. the River Freshney and Laceby Beck;

ii. the Waithe and Orford Beck;

iii. the Oldfleet Drain Diversion;

iv. the Blackleg Drain;

v. the Poulton Drain;

vi. the Louth Canal;

vii. the River Lud;

viii. the Grayfleet Drain;

ix. the Stewton Beck;

x. the Long Eau;

xi. the Great Eau;

xii. the Woldgrift Drain;

xiii. the Willoughby High Drain;

xiv. the Little River Lymn and Cowcroft Drain;

xv. the River Steeping;

xvi. the East Fen Catchwater;

xvii. the West Fen Catchwater;

xviii. the River Witham;

xix. the South Forty Foot Drain;

xx. the River Glen;

xxi. the River Welland; and

xxii. the River Nene.

5A.3.11 Numerous ordinary watercourses, including those adopted by IDBs to maintain arterial drainage within their districts, are also present within the Study Area. These range in size from field-edge ditches to substantial 'main drains' such as the North Level and South Holland Main Drains, which are larger than many of the main rivers bisecting the Study Area.

Flood Defence Assets

5A.3.12 The Environment Agency's Spatial Flood Defences dataset (Ref 45) shows the presence of numerous Environment Agency maintained flood defence assets within the Study Area. The existing flood defences are shown to offer a varying standard of protection from both fluvial flooding associated with the main rivers and tidal flooding associated with the adjacent coastline.

5A.3.13 The Environment Agency's Reduction in Flood Risk from Rivers and Sea due to Defences dataset (Ref 46) shows the central and southern parts of the Study Area, from Alford to Walpole St Andrew, to benefit from the presence of formal flood defences. Further information on the protection offered by the existing flood defences to the various elements of the Project is provided in section 5A.3.

Project Description

Summary

5A.3.14 The key elements of the Project are summarised below with further information provided in **PEI Report Volume 2 Part A Chapter 5 Project Description**.

5A.3.15 The Project is at an early stage of development but is expected to include 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). The extent of decommissioning will be determined and reported in the ES;

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

iv. up to two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District (to be referred to as Weston Marsh Substation A and Weston Marsh Substation B);

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"); and

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.

Operation Phase

Overhead lines

5A.3.16 The proposed Sections of overhead line would comprise of conductors supported by pylons. A typical span distance between typical pylons operating at 400 kV is approximately 350 m resulting in an approximate average of three pylons for every km of overhead line.

5A.3.17 The proposed pylons would comprise steel lattice with three crossarms on either side of a central body with alternative pylon designs to be considered where mitigation (e.g. for landscape and visual effects) is required.

Substations

5A.3.18 Up to six new 400 kV substations are proposed as part of the Project. For the purpose of the preliminary environmental assessment, it has been assumed that all six substations would be Air Insulated Switchgear (AIS) substations.

5A.3.19 AIS substations use air as the insultation medium for electrical equipment meaning that equipment is predominantly located outdoors.

New Grimsby West Substation

5A.3.20 The proposed new Grimsby West Substation is to be located within Section 1 New Grimsby West Substation of the Project, situated in the local authority of North East Lincolnshire. The functional footprint of the proposed new substation including an approximately 5 m buffer around the fence line, is approximately 522 m x 185 m which totals up to an area of approximately 9.7 ha, plus an approximately 106 m x 52 m extra area near the entrance. It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

New Lincolnshire Connection Substation A

5A.3.21 The proposed new Lincolnshire Connection Substation A Substation is located within Section 3 New Lincolnshire Connection Substations A and B of the Project in the local authority of East Lindsey. The functional footprint of LCS A is approximately 475 m x 178 m, including an approximately 5 m buffer around the fence line, which totals up to an approximate area of 8.5 ha. It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

New Lincolnshire Connection Substation B

5A.3.22 The proposed new LCS B will connect to LCS A via approximately 4.3 km of new 400 kV overhead line and is also situated within Section 3 of the Project and the local authority of East Lindsey. The functional footprint of LCS B, including an approximately 5 m buffer around the fence line is approximately 522.5 m x 178 m which totals up to an area of approximately 9.3 ha, plus an approximately 85 m x 40 m extra area near the entrance. It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

Refined Weston Marsh Substation

5A.3.23 The proposed refined Weston Marsh Substation is required to connect a new 400 kV transmission line to Walpole B Substation. This PEI Report has assumed two Weston Marsh substations located within the Refined Weston Marsh Substation Siting Zone: Weston Marsh Substation A and Weston Marsh Substation B with an overhead line between them. In addition, the new Weston Marsh Substation will connect to the existing 400 kV 4ZM transmission line that runs south east of Sleaford towards King's Lynn, and the existing 400 kV 2WS transmission line that runs east of Spalding towards a Tee-Point with the 400 kV 4ZM transmission line between Sleaford and King's Lynn. Due to the proposed location of the new Weston Marsh Substation, it will also enable flexibility as the design evolves in relation to the connection of the

new Lincolnshire Connection Substation B (LCS-B) circuit to the rest of the transmission network.

5A.3.24 The new refined Weston Marsh Substation is to be located within Section 5 Refined Weston Marsh Substation Siting Zone of the Project, situated in the local authority of South Holland, with the precise location to be confirmed at statutory consultation. It has been assumed that Weston Marsh Substation A and Weston Marsh Substation B would each be located within a separate secured fenced compound, and that that the footprint of the new Weston Marsh Substation A would be approximately 550 m by 200 m (approximately 9 ha) and new Weston Marsh Substation B would be approximately 350 m by 200 m (approximately 6 ha). It should be noted that this excludes related development including access arrangements, drainage, landscaping and other associated environmental works.

New Walpole B Substation

5A.3.25 The proposed new Walpole B Substation will connect to the existing 400 kV overhead line (known as the 4ZM route) that is routed in a south-easterly direction, located to the east of the proposed Walpole B Substation. The Walpole B Substation is located within Section 7 New Walpole B Substation of the Project and is situated within the local authority of Kings Lynn and Norfolk. The functional footprint of the proposed Walpole B Substation, including a 5 m buffer around the fence line, is 793 m x 190 m which totals up to an area of approximately 15 ha, plus a 90 m x 41 m extra area near the entrance and a 56 m x 52 m existing 2 Cable Sealing End (CSE) compound.

Construction Phase

Overhead Line Construction

5A.3.26 The construction of the proposed 400 kV overhead linewould 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 access tracks (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 access tracks and bellmouths; and

xix. removal of construction compounds and ground reinstatement.

5A.3.27 Further information on the proposed nature, number and location of temporary construction compounds associated with each section of proposed overhead line is found in **PEI Report Volume 2 Part A Chapter 5 Project Description,** along with details of the proposed construction access points and haul routes.

Substations

5A.3.28 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; and

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

5A.3.29 Further information on the proposed nature, number and location of temporary construction compounds associated with each proposed substation is found in **PEI**

Report Volume 2 Part A Chapter 5 Project Description, along with details of the proposed construction access points and haul routes.

Vulnerability Classification

5A.3.30 Section 5A.7 outlines National Grids iterative approach to determine the preferred option for the Project. A sequential approach was taken in the selection of the route corridor, siting zones and siting areas, with flood risk being considered throughout the process alongside the numerous other technical, environmental, and socio-economic constraints.

5A.3.31 As set out in section 5A.2.9, the Flood Risk and Coastal Change PPG (Ref 7) provides guidance on the classification of flood risk vulnerability and the compatibility of vulnerability with the flood zones given by the Environment Agency's Flood Map for Planning.

5A.3.32 **Table 5A.10**, which is adapted from Table 2 in PPG (Ref 4) provides a summary of the flood risk vulnerability and associated flood zone compatibility of the various elements of the construction and operational phases of the Project. The ticks and crosses indicate if the project element is compatible or not in the respective flood zones.

5A.3.33 As identified in **Table 5A.10,** following the application of the Sequential Test there will be some components of the Project that will require the application of the Exception Test. Section 5A.7 provides further background on the Sequential Test and Exception Test, while further detail on the application of these tests will be provided as part of the FRA submitted in support of the DCO application for the Project.

Table 5A.10 Flood risk vulnerability classification and flood zone compatibility

Project Element	**Flood Risk Vulnerability Classification**	**Compatibility**			
		Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Construction Phase					
Temporary Construction Compounds	Less Vulnerable	✓	✓	✓	X
Construction Activity Areas	Less Vulnerable	✓	✓	✓	X
Watercourse Crossings and Drainage Outfalls	Water Compatible	✓	✓	✓	✓*2
Operation Phase					
Overhead line	Essential Infrastructure	✓	✓	Exception Test required*1	Exception Test required*2
Substations	Essential Infrastructure	✓	✓	Exception Test required*1	Exception Test required*2

Project Element	Flood Risk Vulnerability Classification	Compatibility			
		Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b

Notes:

[*1] In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

[*2] In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage; and
- not impede water flows and not increase flood risk elsewhere.

5A.4 Flood Risk Screening

Introduction

5A.4.1 The following section summarises the screening of all potential sources of flood risk posed to, and arising from, the Project, during both the construction and operation phases, to identify those that require further assessment. A source-pathway-receptor approach has been adopted as the basis for screening potential sources of flood risk, with an identified receptor necessary for a given source to require further assessment.

5A.4.2 A subsequent preliminary assessment of the risk of flooding posed by those sources identified as requiring further assessment is presented in section 5A.5, with the preliminary identification of the mitigation measures that are expected to be required to manage the risks provided in section 5A.6.

5A.4.3 Additional information on the assessment of baseline flood risk within the Study Areas for each Section of the Project is found in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**.

Flood Risk Datasets

Fluvial and Tidal Flood Risk

5A.4.4 The Environment Agency's Flood Map for Planning (Ref 8) has been adopted as the basis for screening the potential risk of flooding posed from fluvial and tidal sources. Flood Zone 1, 2, and 3 indicate a 'Low', 'Medium', and 'High' likelihood of flooding respectively, with full definitions of each flood zone provided in **Table 5A.1**.

5A.4.5 Ongoing pre-application consultation with the Environment Agency has identified a range of existing hydraulic modelling studies which further define the risk of flooding posed from fluvial and tidal sources within the Study Area. Detailed hydraulic modelling results from these studies will to be used to inform the FRA submitted in support of the DCO application for the Project, with updates or amendments to existing models made in agreement with the Environment Agency where required.

5A.4.6 The Flood Map for Planning is scheduled to be updated in March 2025 to represent the latest available data arising from the Environment Agency's updated National

Flood Risk Assessment (NaFRA2) (Ref 47). The screening exercise presented herein is based on the information available at the time of writing, with the assessment of flood risk in relation to the Project to be updated to reflect the scheduled updates to the Flood Map for Planning as part of the FRA submitted in support of the DCO application for the Project.

Surface Water Flood Risk

5A.4.7 The Environment Agency's Risk of Flooding from Surface Water mapping (Ref 9) has been adopted as the basis for screening the potential risk of flooding posed from surface water sources. The mapping provides an indication of the extent of surface water flooding predicted during the annual probability storm events detailed in **Table 5A.2**.

5A.4.8 The Environment Agency's Risk of Flooding from Surface Water mapping was updated to reflect the outputs of NaFRA2 in January 2025, with the latest available data adopted as the basis for this screening exercise.

Groundwater Flood Risk

5A.4.9 The geological and hydrogeological mapping described in section 5A.3 has been adopted as the basis for screening the potential risk of flooding posed from groundwater sources. The BGS and aquifer designation mapping (Ref 42), described in section 5A.3, provides an indication as to the general permeability of the underlying geology expected to be encountered across the Study Area, which is a key factor in the determination of the risk of flooding posed by groundwater.

Artificial Sources

5A.4.10 The Environment Agency's Reservoir Flood Maps (Ref 9) provide an indication of the maximum extent of flooding that could occur in the unlikely event of a dam or reservoir failure. The Reservoir flood maps include two scenarios, the 'dry-day' scenario is defined as '*the flooding that would occur if the dam or reservoir failed when rivers are at normal levels*' whereas the 'wet day' scenario assesses '*how much worse the flooding might be if a river is already experiencing an extreme natural flood*'. Both scenarios has been considered as part of this assessment.

5A.4.11 The nature of sewer flooding means that there are no mapping datasets available to inform an assessment; consequently, existing land-use within the Study Area has been used as the basis for this assessment as it provides an indication of the likely presence and magnitude of drainage infrastructure within the Study Area.

Historic Flooding

5A.4.12 The Environment Agency's Recorded Flood Outlines dataset (Ref 48) has been utilised as a supplementary source of information to those given above in accordance with the requirements of NPS EN-1.

5A.4.13 A subset of the Recorded Flood Outlines dataset forms the basis for the Environment Agency's Historic Flood Map (Ref 49), which shows the maximum recorded extent of historic flood events from fluvial, tidal and groundwater sources that meet set criteria. It excludes historic surface water events, except in areas where it was not possible to distinguish the source of flooding but the dominant source was considered to be fluvial.

5A.4.14 The Recorded Flood Outlines dataset is adopted for the purposes of this assessment as it includes a wider range of recorded flood events and provides information on the date, source and cause of each event. **Table 5A.11** provides a summary of historic flood events within the Study Area.

Table 5A.11 Historic flood events

Date	Source of Flooding	Cause of Flooding
June 2019	Fluvial (Great Eau)	Overtopping of defences
January 1953	Unspecified (Lincolnshire Coastline)	Overtopping of defences
October 2023	Fluvial (River Steeping)	Overtopping of defences and exceedance of channel capacity
April 1981	Fluvial (West Fen Catchwater)	Operational failure/breach of defence

Screening Assessment Summary

5A.4.15 The results of the screening undertaken for all potential sources of flood risk posed to, and arising from, the Project, during both the construction and operation phases, is presented in **Table 5A.12**

Table 5A.12 Screening of all potential sources of flood risk

Source	Risk	Summary	Requirement for Further Assessment
Tidal	High	The Environment Agency's Flood Map for Planning shows the central and southern parts of the Study Area, from Alford to Walpole St Andrew, to lie predominantly within Flood Zones 2 and 3, with the dominant source of flood risk expected to be tidal. The Environment Agency's Reduction in Flood Risk from Rivers and Sea due to Defences dataset shows the central and southern parts of the Study Area to benefit from the presence of formal flood defences, with the Environment Agency's Spatial Flood Defences dataset identifying that the existing defences offer a varying standard of protection.	Yes
Fluvial	High	The Environment Agency's Flood Map for Planning shows the northernmost region of the Study Area, from Grimsby to Alford, to lie predominantly within Flood Zone 1, with the Study Area traversing areas of Flood Zones 2 and 3 associated with the main rivers (listed in	Yes

Source	Risk	Summary	Requirement for Further Assessment
		section 5A.3.1) which flow in a northeasterly direction to the coast. The dominant source of flooding within the central and southern parts of the Study Area is expected to be tidal. However, given the low-lying nature of the existing topography, the presence of numerous main rivers, IDB-maintained watercourses, and ordinary watercourses and the wide range of existing flood defences offering varying standards of protection against fluvial and tidal sources in the region, it is expected that the risk of flooding is posed by a complex interaction between fluvial, tidal and surface water flood mechanisms.	
Surface Water	Medium	The Environment Agency's Risk of Flooding from Surface Water mapping shows the Study Area to lie within an area predominantly subject to a 'Very Low' probability of surface water flooding. Areas subject to a 'Low' to 'High' probability of flooding from this source are shown throughout the Study Area, representing localised ponding expected to occur in topographic low-spots or coinciding with the network of existing main rivers, LLFA/IDB-maintained watercourses, and ordinary watercourses present within the Study Area.	Yes
Groundwater	Medium	BGS mapping shows the underlying bedrock within the Study Area to range from chalk in the north to mudstone in the south, with limestone, and interbedded sandstone and mudstone, shown in the vicinity of Skegness in the central part of the Study Area. The bedrock in the northern part of the Study Area is shown to be classified as a principal aquifer and is expected to exhibit high permeability. The areas of sandstone, interbedded mudstone and limestone are classified as Secondary aquifers[4] with varying degrees of permeability, whilst the mudstone shown to underly the southernmost part of the	Yes

[4] Secondary A aquifers comprise permeable layers that support local water supplies and can act as a source of base flow to rivers. Secondary B aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through fissures and openings or eroded layers. Secondary undifferentiated aquifers are those where it is not possible to apply either a Secondary A or B definition due to the variable characteristics of the rock type.

Source	Risk	Summary	Requirement for Further Assessment
		Study Area is classified as unproductive strata[5] with low permeability. Given the varying geology throughout the Study Area, the low-lying nature of the existing topography, the proximity to the coastline, and the presence of numerous main rivers and LLFA/IDB-maintained watercourses, it is considered that groundwater poses a potential risk of flooding to the Project.	
Artificial (Reservoirs)	Residual	The Environment Agency's Reservoir flood maps show the Study Area to traverse areas that lie within the extent of flooding predicted to occur in the unlikely event of a dam or reservoir failure. The risk shown within the Study Area is associated with both 'dry day' and 'wet day' scenarios. It should be noted that all large reservoirs must be inspected and supervised by reservoir panel engineers in accordance with the Reservoir Act 1975 (RA 1975) (Ref 50). The Environment Agency serve as the enforcement authority for the RA 1975 in England and are required to ensure that reservoirs are inspected regularly, and essential safety work undertaken. Consequently, this is considered to represent a residual risk of flooding to the Project and will be assessed as such in accordance with the requirements of NPS EN-1.	Yes (Residual)
Artificial (Sewers)	Low	The Study Area is predominantly rural, with large parts of the land under arable farming use. Surface water that would be generated by the Project is anticipated to be discharged to ground via infiltration or to surface waterbodies in preference to the public sewer network in accordance with the drainage hierarchy. Consequently, interfaces between the Project and the public surface water sewer network are expected to be minimal. In the event that sewer flooding occurs, it is anticipated that the resultant flow paths would follow the existing topography and accumulate in low-lying areas, therefore patterns would be	No

[5] Unproductive strata is largely unable to provide usable water supplies and are therefore unlikely to be relied upon by surface water and wetland ecosystems.

Source	Risk	Summary	Requirement for Further Assessment
		similar to that associated with surface water flooding.	
Artificial (IDB Drainage Infrastructure)	Residual	The southern part of the Study Area lies within catchments in which water levels are managed by IDBs. Consequently, there is a residual risk of flooding posed to the Project associated with a potential failure of IDB drainage infrastructure.	Yes (Residual)
Artificial (Canals)	Residual	The Louth Canal crosses the Study Area within the River Lud corridor. Canals and their associated structures are highly maintained and regulated to maintain a constant water volume so do not pose a risk of flooding the event of a storm event. They do however pose a residual risk associated with a potential breach if the canal is impounded above existing ground levels.	Yes (Residual)

5A.4.16 The risk of flooding posed to, and arising from, the Project, from tidal, fluvial, surface water, groundwater and sewer sources are all considered to require further assessment and is considered in detail in section 5A.5, with the risk of flooding from reservoirs, canals and supporting infrastructure such as pumping stations assessed as a residual risk. This includes consideration of construction related activities such as access tracks, construction compounds and working areas" work.

5A.5 Flood Risk Assessment

Introduction

5A.5.1 The following section summarises the preliminary assessment of the risk of flooding posed by those sources identified as requiring further assessment following the screening exercise presented in section 5A.4. It includes an assessment of the risk of flooding posed both to, and arising from, the Project in accordance with the requirements of NPS EN-1 (Ref 5). The identification of mitigation measures that are expected to be required to manage the risks assessed in this section is provided in section 5A.6.

5A.5.2 Additional information on the assessment of baseline flood risk within the Study Areas for each Section of the Project is found in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk.**

Construction Phase Risks

Overhead Lines

5A.5.3 The anticipated sequencing of the construction phase for the proposed overhead line elements of the Project is summarised in section 5A.3.2 with plans detailing the anticipated temporary and construction features associated with each Section of the Project provided in **PEI Report Volume 2 Part B**.

5A.5.4 The temporary and construction features anticipated to be required to deliver the proposed overhead line elements of the Project include:

i. Site preparation and earthworks;

ii. Access routes (including temporary watercourse crossings);

iii. Pylon working areas;

iv. Pylon stringing positions;

v. Crossing protection work areas;

vi. Construction compounds;

vii. Surface water outfalls;

viii. Third party diversion areas; and

ix. SuDS features.

5A.5.5 There is a risk of flooding during construction to the proposed overhead line elements of the Project from tidal, fluvial, surface water and groundwater sources associated with the proposed temporary and construction features listed above, where these activities are to be located in areas identified as being at a risk of flooding from these sources within the Study Area.

5A.5.6 The proposed overhead line elements of the Project have the potential to increase the risk of flooding posed by fluvial and tidal sources to other receptors during the construction phase associated with the proposed temporary and construction features where these activities are to be located in areas identified as being at a risk of flooding from these sources within the Study Area. Potential flooding mechanisms include a loss of floodplain storage or a change in floodplain conveyance where activities are undertaken in areas identified as being at risk of flooding along with changes to watercourse conveyance associated with the proposed temporary watercourse crossings.

5A.5.7 The proposed overhead line elements of the Project have the potential to increase the risk of surface water flooding to other receptors during the construction phase. The increased risk is associated with an increase in impermeable surfacing or through the obstruction or diversion of existing surface water flow paths.

5A.5.8 Construction phase activities associated with the proposed access routes have the potential to impact the standard of protection offered by the existing fluvial and tidal flood defences within the Study Area should temporary construction access crossings of existing defences are proposed.

5A.5.9 There is a residual risk of flooding posed to the overhead line elements of the Project during the construction phase associated with a failure of a dam or reservoir where

activities are to be located in areas shown to be at risk of flooding from this source by the Environment Agency's Reservoir flood mapping (Ref 9). Areas within the Study Area along the corridor of the River Freshney, the corridor of the River Lud/Louth Canal and in the vicinity of Boston and Spalding are shown to be at risk from this source in a mixture of both 'dry day' and 'wet day' scenarios. The Louth Canal could also pose a residual risk of flooding to the overhead line of the Project during the construction phase through a potential breach if it is found to be impounded above existing ground levels.

5A.5.10 The mitigation measures proposed to manage these risks are identified in section 5A.6.3 with further details provided for each in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**.

Substations

5A.5.11 The anticipated sequencing of the construction phase for the new substations proposed as part of the Project is summarised in section 5A.3.2 with plans detailing the anticipated temporary and construction features associated each substation provided in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**.

5A.5.12 The temporary and construction features anticipated, at this stage, to be required to deliver the new substations proposed as part of the Project include:

i. Access routes (including temporary watercourse crossings);

ii. Construction compounds;

iii. Working areas/substation compound area;

iv. Surface water outfalls; and

v. SuDS features.

5A.5.13 There is a risk of flooding posed from tidal, fluvial, surface water and groundwater sources during the construction phase in respect of the new substations, associated with the proposed access route, construction compounds and working areas where these activities are to be located in areas identified as being at a risk of flooding from these sources within the Study Area.

5A.5.14 The new substations have the potential to increase the risk of flooding posed by tidal, fluvial and surface water sources to other receptors during the construction phase associated with the proposed access routes, construction compounds and working areas. Potential flooding mechanisms include a loss of floodplain storage or a change in floodplain conveyance where activities are undertaken in areas identified as being at risk of flooding along with changes to the conveyance of existing watercourses associated with the proposed temporary watercourse crossings.

5A.5.15 The new substations have the potential to increase the risk of surface water flooding to other receptors during the construction phase associated with the proposed access routes, construction compounds and working areas arising from an associated increase in impermeable surfacing or through the obstruction or diversion of existing surface water flow paths.

5A.5.16 Construction phase activities associated with the proposed access routes have the potential to impact the standard of protection offered by the existing fluvial and tidal

flood defences within the Study Area where temporary construction access crossings of existing defences are proposed.

5A.5.17 The mitigation measures proposed to manage these risks are identified in section 5A.6.3 with further details provided for each Section of Project in **PEI Report Volume 2 Part B Sections 1-7 Chapter 6 Water Environment and Flood Risk**.

Operation Phase Risks

Overhead Lines

5A.5.18 The overhead line elements of the Project traverse areas shown to be subject to a risk of flooding from tidal, fluvial and surface water sources; whilst the underlying geology anticipated to be encountered in the northernmost section of the Study Area (Sections 1, 2, 3 and 4 as described in **PEI Report Volume 2 Part B**) may be conducive to groundwater flooding. In addition, the potential breach or overtopping of existing flood defences and the potential failure of a dam or reservoir represent residual risks of flooding to the overhead line elements of the Project during the operation phase.

5A.5.19 The sequential approach has been adopted to locate the pylons associated with the proposed overhead line elements of the Project outside of those areas identified as being subject to a risk of flooding from any source, wherever practicable. This process sought to ensure that the Project is sited in the lowest flood risk areas where possible, whilst acknowledging the wider aims of the Project and the extensive flood risk present throughout the region. Lattice pylons, such as those proposed to be used in the Project, do not displace significant volumes of water and pose minimal obstruction to water flow. Therefore, where pylons are required to be located within areas identified as being at risk of flooding, they will not significantly affect floodplain storage or conveyance during operation.

5A.5.20 Furthermore, pylons are resilient to water damage from occasional flooding and the conductors are located sufficiently above the highest flood level conceivable over the lifetime of the Project, ensuring that they will remain operational during a flood event and will not pose a safety risk.

5A.5.21 The risk of flooding from the overhead line elements of the Project during the operation phase is considered to be low. The FRA submitted in support of the DCO application for the Project will include a detailed assessment and conclusion of risk for all elements of the project during the operation phase.

Substations

New Grimsby West Substation

5A.5.22 An overview of the proposed new Grimsby West Substation is provided in **PEI Report Volume 2 Part B Section 1 Figure 1.3 Permanent and Operational Features**.

5A.5.23 The Environment Agency's Flood Map for Planning shows the proposed new Grimsby West Substation to lie wholly within Flood Zone 1 and to therefore be subject to a 'Low' probability of flooding from fluvial and tidal sources (as defined in **Table 5A.1**), with an associated annual probability of flooding of less than 0.1 per cent (Ref 7).

5A.5.24 The Environment Agency's Risk of Flooding from Surface Water mapping shows the proposed new Grimsby West Substation to predominantly be subject to a 'Very Low' probability of surface water flooding (as defined in **Table 5A.2**), with an associated annual probability of flooding of less than 0.1 per cent (Ref 9). An existing surface water flow path is shown to run from south-west to north-east along the northern edge of the indicative new substation boundary. The probability of flooding associated with the existing flow path is shown to be predominantly 'Low', with an annual probability of between 0.1 per cent and 1 per cent. However, areas of 'Medium' and 'High' probability, with associated annual probabilities of between 1 per cent and 3.3 per cent and greater than 3.3 per cent respectively, are also shown to be present.

5A.5.25 BGS mapping shows the proposed new Grimsby West Substation to be underlain by bedrock comprised of the Burnham Chalk formation and superficial deposits of Devensian Till. The underlying bedrock is classified as a principal aquifer and is therefore anticipated to exhibit high permeability which may be conducive to groundwater flooding.

5A.5.26 The Environment Agency's Reservoir flood maps do not show the proposed new Grimsby West Substation to lie within the predicted maximum flood extents associated with a dam or reservoir failure.

5A.5.27 None of the historic flood events recorded within the Study Area detailed in **Table 5A.11** are shown to have affected the area in which the proposed new Grimsby West Substation is to be located.

New Lincolnshire Connection Substation A

5A.5.28 An overview of the proposed new Lincolnshire Connection Substation A (LCS-A) Substation is provided in **PEI Report Volume 2 Part B Section 3 Figure 1.3 Permanent and Operational Features**.

5A.5.29 The Environment Agency's Flood Map for Planning show the proposed new LCS-A Substation to lie wholly within Flood Zone 1 and to therefore be subject to a 'Low' probability of flooding from fluvial and tidal sources, with an associated annual probability of flooding of less than 0.1 per cent (Ref 7). Areas of land within the Study Area to the south of LCS-A and are shown to lie within Flood Zones 2 and 3, with the predicted peak flood extents shown to be associated with the Woldgrift Drain, an Environment Agency designated main river. Consequently, the FRA submitted in support of the DCO application for the Project will include a detailed assessment of the expected increase in fluvial flood risk posed as a result of the anticipated impacts of climate change.

5A.5.30 The Environment Agency's Risk of Flooding from Surface Water mapping shows the proposed new LCS-A Substation to predominantly be subject to a 'Very Low' probability of surface water flooding, with an associated annual probability of flooding of less than 0.1 per cent (Ref 9). Isolated areas of surface water flood risk are shown to be present within the indicative new substation boundary, with probabilities ranging from 'Low' to 'High'.

5A.5.31 BGS mapping shows the proposed new LCS-A Substation to be underlain by bedrock comprised of the Ferriby Chalk formation. Superficial deposits of Till are shown to be present in the indicative proposed location of the LCS-A substation. The underlying bedrock is classified as a principal aquifer and is therefore anticipated to exhibit high permeability which may be conducive to groundwater flooding.

5A.5.32 The Environment Agency's Reservoir flood maps do not show the proposed new LCS-A Substation to lie within the predicted maximum flood extents associated with a dam or reservoir failure.

5A.5.33 None of the historic flood events recorded within the Study Area detailed **in Table 5A.11** are shown to have affected the area in which the proposed new LCS-A Substation is to be located.

New Lincolnshire Connection Substation B

5A.5.34 An overview of the proposed new LCS-B substation is provided in **PEI Report Volume 2 Part B Section 3 Figure 1.3 Permanent and Operational Features**.

5A.5.35 The Environment Agency's Flood Map for Planning show the proposed new LCS-B Substation to lie wholly within Flood Zone 1 and to therefore be subject to a 'Low' probability of flooding from fluvial and tidal sources, with an associated annual probability of flooding of less than 0.1 per cent (Ref 7). Areas of land within the Study Area surrounding LCS-B are shown to lie within Flood Zones 2 and 3, with the predicted peak flood extents shown to be associated with the Woldgrift Drain, an Environment Agency designated main river. Consequently, the FRA submitted in support of the DCO application for the Project will include a detailed assessment of the expected increase in fluvial flood risk posed as a result of the anticipated impacts of climate change.

5A.5.36 The Environment Agency's Risk of Flooding from Surface Water mapping shows the proposed new LCS-B Substation to predominantly be subject to a 'Very Low' probability of surface water flooding, with an associated annual probability of flooding of less than 0.1 per cent (Ref 9). Isolated areas of surface water flood risk are shown to be present within the indicative new substation boundary, with probabilities ranging from 'Low' to 'High'.

5A.5.37 BGS mapping shows the proposed new LCS-B Substation to be underlain by bedrock comprised of the Welton Chalk formation. Superficial deposits of Till are shown to be present in the indicative proposed location of the LCS-B Substation. The underlying bedrock is classified as a principal aquifer and is therefore anticipated to exhibit high permeability which may be conducive to groundwater flooding.

5A.5.38 The Environment Agency's Reservoir flood maps do not show the proposed new LCS-B Substation to lie within the predicted maximum flood extents associated with a dam or reservoir failure.

5A.5.39 None of the historic flood events recorded within the Study Area detailed **in Table 5A.11** are shown to have affected the area in which the proposed new LCS-B Substation is to be located.

Refined Weston Marsh Substation(s)

5A.5.40 A high level overview of the Refined Weston Marsh Substation Siting Zone for up to two Weston Marsh Substations is provided in **PEI Report Volume 2 Part B Section 5 Figure 1.3 Permanent and Operational Features**.

5A.5.41 The Environment Agency's Flood Map for Planning shows the Refined Weston Marsh Substation Siting Zone to predominantly lie within Flood Zone 3 and to therefore be subject to a 'High' probability of flooding from fluvial and tidal sources, with an associated annual probability of flooding of greater than 1 per cent. Small areas within the Refined Weston Marsh Substation Siting Zone are shown to lie in Flood

Zone 2 and to therefore be subject to a ‘Medium’ probability of flooding, with an associated annual probability of between 0.1 per cent and 1 per cent.

5A.5.42 Ongoing pre-application consultation with the Environment Agency has identified that the dominant flooding mechanism in the vicinity of the Refined Weston Marsh Substation Siting Zone is expected to be tidal. This assumption is reinforced by the 2016 update of the South Holland District Council SFRA (Ref 51) which shows the Refined Weston Marsh Substation Siting Zone to be located within an area in which flood risk is identified as being tidally dominated.

5A.5.43 The Environment Agency’s Reduction in Flood Risk from Rivers and Sea due to Defences dataset shows the Refined Weston Marsh Substation Siting Zone to benefit from the presence of formal flood defences, with the Environment Agency’s Spatial Flood Defences dataset identifying that the closest defences are located along the banks of the River Welland approximately 1 km to the west. The existing defences along the banks of the River Welland are stated as providing protection against tidal flooding, with the design standard of protection varying between the 2 per cent annual probability event and the 1 per cent annual probability event. The Spatial Flood Defences dataset also shows the presence of existing coastal flood defences along the frontage of the Wash, approximately 10.5 km to the north-east of the Refined Weston Marsh Substation Siting Zone , with the design standard of protection given as the 0.67 per cent annual probability event.

5A.5.44 Ongoing pre-application consultation with the Environment Agency has identified a range of existing hydraulic modelling studies which further define the risk of flooding posed from fluvial and tidal sources in the vicinity of the Refined Weston Marsh Substation Siting Zone for the proposed new Weston Marsh Substations. At the time of writing, these studies are understood to include the following:

i. the Northern Area Tidal Modelling study (2010) (Ref 52);

ii. the Tidal Nene and Tidal Welland Hazard Mapping study (2011) (Ref 53);

iii. the Welland Catchment Modelling Update study (2016) (Ref 54); and

iv. the 2016 update of the South Holland District Council SFRA.

5A.5.45 The FRA submitted in support of the DCO application for the Project will include a detailed assessment of the risk of fluvial and tidal flooding using the outputs of existing hydraulic modelling studies, with updates or amendments to existing models made in agreement with the Environment Agency where appropriate, and will include an assessment of the expected increase in flood risk posed as a result of the anticipated impacts of climate change. The FRA will also include an assessment of the residual risk associated with a potential breach or overtopping of the existing flood defences along with outline details of the proposed mitigation measures required to manage residual risk as appropriate.

5A.5.46 As the Refined Weston Marsh Substation Siting Zone is located in Flood Zones 2 and 3, resilience is to be provided up to the 0.1 per cent annual probability flood event as part of substation design, including appropriate allowances for climate change and uncertainty and taking account of the presence of existing flood defences, in accordance with the National Grid guidance detailed in section 5A.2.6. Preliminary identification of the proposed mitigation measures to be adopted, along with a discussion of the compensatory storage which may be required to ensure that the Project would not result in an increase in flood risk elsewhere over its lifetime in accordance with the requirements of NPS EN-1 (Ref 5), is provided in section 5A.6.4.

5A.5.47 In addition to the updates to the Flood Map for Planning scheduled to be released in March 2025, it is understood that the Environment Agency has commenced a project to update its breach and overtopping modelling for the Lincolnshire and Northamptonshire area, with the study covering the area from Whitton on the south bank of the Humber to Terrington in the Wash. The study will take account of updated sea level data, climate change allowances for sea level rise and any changes to existing flood defences. The programme for delivery of this study is unknown at the time of writing but any updates to the datasets adopted as the basis of this assessment will be reviewed as the Project progresses, along with any supplementary information as it becomes available, with the findings incorporated into the FRA submitted in support of the DCO application for the Project as appropriate.

5A.5.48 The Environment Agency's Risk of Flooding from Surface Water mapping shows the Refined Weston Marsh Substation Siting Zone to predominantly be subject to a 'Very Low' probability of surface water flooding, with an associated annual probability of flooding of less than 0.1 per cent. Isolated areas of surface water flood risk are shown to be present within the indicative new substation boundary, with probabilities ranging from 'Low' to 'High'.

5A.5.49 BGS mapping shows the Refined Weston Marsh Substation Siting Zone to be underlain by bedrock comprised of the Oxford Clay formation and superficial tidal flat deposits. The underlying bedrock is designated as Unproductive Strata, defined as strata which have negligible significance for water supply or baseflows to rivers, lakes and wetlands. They consist of strata with low permeability that naturally offer protection to any aquifers that may be present beneath.

5A.5.50 Water levels within the catchment in which the Refined Weston Marsh Substation Siting Zone is to be located are managed by the South Holland IDB. Pre-application consultation with the IDB has confirmed that the nearest IDB managed water level control structures are the Lords Pumping Station and Lords Sluice. Consequently, there is a residual risk of flooding posed to the Refined Weston Marsh Substation Siting Zone associated with a potential failure of these structures, along with any other IDB drainage assets which manage water levels in the catchment, that will require further assessment within the FRA submitted in support of the DCO application for the Project.

5A.5.51 The Environment Agency's Reservoir flood maps do not show the Refined Weston Marsh Substation Siting Zone to lie within the predicted maximum flood extents associated with a dam or reservoir failure.

5A.5.52 None of the historic flood events recorded within the Study Area detailed in **Table 5A.11** are shown to have affected the Refined Weston Marsh Substation Siting Zone.

New Walpole B Substation

5A.5.53 An overview of the proposed new Walpole B Substation design is provided in **PEI Report Volume 2 Part B Section 7 Figure 1.3 Permanent and Operational Features**.

5A.5.54 The Environment Agency's Flood Map for Planning shows the proposed new Walpole B Substation to lie wholly within Flood Zone 3 and to therefore be subject to a 'High' probability of flooding from fluvial and tidal sources, with an associated annual probability of flooding of greater than 1 per cent.

5A.5.55 Ongoing pre-application consultation with the Environment Agency has identified that the dominant flooding mechanism in the vicinity of the proposed new Walpole B Substation is expected to be tidal, with the Environment Agency stating that the flood extents given by the Flood Map for Planning in this area are based on the outputs of the Fenland Flood Zone Improvements study (2007) (Ref 55).

5A.5.56 The Environment Agency's Reduction in Flood Risk from Rivers and Sea due to Defences dataset shows the proposed new Walpole B Substation to benefit from the presence of formal flood defences, with the Environment Agency's Spatial Flood Defences dataset identifying that the closest defences are located along the banks of the River Nene approximately 2.8 km to the west. The existing defences along the banks of the River Nene are stated as providing protection against tidal flooding, with the design standard of protection given as the 0.67 per cent annual probability event. The Spatial Flood Defences dataset also shows the presence of existing coastal flood defences along the frontage of the Wash, approximately 12 km to the north of the proposed new Walpole B Substation, with the design standard of protection given as the 0.67 per cent annual probability event. Existing tidal flood defences are also shown to be present along the banks of the River Great Ouse, approximately 10 km to the east of the proposed new Walpole B Substation, with the design standard of protection of given as the 1 per cent annual probability event.

5A.5.57 Ongoing pre-application consultation with the Environment Agency has identified a range of existing hydraulic modelling studies which further define the risk of flooding posed from fluvial and tidal sources in the vicinity of the proposed new Walpole B Substation. At the time of writing, these studies are understood to include the following:

i. Fenland Flood Zone Improvements study (2007);

ii. The Tidal Nene and Tidal Welland Hazard Mapping study (2011);

iii. The Nene Flood Map Improvements Project (2013) (Ref 56); and

iv. The East Anglian Coastal Modelling study (2019) (Ref 57).

5A.5.58 The FRA submitted in support of the DCO application for the Project will include a detailed assessment of the risk of fluvial and tidal flooding. This will use the outputs of existing hydraulic modelling studies, with updates or amendments to existing models made in agreement with the Environment Agency where appropriate. It will include an assessment of the expected increase in flood risk posed as a result of the anticipated impacts of climate change. The FRA will also include an assessment of the residual risk associated with a potential breach or overtopping of the existing flood defences along with outline details of the proposed mitigation measures required to manage residual risk as appropriate.

5A.5.59 As the proposed new Walpole B Substation is located in Flood Zone 3, resilience is to be provided up to the 0.1 per cent annual probability flood event as part of substation design, including appropriate allowances for climate change and uncertainty, and taking account of the presence of existing flood defences, in accordance with the National Grid guidance detailed in section 5A.2.6. Preliminary identification of the proposed mitigation measures to be adopted, along with a discussion of the compensatory storage which may be required to ensure that the Project would not result in an increase in flood risk elsewhere over its lifetime in accordance with the requirements of NPS EN-1 (Ref 5), is provided in the Climate Change subsection of section 5A.6.

5A.5.60 In addition to the updates to the Flood Map for Planning scheduled to be released in March 2025, it is understood that the Environment Agency has commenced a project to update its breach and overtopping modelling for the Lincolnshire and Northamptonshire area, with the study covering the area from Whitton on the south bank of the Humber to Terrington in the Wash. The study will take account of updated sea level data, climate change allowances for sea level rise and any changes to existing flood defences. The programme for delivery of this study is unknown at the time of writing but any updates to the datasets adopted as the basis of this assessment will be reviewed as the Project progresses, along with any supplementary information as it becomes available, with the findings incorporated into the FRA submitted in support of the DCO application for the Project.

5A.5.61 The Environment Agency's Risk of Flooding from Surface Water mapping shows the proposed new Weston Marsh Substation to predominantly be subject to a 'Very Low' probability of surface water flooding, with an associated annual probability of flooding of less than 0.1 per cent. Isolated areas of surface water flood risk are shown to be present within the indicative new substation boundary associated with the network of existing drainage ditches and IDB-maintained watercourses shown to be present, with probabilities ranging from 'Low' to 'High'.

5A.5.62 BGS mapping shows the indicative new substation boundary to be underlain by bedrock comprised of the Ampthill Clay formation and superficial tidal flat deposits. The underlying bedrock consists of strata with low permeability that naturally offer protection to any aquifers that may be present beneath.

5A.5.63 Water levels within the catchment in which the proposed new Walpole B Substation is to be located are managed by the King's Lynn IDB. Consequently, there is a residual risk of flooding posed to the proposed new Walpole B Substation associated with a potential failure of IDB drainage assets which manage water levels in the catchment that will require further assessment as part of the FRA submitted in support of the DCO application for the Project.

5A.5.64 The Environment Agency's Reservoir flood maps do not show the proposed new Walpole B Substation to lie within the predicted maximum flood extents associated with a dam or reservoir failure.

5A.5.65 None of the historic flood events recorded within the Study Area detailed in **Table 5A.11** are shown to have affected the area in which the proposed new Walpole B Substation is to be located.

5A.6 Flood Risk Management

Introduction

5A.6.1 The following section summarises the mitigation measures that are expected to be required to ensure that the Project is designed and constructed to remain safe and operational, without increasing flood risk elsewhere, over its intended design life, taking climate change into account, in accordance with the requirements of NPS EN-1 (Ref 5). The proposed mitigation measures and key design principles will be confirmed in the FRA submitted in support of the DCO application for the Project. Currently, no detailed design has been undertaken for any aspect of the proposed mitigation measures identified below, rather, this Preliminary FRA seeks to identify the design standards that would be adopted by the Project.

5A.6.2 The Project and Study Area have been designed to avoid areas of flood risk as far as practicable, with further details provided in **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered**. The sequential approach is to continue to be utilised throughout the design process to minimise risk posed to the Project from all potential sources of flooding in both the construction and operation phases.

Climate Change

5A.6.3 **Table 5A.13** summarises the climate change allowances applicable to the assessment and mitigation of flood risk in relation to both the construction and operation phases of the Project.

5A.6.4 Climate change allowances are predictions of anticipated change for peak river flow, peak rainfall intensity, sea level rise and offshore wind speed and extreme wave height. The range of allowances is based on percentiles. The central allowance is based on the 50th percentile, the higher central allowance is based on the 70th percentile and the upper end allowance is based on the 95th percentile. The 'Allowance' column in **Table 5A.13** details the climate change allowance to be applied when assessing different climate change scenarios over different epochs.

Table 5A.13 Climate change allowances summary

Project Element	Flood Risk Vulnerability Classification	Epoch	Allowance
Construction Phase			
Fluvial Flood Risk			
Temporary Construction Compounds and Construction Activity Areas	Less Vulnerable	The '*2020s*' (2015-2069)	Central
Watercourse Crossings and Drainage Outfalls	Water Compatible		
Surface Water Flood Risk			
Temporary Construction Compounds and Construction Activity Areas	Less Vulnerable	The '*2050s*' (Present-2060)	Central
Watercourse Crossings and Drainage Outfalls	Water Compatible		
Sea Level Rise			
Temporary Construction Compounds and Construction Activity Areas	Less Vulnerable	2000-2035	Higher central and Upper end
Watercourse Crossings and Drainage Outfalls	Water Compatible		
Operation Phase			

Project Element	Flood Risk Vulnerability Classification	Epoch	Allowance
Fluvial Flood Risk			
Overhead line	Essential Infrastructure	The '*2080s*' (2070-2115)	Higher central
Substations			
Floodplain Compensation			
Surface Water Flood Risk			
Overhead line	Essential Infrastructure	The '*2070s*' (2061-2125)	Upper end
Substations			
Sea Level Rise			
Overhead line	Essential Infrastructure	2096-2125	Higher central and Upper end
Substations			

Construction Phase Mitigation Measures

5A.6.5 A Preliminary Code of Construction Practice (CoCP) is provided in **PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice**. The Preliminary CoCP will be updated as the Project evolves to include additional measures identified through the engineering design, the Environmental Impact Assessment (EIA) process and from engagement with stakeholders to form the Final CoCP submitted as an appendix to the ES in support of the DCO application.

5A.6.6 The Final CoCP will be supported by relevant outline Environmental Control Plans (ECPs) including a Construction Environmental Management Plan (CEMP) detailing how environmental impacts are to be mitigated during the construction phase. Compliance with the ECPs will be secured through the DCO.

5A.6.7 The Preliminary FRA submitted as an appendix to the ES in support of the DCO application will set out the mitigation measures required to ensure that the Project is designed to remain safe and operational, without increasing flood risk elsewhere, during the construction phase in accordance with the requirements of NPS EN-1 (Ref 5).

5A.6.8 An outline Surface Water Drainage Strategy (SWDS) for temporary construction activities proposed as part of the Project will be presented in the FRA submitted in support of the DCO application for the Project to demonstrate how surface water runoff will be managed in a sustainable manner commensurate with the relevant policies and best practice guidance. The principles established as part of the outline SWDS will be fed into a Drainage Management Plan (DrMP) for the construction phase which will form part of the ECPs.

5A.6.9 Proposed discharge locations for runoff generated by construction phase activities should be determined in accordance with the drainage hierarchy presented in section 5A.2.2. The 1 per cent annual probability storm event, including an appropriate allowance for the anticipated impacts of climate change on peak rainfall intensity, should be adopted as the design storm. Peak discharge rates should be limited to the

lesser of the mean annual flood (QBAR) greenfield runoff rate[6] or the maximum permitted rate prescribed by the relevant LLFA or IDB policies where applicable to provide both peak rate control and volume control in accordance with the requirements of the Non-Statutory Technical Standards for SuDS (Ref 41).

5A.6.10 The use of SuDS, in accordance with current best practice guidance represented by The SuDS Manual, should be adopted to provide the volumes of attenuation required to limit peak discharge rates to those identified above and to provide sufficient treatment of surface water runoff prior to discharge where practicable.

5A.6.11 **Table 5A.14** summarises the embedded construction phase flood risk mitigation measures detailed in **PEI Report Volume 3 Part A Appendix 5A Preliminary Code of Construction Practice**.

Table 5A.14 Embedded construction phase mitigation measures

Category	Source of Flood Risk	Mitigation Measure	Reference
General	All	The Project will be compliant with all relevant legislation, consents and permits.	GG01
Watercourse Crossings	Tidal and Fluvial	All works affecting watercourses or within the relevant permitting stand-off distance from the top of bank or landward toe of a flood defence on main rivers and IDB-maintained watercourses will be in accordance with a method approved under consents issued under the Environmental Permitting Regulations 2016, Land Drainage Act 1991, IDB Byelaws (where relevant) or the protective provisions of the DCO for the benefit of the Environment Agency, LLFAs and IDBs . Where possible, a stand-off distance from the top of bank of all watercourses/waterbodies will be established (with the exception of crossings and where existing field access roads are already located adjacent to watercourses are to be utilised). To align with Environment Agency and IDB consenting requirements, it is proposed that this will be: 16 m for tidal main rivers; 8 m for non-tidal main rivers; and 9 m for IDB-maintained watercourses. No statutory stand-off distances are specified for ordinary watercourses, but any works liable to cause an obstruction to flow would be subject to consent under the Land Drainage Act 1991. Appropriate stand-off distances should also be implemented where Project construction activities coincide with water supply and sewerage infrastructure. These are to be agreed on a case-	W01

[6] QBAR is the mean annul maximum flow rate and is an approximate return period of 2.

Category	Source of Flood Risk	Mitigation Measure	Reference
		by-case basis. For any instances where the stand-off distances stated above cannot be achieved between construction works and watercourses, these works would be subject to the appropriate consent by the relevant drainage authority (FRAP for main rivers, OWC for ordinary watercourses).	
		Where watercourses are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary spanned bridges. Once the temporary culvert is installed, the area above the temporary culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials, and people. Temporary culverts will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions and kept free from debris. Where used, temporary bridges will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross the bridge. Specific detailed designs for each watercourse crossing, consistent with these design principles, will be prepared by the construction contractor. These will be subject to the appropriate consent by the relevant drainage authority (FRAP from the Environment Agency for main rivers, OWC from the LLFA or IDB for ordinary watercourses).	W04
Flood Risk	Tidal, Fluvial and Surface Water	The Project will incorporate appropriate surface water drainage measures into its final design for the haul roads, access tracks, works compounds and laydown areas so that they do not lead to a significant increase in flood risk. Access roads (and working areas) in the floodplain are to be as close to ground level as possible (a slight raised surface, relative to the adjacent land, is often required to allow for drainage). This is to minimise the loss of floodplain storage volumes associated with raised structures such as raised access roads, working areas and associated topsoil stockpiles (for example Trackway may be used). Cross drainage would be provided as necessary at topographic low points. Stockpiles would be located outside of the floodplain. Approaches to bridges and culverts in Flood Zones would minimise ramping up to the bridge deck so as not to impede flood flow conveyance.	W06

Category	Source of Flood Risk	Mitigation Measure	Reference
	Tidal, Fluvial, Surface Water and Artificial (Reservoirs)	The contractor(s) will subscribe to the Environment Agency's Floodline service, which provides advance warning of potential local flooding events, and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning information. The contractor(s) will implement a suitable flood risk action plan, which would form part of the Emergency Action Plan, and will include appropriate evacuation procedures should a flood occur or be forecast.	W07
	Fluvial and Surface Water	Severance of existing land drainage routes, including agricultural field drainage systems would be managed during construction through provision of temporary alternative drainage routes, and these drainage systems would be permanently reinstated to ensure their existing function is maintained.	W10
Surface Water Drainage	Surface Water	The contractor(s) will comply with all relevant consent conditions or DCO provisions regarding de-watering and other discharge activities. This will particularly be with regard not only to volumes and discharge rates, but also to water quality (particularly suspended solids, pH and hydrocarbons) and will include discharges to land, water bodies or third-party drains/sewers.	W05
		Appropriate control of runoff from working areas will be achieved through implementation of a DrMP for the construction phase. The DrMP will use SuDS principles, promoting infiltration of runoff wherever possible and specifying appropriate treatment and attenuation storage to ensure any discharges to watercourses are uncontaminated and limited to greenfield rates. The DrMP will cover all aspects of construction works and temporary infrastructure. Drainage measures will be phased to be completed before the commencement of earthwork operations, in a specific area, and will be retained until the drainage system of the completed Project is fully operational, or site restoration works are completed. This will include the temporary diversion of existing agricultural drainage around working areas, if required, followed by reinstatement on completion of works. At this stage of the design process preliminary work has already been done to identify runoff treatment and attenuation requirements for temporary access tracks and working areas associated with overhead line construction,	W11

Category	Source of Flood Risk	Mitigation Measure	Reference
		including defining potential locations of water treatment areas and discharge outfalls. Further work is required to develop drainage strategies for substations, considering arrangements for both construction and operational phases of the Project, which will be reported as part of the ES chapter and FRA in submission with the DCO application.	

Operation Phase Mitigation Measures

5A.6.12 The FRA submitted in support of the DCO application will summarise the outline designs of all proposed permanent watercourse crossings, watercourse diversions, and surface water drainage infrastructure that is proposed to manage surface water that would be generated by the Project during the operation phase.

5A.6.13 The risk of flooding posed to, arising from, the proposed Overhead line elements of the Project during the operation phase is considered to be low; therefore, no mitigation measures are proposed to manage this risk at this stage.

Fluvial and Tidal Flood Risk

5A.6.14 The proposed Grimsby West Substation, LCS-A and LCS-B are shown to lie wholly within Flood Zone 1 and are therefore subject to a ‘Low’ probability of flooding from fluvial and tidal sources. However, the FRA submitted in support of the DCO application for the Project will include a detailed assessment of the expected increase in fluvial flood risk posed as a result of the anticipated impacts of climate change.

5A.6.15 The proposed Weston Marsh Substation(s) and Walpole B substation are shown to be located in Flood Zones 2 and 3 and to benefit from the presence of existing flood defences in the region. To mitigate the risk of flooding posed to both substations from tidal and fluvial sources, resilience is to be provided up to the 0.1 per cent annual probability flood event, including appropriate allowances for climate change and uncertainty, taking account of the presence of existing flood defences, in accordance with National Grid guidance.

5A.6.16 At this stage of the Project, it is anticipated that resilience would be provided through the setting of finished ground levels above the predicted peak flood level for the design event, with localised raising of critical equipment and/or other flood defence techniques adopted as appropriate.

5A.6.17 Ongoing pre-application consultation with the Environment Agency has identified that compensatory storage would be required for any loss of floodplain that would occur as a result of the Project during a 1 per cent annual probability fluvial event or a 0.5 per cent annual probability tidal event, including an appropriate allowance for climate change, when taking account of the presence of existing flood defences.

5A.6.18 The FRA submitted in support of the DCO application for the Project will utilise the detailed outputs of existing hydraulic modelling studies, with updates or amendments to existing models made in agreement with the Environment Agency where required, to quantify any volumes of floodplain that may be lost to provide resilience during the design flood event as described above. Outline designs of any compensatory storage

required to mitigate the risk arising will be provided as part of the mitigation measures summarised in the FRA to demonstrate that the Project would not result in an increase in flood risk elsewhere over its lifetime in accordance with the requirements of NPS EN-1 (Ref 5).

Surface Water Flood Risk

5A.6.19 Surface water drainage strategies for each of the substations proposed as part of the Project are to be developed and will be submitted with the FRA. The FRA submitted in support of the DCO application will summarise the outline designs to ensure that they are commensurate with the relevant policies and best practice guidance.

5A.6.20 Proposed discharge locations for runoff generated by the operation phase of the Project will be determined in accordance with the drainage hierarchy presented in section 5A.2.2. The 1 per cent annual probability storm event, including an appropriate allowance for the anticipated impacts of climate change on peak rainfall intensity, will be adopted as the design storm. Peak rate and volume control will be provided in accordance with the requirements of the Non-Statutory Technical Standards for SuDS (Ref 41) or as prescribed by the relevant LLFA or IDB policies where applicable.

5A.6.21 The outline designs of the surface water drainage infrastructure to serve each of the substations proposed as part of the Project should ensure that there is no flooding on site or in operational areas during a 3.3 per cent annual probability storm event or a 1 per cent annual probability storm event respectively in accordance with the National Grid guidance detailed in sub-section other technical guidance within section 5A.2. Substations should be designed to prevent flooding of neighbouring third-party land during storm events that exceed the design storm scenario.

5A.7 Planning Requirements

The Sequential Test

5A.7.1 The purpose of the Sequential Test, which is described in more detail in paragraphs 3.4.10 – 3.4.12 in the Corridor Preliminary Routing and Siting Study (CPRSS) (Ref 58), is to ensure that a sequential, risk-based approach is followed to ‘steer new development to areas with the lowest risk of flooding from any source’ as stated in the NPPF (Ref 5).

5A.7.2 National Grid has been through an iterative options appraisal process to determine the preferred option for the Project, with consideration given to a wide range of criteria including environmental, socio-economic, technical, and cost factors throughout the process. This process is presented in **PEI Report Volume 2 Part A Chapter 3 Main Alternatives Considered** which summarises the outcomes of the Strategic Options Report (SOR), the CPRSS, the non-statutory consultation undertaken on the graduated swathe developed as part of the CPRSS and the work subsequently undertaken to further develop the Project.

5A.7.3 The SOR identified a new primarily Overhead line connection between a new Grimsby West Substation and a new substation at Walpole, via Lincolnshire Connection Substation(s), as the emerging preference to deliver the aims of the Project. Following the publication of the SOR, further work was undertaken on developing and evolving the strategic option for the East Coast generation group as

which concluded that establishment of a new substation at Weston Marsh was necessary and highlighted a preference for the new substation at Walpole to be situated on the Burwell-Walpole circuits. Further information on this can be found in the Addendum to the SOR (Ref 59).

5A.7.4 The CPRSS summarises the identification and assessment of the preliminary route corridors, siting zones and siting areas undertaken following the publication of the SOR. A sequential approach was taken in the selection of the route corridor, siting zones and siting areas, with flood risk being considered throughout the process alongside the numerous other technical, environmental, and socio-economic constraints. This process sought to ensure that the Project is sited in the lowest flood risk areas where possible, whilst acknowledging the wider aims of the Project and the extensive flood risk present throughout the region.

5A.7.5 Non-statutory consultation on the graduated swathe developed as part of the CPRSS was undertaken in 2024. The graduated swathe has been further developed following the non-statutory consultation to take account of the feedback received and the outcomes of ongoing environmental and technical studies. Further details of the feedback received during non-statutory consultation can be found in the 2024 Non-statutory **Grimsby to Walpole Stage 1 Consultation Feedback Report** and the **Design Development Report**.

5A.7.6 Relevant information from the options appraisal process will be presented within the FRA submitted in support of the DCO application for the Project to inform the application of the Sequential Test and, where required, the application of the Exception Test.

The Sequential Approach

5A.7.7 In accordance with the requirements of NPS EN-1 (Ref 5), the sequential approach will continue to be applied as the Project progresses to minimise risk by directing the most vulnerable uses to areas of the lowest flood risk, including residual risk where applicable.

The Exception Test

5A.7.8 The requirements of the Exception Test are detailed in section 5A2.2, with its potential applicability to the various elements of the Project summarised in section 5A.3. **Table 5A.10** identifies that the Exception Test would need to be applied to any permanent infrastructure proposed to be located in Flood Zone 3a or Flood Zone 3b as part of the Project. In accordance with the requirements of NPS EN-1 (Ref 5), where applicable, both parts of the Exception Test will need to be satisfied for the Project to be consented:

i. Part (a) of the Exception Test requires the Project to provide wider sustainability benefits to the community that outweigh flood risk; and

ii. Part (b) of the Exception Test requires that the Project will be safe for its lifetime, taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. As noted in the PPG, ‘Essential infrastructure’ proposed in Flood Zone 3a should also be designed and constructed to remain operational and safe in times of flood.

5A.7.9 Evidence will be provided within the FRA submitted in support of the DCO application for the Project to inform the application of parts (a) and (b) of the Exception Test.

5A.8 Conclusion

5A.8.1 This Preliminary FRA has been prepared by WSP on behalf of National Grid to support statutory consultation on the proposed reinforcement of the transmission network. The Project will include a new 400 kilovolt (kV) electricity transmission line over a distance of approximately 140 km starting from a new 400 kV substation west of the town of Grimsby in North East Lincolnshire and ending at a new 400 kV substation west of the village of Walpole St Andrew and north of the town of Wisbech, in King's Lynn and West Norfolk District. The Project also includes the construction two new 400 kV Lincolnshire Connection Substations located south-west of Mablethorpe in East Lindsey, up to two new 400 kV substations in the vicinity of the Spalding Tee-Point in South Holland District and the decommissioning (in full or part) of the existing Grimsby West Substation.

5A.8.2 The Project is classified as an NSIP under the PA 2008 (Ref 1) and National Grid is therefore required to apply for a DCO to the SoS, with responsibility for determination delegated to the Planning Inspectorate.

5A.8.3 This Preliminary FRA has been prepared to inform statutory consultation under Section 42 of the PA 2008 ahead of a subsequent application for a DCO and forms Appendix 5A of the **PEI Report Volume 2 Part C Chapter 5 Water Environment and Flood Risk**. It has been prepared in accordance with the requirements of NPS EN-1 (Ref 5) and NPS EN-5 (Ref 2), with reference made to the NPPF (Ref 3) and the associated Flood Risk and Coastal Change PPG (Ref 7) for additional guidance where relevant. The emerging outcomes of ongoing pre-application consultation with key flood risk stakeholders are referenced as appropriate.

5A.8.4 The Environment Agency's Flood Map for Planning shows the central and southern parts of the Study Area lie predominantly within Flood Zones 2 and 3, with the dominant source of flood risk expected to be tidal. The Flood Map for Planning shows the northernmost region of the Study Area, from Grimsby to Alford, to lie predominantly within Flood Zone 1, with the Study Area traversing areas of Flood Zones 2 and 3 associated with the main rivers located within the Study Area as it bisects each catchment from north to south.

5A.8.5 The Environment Agency's Risk of Flooding from Surface Water mapping shows the Study Area to lie within an area predominantly subject to a 'Very Low' probability of flooding from this source. Areas subject to a 'Low' to 'High' probability of flooding from this source are shown throughout the Study Area, representing localised ponding expected to occur in topographical low spots or coinciding with the network of existing main rivers, LLFA/IDB-maintained watercourses present within the Study Area.

5A.8.6 The sequential approach has been adopted to locate pylons associated with the proposed overhead line elements of the Project outside of those areas identified as being subject to a risk of flooding from any source where practicable. The risk posed to, and arising from, pylons that are to be located in areas identified as being subject to a risk of flooding during the operation phase is considered to be low; therefore, no mitigation measures are proposed to manage this risk at this stage.

5A.8.7 The probability of surface water flooding in the locations of each of the new substations proposed as part of the Project is shown to range from 'Very Low' to 'High' but is not considered to present a significant risk. None of the proposed new substations are shown to lie within the predicted maximum flood extents associated with a dam or reservoir failure or to have been impacted by any of the historic flood

events recorded within the Study Area given by the Environment Agency's Recorded Flood Outlines dataset (Ref 48).

5A.8.8 The proposed new Grimsby West, LCS-A and LCS-B substations are shown to lie wholly within Flood Zone 1 and to therefore be subject to a 'Low' probability of flooding from fluvial and tidal sources. The underlying bedrock in the location of these substations is classified as a principal aquifer and is therefore anticipated to exhibit high permeability which may be conducive to groundwater flooding.

5A.8.9 The Refined Weston Marsh Substation Siting Zone and Walpole B substations are shown to lie within Flood Zones 2 and 3, with the dominant flooding mechanism understood to be tidal. The bedrock underlain Weston Marsh and Walpole B substations is classified as unproductive strata which has negligible significance for water supply or baseflows to rivers, lakes and wetlands. The Refined Weston Marsh Substation Siting Zone and Walpole B substations are shown to benefit from the presence of formal flood defences, with the stated design standard of protection ranging from the 2 per cent annual probability event to the 0.5 per cent annual probability event. The FRA to be submitted as part of an ES in support of the DCO application will include a detailed assessment of the risk of fluvial and tidal flooding posed to the proposed new Weston Marsh and Walpole B substations using the outputs of existing hydraulic modelling studies, including an assessment of the expected increase in flood risk posed over the lifetime of the Project as a result of the anticipated impacts of climate change. The FRA will also include an assessment of the residual risk associated with a potential breach or overtopping of the existing flood defences along with outline details of the proposed mitigation measures required to manage residual risk as appropriate.

5A.8.10 To mitigate the risk of flooding posed to both substations from tidal and fluvial sources, resilience is to be provided up to the 0.1 per cent annual probability flood event, including appropriate allowances for climate change and uncertainty, taking account of the presence of existing flood defences, in accordance with the National Grid guidance. At this stage of the Project, it is anticipated that resilience would be provided through the setting of finished ground levels above the predicted peak flood level for the design event, with localised raising of critical equipment and/or other flood defence techniques adopted as appropriate.

5A.8.11 Ongoing pre-application consultation with the Environment Agency has identified that compensatory storage would be required for any loss of floodplain that would occur as a result of the Project during a one per cent annual probability fluvial event or a 0.5 per cent annual probability tidal event, including an appropriate allowance for climate change, when taking account of the presence of existing flood defences. Outline designs of any compensatory storage required to mitigate the risk arising will be provided as part of the mitigation measures summarised in the FRA submitted as part of the DCO application to demonstrate that the Project would not result in an increase in flood risk elsewhere over its lifetime in accordance with the requirements of NPS EN-1 (Ref 5).

5A.8.12 A Final CoCP supported by relevant outline or draft ECPs, including a CEMP and DrMP, will be submitted as an appendix to the ES prepared in support of the DCO application. Compliance with the ECPs will be secured through the DCO.

5A.8.13 An outline SWDS for temporary construction activities proposed as part of the Project will be presented in the FRA submitted in support of the DCO application to demonstrate how surface water runoff will be managed in a sustainable manner commensurate with the relevant policies and good practice guidance. The principles

established as part of the outline SWDS will be fed into the DrMP for the construction phase of the Project.

5A.8.14 The sequential approach should continue to be applied as the Project progresses to minimise risk by directing the most vulnerable uses to areas of lowest flood risk, including residual risk where applicable.

5A.8.15 The Exception Test would need to be applied to any permanent infrastructure proposed to be located in Flood Zone 3a or Flood Zone 3b as part of the Project. In accordance with the requirements of NPS EN-1 (Ref 5), where applicable, both parts of the Exception Test should be satisfied for the Project to be consented. Evidence will be provided within the FRA prepared in support of the DCO application to inform the application of parts (a) and (b) of the Exception Test.

5A.8.16 The Preliminary FRA comprises a preliminary assessment of the risk of flooding within the Study Area posed to, and arising from, the Project associated with the construction and operation phases. The Preliminary FRA will be further developed in line with emerging design information and ongoing stakeholder consultation to form a FRA to be submitted as part of an ES in support of the DCO application.

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5B. Preliminary WFD Screening Assessment

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Contents

5B. Water Framework Directive: Screening Assessment

5B.1 Introduction

Background and Purpose of this Technical Note

5B.1.1 This technical note sets out the intended approach to undertaking a Water Framework Directive (WFD) assessment for the Grimsby to Walpole Project (the Project), including the methodology and findings of Stage 1 of the WFD assessment (the full list of WFD stages is provided below).

5B.1.2 This note has been prepared for Stage 2 Consultation with reference to Planning Inspectorate WFD advice (Ref 1) which encourages early engagement with statutory consultation bodies, to set out and agree intended Zones of Influence (ZoIs), guidance to be followed, sources of baseline data, and the approach to assessing the activities of the Project on water bodies not monitored for WFD classification (i.e. tributaries or non-reportable waterbodies). The note concludes with a description of the intended approach to reporting the WFD assessment. Statutory bodies will be engaged as part of Stage 2 Consultation.

5B.1.3 The purpose of this note is to identify water bodies and protected areas within the Anglian and Humber River Basin Districts (RBDs) within the proposed Zone of Influence (ZoI) of the Project and screen those water bodies with the potential to be impacted by the Project (WFD Stage 1). A RBD is used to summarise baseline conditions and set broad improvement objectives. River Basin Management Plans (RBMPs) are produced every six years, in accordance with the RBMP cycle.

5B.1.4 Under the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, an application for a Development Consent Order (DCO) must be accompanied by a plan with accompanying information identifying water bodies in the relevant RBMP, together with an assessment of any effects on such water bodies likely to be caused by the development. The relevant water bodies are shown in this note as part of Stage 1.

5B.1.5 In addition to this note, Stage 2 (WFD Scoping) and Stage 3 (WFD Impact Assessment) will be submitted with the DCO application, to provide the full WFD Assessment.

Policy and Guidance

5B.1.6 The assessment will draw on guidance published by the Environment Agency (EA) and the Planning Inspectorate, namely:

i. Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref 1);

ii. Clearing the Waters for All / Water Framework Directive Assessment: estuarine and coastal waters (Ref 2); and

iii. Water Framework Directive Risk Assessment – How to Assess the Risk of your Activity (Ref 3).

Approach to Reporting

5B.1.7 It is proposed to undertake the WFD assessment in three stages:

i. Stage 1: WFD Screening – This stage identifies the ZoI, screens waterbodies that have potential to be impacted by the Proposed Development, and sets out high-level baseline data for those waterbodies. Screening is required to identify activities which have the potential to result in either deterioration of a water body or fail to comply with the objectives of that water body. Screening also serves to identify those proposed activities (e.g. proposed construction methods) that are required to be taken through to scoping, and those activities that are unlikely to result in the deterioration of the water body.

ii. Stage 2: WFD Scoping - Scoping is required to identify risks to receptors from a project's activities, based on the relevant water bodies and their water quality elements (including information on status, objectives, and the parameters for each water body) for the Construction and Operation Stages. Potential risks to hydromorphology, biology (habitats and fish), water quality, WFD protected areas, and invasive non-native species should be assessed. For construction and decommissioning (of the existing Grimsby West Substation (in full or part)), the proposed works are not considered to cause water body deterioration if it can be demonstrated that the water body:

- Is only impacted for a short period of time;
- Recovers within a short period of time; and
- Recovers without the need for any restoration measures.

5B.1.8 The scoping Stage identifies which elements need to be carried forward to Stage 3 assessment.

i. Stage 3: WFD Impact Assessment - An impact assessment is carried out for each receptor identified as being at risk in terms of potential deterioration or non-compliance with its specific objectives as set out in the River Basin Management Plan as a result of the project. Where the potential for deterioration of water bodies is identified, and it is not possible to mitigate the impacts to a level where deterioration can be avoided, the project will need to be assessed in the context of Article 4.7 of the WFD (Ref 1).

5B.1.9 The findings of each stage of the WFD assessment will be shared with the EA for review and comment.

5B.1.10 This note sets out Stage 1 of the WFD assessment:

i. section 5B.2 describes the proposed zones of influence, Anglian and Humber RBDs and WFD objectives and measures;

ii. section 5B.3 lays out the Screening of WFD Waterbodies (including surface water, transitional, coastal and groundwater) and Protected Areas. In addition, section 5B.4 assess the activities of the Project; and

iii. section 5B.4 describes the screening of activities at both construction and operational phases.

5B.2 Project's Zones of Influence and the Water Framework Directive Water Bodies

Zones of Influence

5B.2.1 The Study Area for a WFD assessment is defined by a ZoI or ZoIs. ZoIs are set following consideration of the nature, scale and duration of a project's construction and operational activities. The ZoIs proposed for this WFD assessment have also been selected to be consistent with other recent similar linear DCO schemes.

5B.2.2 For the activities proposed by the Project, the proposed ZoI will include all surface water bodies regulated by the WFD that could be directly impacted (i.e., within the draft Order Limits and the Refined Weston Marsh Substation Siting Zone (hereafter referred to as the Refined Siting Zone)), and those within 500 m of the draft Order Limits and Refined Siting Zone to account for potential indirect downstream impacts. In addition, the proposed ZoI for groundwater bodies is the area within the draft Order Limits and Refined Siting Zone and a 1 km buffer of the draft Order Limits and Refined Siting Zone. Protected areas with a surface or groundwater dependency within 500 m or 1 km, respectively, of the draft Order Limits will also be included in the scope of the assessment following consideration of the distance over which the Project's activities (see section 5B.4) can reasonably have the potential to cause significant effects/influence on the achievement of the WFD status. This approach aligns with that adopted for the Environment Impact Assessment (EIA) (details provided in **Preliminary Environmental Information (PEI) Volume 2 Part A Chapter 4 Approach to Preliminary Environmental Information** and **PEI Report Volume 3 Part A Appendix 4B Environmental Impact Assessment Methodologies and Scope**), thereby facilitating consistency of approach across both the WFD and EIA assessments.

5B.2.3 The Project is entirely terrestrial and there are no coastal water bodies within the ZoI as defined above. Therefore, potential effects on coastal waterbodies are screened out from further assessment. However, two transitional water bodies are intersected by the draft Order Limits and will be considered as part of this assessment.

Anglian and Humber River Basin Districts

5B.2.4 The Project is mostly located within the Anglian RBD and partially within the Humber RBD. Following consideration of the ZoI of the Project, the Anglian and Humber RBMPs, updated for the third cycle of the WFD in December 2022, have been reviewed to identify potentially affected WFD water bodies. The EA's Catchment Data Explorer online tool (Ref 4) has also been used to assist in this task.

5B.2.5 The Anglian RBD is divided into a number of surface water, artificial water and groundwater management catchments. Those catchments intersected by the Project comprise:

i. Anglian groundwater management catchment (Ref 5);

ii. Witham surface water management catchment, located north of Boston;

iii. Welland surface water management catchment, located south of Boston;

iv. Nene surface water management catchment, located northwest of Wisbech;

v. North West Norfolk surface water management catchment, located southeast of Wisbech; and

vi. Anglian Transitional and Coastal (TraC) management catchment (Ref 6).

5B.2.6 There are no artificial water management catchments within the Anglian RBD.

5B.2.7 The Humber RBD is also divided into a number of surface water, artificial water and groundwater management catchments. Those catchments intersected by the Project comprise:

i. Humber groundwater management catchment (Ref 7); and

ii. Louth Grimsby and Ancholme surface water management catchment, located south of Hull.

5B.2.8 There are no artificial water management catchments within the Humber RBD.

Water Framework Directive Objectives and Measures

5B.2.9 The fundamental objective of the WFD is that the planned status of any water body must be achieved or maintained. The aims of the WFD are:

i. to enhance the status and prevent further deterioration of surface water bodies, groundwater bodies and their ecosystem;

ii. to ensure progressive reduction of groundwater pollution;

iii. to reduce water pollution, especially by Priority Substances and Certain Other Pollutants under Annex II of the Environmental Quality Standards Directive 2008/105/EC;

iv. to support mitigating the effects of floods and droughts;

v. to achieve at least good surface water status for all surface water bodies and good chemical status in groundwater bodies by 2015 (Article 4), or good ecological potential for artificial or heavily modified water bodies; and

vi. to support sustainable water use.

5B.2.10 There are two different status objectives for each WFD water body. For surface waters these are the ecological status (or potential) and the chemical status objectives. These are composed of the following:

i. Ecological status

- biological quality;
- general chemical and physicochemical quality;
- hydromorphological quality; and
- specific pollutants with UK Environmental Quality Standards.

ii. Chemical Status

- priority substances and other EU level substances under the EU's Environmental Quality Standards.

5B.2.11 For groundwater these are quantitative status and chemical status objectives. There are five chemical and four quantitative status tests, some elements of which are

common to both. For each groundwater body, the ‘worst-case’ classification from the five chemical tests is reported as the overall chemical status of the groundwater body, and the ‘worst-case’ classification from the four quantitative tests is reported as the overall quantitative status (Ref 8).

5B.2.12 All but seven of the WFD surface water bodies located within the ZoI (See **Table 5B.1**), achieved Moderate ecological status or potential, with five achieving Poor and two achieving a Bad ecological status. All the surface water bodies that achieved Moderate and Poor ecological status in Cycle 3 (2022) have an objective of achieving Good ecological status by 2027. Out of the two surface water bodies that achieved Bad ecological status, one still has an ecological objective of Moderate by 2015 while the other is targeted to achieve Good ecological status by 2027.

5B.2.13 All the surface water bodies in the Anglian and Humber RBD have a chemical status objective of ‘Good’ by 2063. All of these surface water bodies were assessed as failing in Cycle 2 (2019) and as not requiring assessment in Cycle 3 (2022) of the RBMPs.

5B.2.14 There are several programmes of measures described in the Anglian and Humber RBMPs which apply across multiple management catchments. These are actions that funding has been committed to, or for which there are established funding mechanisms. Examples include measures required to address physical modifications, measures required to manage changes to natural flow and levels of water and measures required for peatland restoration, amongst others.

5B.3 Screening of Water Framework Directive Water Bodies

Introduction

5B.3.1 Water bodies have been screened for potential effects from the Project using the ZoI as defined in Zones of Influence, as detailed in section 5B.2 of this report.

Water Framework Directive Water Bodies and Baseline Status

5B.3.2 Water bodies within the proposed ZoI and their current WFD status are described in **Table 5B.1**. The Project has been split into seven Sections (details provided in **PEI Report Volume 2 Part A Chapter 1 Introduction**) and the relevant Section for each water body is provided in Table 5B.1. The water bodies within the proposed ZoI and the Project Section boundaries are illustrated on **PEI Report Volume 2 Part C Figure 5B.1 Water Framework Directive Surface Water Body Status**. All water bodies within the ZoI have been screened in for future assessment at Stage 2: WFD Scoping.

5B.3.3 For further detail, please refer to **Annex A Water Framework Directive Water body Status and Objectives**.

Table 5B.1 WFD surface and transitional water bodies and baseline status

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
Section 1 and 2	GB104029067540	Mawnbridge Drain	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 1 and 2	GB104029067530	Laceby Beck/River Freshney Catchment (to N Sea)	Hydromorphological designation: Heavily Modified Ecological status/potential: Poor Chemical status: Fail Overall status: Poor
Section 2	GB104029062110	Buck Beck from Source to N Sea	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall Status: Moderate
Section 2	GB104029062100	Waithe Beck lower catchment (to Tetney Lock)	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 2	GB104029062030	New Dike Catchment (tributary of Louth Canal)	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall Status: Moderate
Section 2	GB104029062162	Land Dike Drain to Louth Canal (West)	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
Section 2	GB104029062010	Poulton Drain Catchment (tributary of Louth Canal)	Hydromorphological designation: Heavily Modified Ecological potential/status: Moderate Chemical status: Fail Overall status: Moderate
Section 2	GB104029062000	Black Dyke Catchment (tributary of Louth Canal)	Hydromorphological designation: Heavily Modified Ecological potential/status: Moderate Chemical status: Fail Overall status: Moderate
Section 2	GB104029061990	Louth Canal	Hydromorphological designation: Heavily Modified Ecological potential/status: Poor Chemical status: Fail Overall status: Poor
Section 2	GB105029061680	South Dike and Grayfleet Drain	Hydromorphological designation: Heavily Modified Ecological potential/status: Moderate Chemical status: Fail Overall status: Moderate
Section 2	GB105029061670	Long Eau	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 2	GB105029061660	Great Eau (downstream of South Thoresby)	Hydromorphological designation: Heavily Modified Ecological status/potential: Poor Chemical status: Fail Overall status: Poor
Section 2 and 3	GB105029061641	Trusthorpe Pump Drain	Hydromorphological designation: Artificial

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
			Ecological potential/status: Moderate Chemical status: Fail Overall status: Moderate
Section 2 and 3	GB105029061750	Woldgrift Drain	Hydromorphological designation: Artificial Ecological potential/status: Moderate Chemical status: Fail Overall status: Moderate
Section 3 and 4	GB105029061720	Boygrift Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4	GB105029061730	Anderby Main Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall Status: Moderate
Section 4	GB105029061710	Willoughby High Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4	GB105029061700	Ingoldmells Main Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4	GB105030056441	Wedlands and North Drains	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
			Chemical status: Fail Overall status: Moderate
Section 4	GB105030056442	Cow Bank Drain	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4	GB105030062430	Lymn/Steeping	Hydromorphological designation: Heavily Modified Ecological: Moderate Chemical: Fail Overall status: Moderate
Section 4	GB205030056405	East and West Fen Drains	Hydromorphological designation: Artificial Ecological status/potential: Bad Chemical status: Fail Overall status: Bad
Section 4	GB205030056465	Maud Foster and Fen Catchwater Drains	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4	GB205030062426	Lower Witham - conf Bain to Grand Sluice	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4	GB205030051515	Black Sluice Internal Drainage Board (IDB) draining to the	Hydromorphological designation: Heavily Modified Ecological status/potential: Poor Chemical status: Fail

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
		South Forty Foot Drain	Overall status: Poor
Section 4	GB205031055535	Fosdyke Bridge Outfall	Hydromorphological designation: Artificial Ecological status/potential: Bad Chemical status: Fail Overall status: Bad
Section 4 and 5	GB205031055525	Risegate Eau	Hydromorphological designation: Artificial Ecological status/potential: Poor Chemical status: Fail Overall status: Poor
Section 4 and 5	GB530503100400	Welland	Hydromorphological designation: Heavily Modified Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4 and 5	GB105031050720	Glen	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4, 5 and 6	GB205031050755	Moulton River	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 4, 5 and 6	GB205031055495	Whaplode River	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
Section 4, 5 and 6	GB205031050705	Vernatt's Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 6	GB205032050395	North Level Main Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate
Section 5, 6 and 7	GB205032050405	South Holland Main Drain	Hydromorphological designation: Artificial Ecological status/potential: Moderate Chemical status: Fail Overall status: Moderate

**Ecological 2022, chemical 2019*

Transitional Water bodies and Water Framework Directive Baseline Status

5B.3.4 The estuarine (transitional) water bodies within the ZoI and their current WFD status are described in **Table 5B.2**.

Table 5B.2 WFD transitional water bodies and baseline status

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
Section 4	GB530503000100	WITHAM	Hydromorphological designation: Heavily modified Ecological status/potential: Bad Chemical status: Fail Overall status: Bad
Section 6 and 7	GB530503200200	NENE	Hydromorphological designation: Heavily modified Ecological status/potential: Moderate

Section	Water body ID	Water body Name	Designations and Classifications (2019/2022)*
			Chemical status: Fail Overall status: Moderate

**Ecological 2022, chemical 2019*

Groundwater Bodies and Water Framework Directive Baseline Status

5B.3.5 Groundwater bodies intersected by the ZoI and their current WFD status are described in **Table 5B.3**.

Table 5B.3 WFD ground water bodies and baseline status

Section	Water body ID	Water body Name	2019 Water body
Section 1 and 2	GB40401G401500	North Lincolnshire Chalk Unit	Overall: Poor Quantitative: Poor Chemical: Poor
Section 2, 3 and 4	GB40501G401600	South Lincolnshire Chalk Unit	Overall: Poor Quantitative: Good Chemical: Poor
Section 4	GB40501G401700	Spilsby Sandstone Unit	Overall: Poor Quantitative: Poor Chemical: Good

Protected Areas

5B.3.6 A number of protected areas within the ZoI have been identified that have a known or potential surface or groundwater dependency.

5B.3.7 The ZoI also incorporates numerous Source Protection Zones including Zone I – Inner Protection Zone, Zone II – Outer Protection Zone and Zone III – Total Catchment. Two Drinking Water Safeguard Zones are present for surface bodies, which are the Great Eau (SWSGZ1002) of the Anglian RBD and Louth Canal (SWSGZ1001) of the Humber RBD.

5B.3.8 In addition, both the Nene and Welland TraCs are situated within a Special Protection Area (SPA), Ramsar Site, Special Area of Conservation (SAC) and Shellfish Water Directive. Further details can be found in **Table 5B.4**.

Table 5B.4 Nene (GB530503200200) and Welland (GB530503100400) TraC WFD water body protected area classifications

TraC Water Body	Protected Area Type	Protected Area Name	Protected Area ID
NENE (GB530503200200)	SPA	Nene Washes	UK9008031
		The Wash	UK9008021
	Ramsar Site	Nene Washes	UK11046
		The Wash	UK11072
	SAC	The Wash and North Norfolk Coast	UK0017075
	Shellfish Water Directive	Southeast Wash	UKSW2
WELLAND (GB530503100400)	SPA	The Wash	UK9008021
	Ramsar Site	The Wash	UK11072
	SAC	The Wash and North Norfolk Coast	UK0017075
	Shellfish Water Directive	West Wash	UKSW4

5B.3.9 The aim of the Project (during both construction and operational phases) is to not compromise the objectives or designated features of these protected areas and safeguarding zones. However, as a precaution and until all ecological surveys are complete (approximately October 2025) and a more detailed understanding of the hydrological connectivity and reliance of the protected areas interest features on surface or groundwater flows is obtained, all protected areas within the ZoI are screened in.

Water Framework Directive Water Bodies Screened Out

5B.3.10 Surface water, transitional water and coastal water bodies situated hydrologically downstream have been investigated too, however they are all situated significantly downstream such that any potential impacts would be diminished to the extent that they are negligible. These downstream water bodies are presented in **Table 5B.5**, along with a justification for screening out for further assessment.

Table 5B.5 WFD waterbodies screened out due to their distance from the Project and therefore, corresponding negligible potential impacts. Note, that the distances in the below table are measured from the downstream limit of the ZoI to the upstream boundary of the waterbodies stated.

Water body ID	Water body Name	Water body Type	Closest distance downstream of the ZoI
GB530402609201	Humber Lower	Transitional Water	The Humber Lower is situated approximately 4.5 km downstream of the ZoI.
GB104029062165	Land Dike Drain to Louth Canal (East)	Surface Water	This water body is situated approximately 3 km downstream of the ZoI.
GB104029062168	Land Dike Drain	Surface Water	This water body is situated approximately 5 km downstream of the ZoI.
GB104029062140	Seven Towns North Eau	Surface Water	This water body is situated approximately 5 km from the ZoI. In addition, this water body is not hydrologically connected to the Proposed Development.
GB104029062150	Seven Towns South Eau	Surface Water	This water body is situated approximately 2 km from the ZoI. In addition, this water body is not hydrologically connected to the Proposed Development.
GB640402492000	Lincolnshire	Coastal Water	Lincolnshire Coastal water body is situated approximately 3.5 km downstream of the ZoI.
GB530503016300	Steeping	Transitional Water	Steeping Transitional water body is situated over 5 km downstream of the ZoI.
GB205031055545	Kirton Marsh Drain	River Water	Kirton Marsh Drain water body is situated approximately 3.5 km downstream of the ZoI.
GB530503000100	Witham	Transitional Water	Witham transitional water body is approximately 5 km downstream of the ZoI.

Water body ID	Water body Name	Water body Type	Closest distance downstream of the ZoI
GB530503311300	Wash Inner	Transitional Water	The Wash Inner is situated approximately 7 km downstream of the ZoI.
GB640523160000	Wash Outer	Transitional Water	The Wash Outer is situated approximately 14 km downstream of the ZoI.

Assessment of the Activities of the Project on Water Bodies Without a Water Framework Directive Status

5B.3.11 It is anticipated that many tributary watercourses that are not monitored for WFD classification but form part of the WFD water body catchments will be crossed by the Project.

5B.3.12 Potential effects on these watercourses will be considered cumulatively within the WFD assessment, with effects on the WFD water body to include the indirect effects associated with works to its 'non designated' tributaries, or non-reportable water bodies. This approach is precedented by being applied on recent linear DCO schemes of similar nature to the Project and has been accepted by the Regulator (the EA).

5B.3.13 In addition, there are non-reportable waterbodies, which are whole areas that fall outside surface water body catchment boundaries. These are located around Section 7, however all watercourses within this area fall within the catchment of the Great Ouse transitional WFD water body (GB530503300300), which is situated approximately 7.5 km downstream. Any potential impacts would be diminished with distance to negligible levels, due to processes like dilution and settling out of suspended sediment. Therefore, the Great Ouse transitional WFD water body is screened out of further assessment.

5B.4 Proposed Components and Activities of the Project

Overview

5B.4.1 Components and activities associated with the construction and operation (including maintenance) of the Project with the potential to impact WFD water bodies within the proposed ZoI, prior to implementation of mitigation measures, are described in **Table 5B.6.**

Construction Phase Activities

5B.4.2 **Table 5B.6** summarises the preliminary screening of the construction phase activities of the Project. **Annex B Infrastructure Located in Water Framework Directive Waterbodies** of this assessment identifies which activities are relevant to each water body.

Table 5B.6 Construction phase activities and preliminary potential risks to WFD water body status

Activities	Risk	Waterbodies Potentially Affected
Watercourse crossings	Physical modifications leading to adverse water quality, ecological and hydro-geomorphological effects. Fragmentation of habitats. Spread of invasive non-native species (INNS).	Surface waters, groundwater, protected areas
Pylons (installation)	Opening pollution pathways to water environment receptors, outbreaks of drilling muds degrading receiving water quality, connection of aquifers. Noise and vibration impacts on fish and other aquatic species.	Surface waters, groundwater, transitional, protected areas
Substations (installation)	Opening pollution pathways to water environment receptors, outbreaks of drilling muds degrading receiving water quality, connection of aquifers. Noise and vibration impacts on fish and other aquatic species.	Surface waters, groundwater, transitional, protected areas
Drainage of temporary access tracks and construction compounds	Physical modifications leading to adverse water quality, changes to runoff regime, ecological and hydro-geomorphological effects.	Surface waters, protected areas
General construction (including drilling and piling, handling and treatment of construction waste, soil stripping, scaffolding and earthworks)	Discharges, spills and leaks of potentially polluting materials degrading receiving water quality. Noise and vibration impacts on fish and other aquatic species. Spread of INNS.	Surface waters, groundwater, protected areas
Vegetation clearance	Physical modifications leading to adverse water quality, ecological and hydro-geomorphological effects. Fragmentation of habitats. Spread of INNS. Noise and vibration impacts to fish and other aquatic species.	Surface waters, protected areas
Watercourse diversions	Physical modifications leading to adverse water quality, ecological and hydro-geomorphological effects. Fragmentation of habitats. Spread of INNS.	Surface waters, groundwater, protected areas

Activities	Risk	Waterbodies Potentially Affected
	Impacts to fish passage and normal fish behaviours.	

Operational Phase Activities (including maintenance)

5B.4.3 **Table 5B.7** summarises the preliminary screening of the operational phase activities of the Project. **Annex B Infrastructure Located in Water Framework Directive Waterbodies** identifies which activities are relevant to each water body.

5B.4.4 There are no risks identified to transitional water bodies associated with operational phase activities. This is due to the substations and pylons being situated in-land such that any drainage and maintenance will be sufficiently distant from the screened-in transitional water bodies.

Table 5B.7 Operational phase activities (including maintenance) and preliminary potential risks to WFD water body status

Activities	Risk	Waterbodies Potentially Affected
Drainage of substations	Physical modifications leading to adverse water quality, ecological and hydro-geomorphological effects.	Surface waters, protected areas
General maintenance activities	Maintenance activities would include routine checks and inspections. Overhead line sections would be inspected annually from the ground using a small van, or by helicopter to check for visible faults or signs of wear.	Surface waters, protected areas

5B.5 Summary

5B.5.1 This note presents the methodology and conclusions of Stage 1 of the WFD assessment. The Project is located within the Anglian and Humber RBDs.

5B.5.2 ZoI is used to define the Study Area for the WFD assessment, based on the nature, scale and duration of the Project. The ZoI includes:

i. surface water bodies: Within or up to 500 m from the draft Order Limits and the Refined Siting Zone;

ii. groundwater bodies: Within the draft Order Limits and the Refined Siting Zone and up to 1 km beyond; and

iii. protected areas: Included if within 500 m (surface) or 1 km (groundwater) and potentially affected.

5B.5.3 Surface water, transitional and groundwater bodies have been identified within the Project's ZoI and are presented in **Table 5B.1, Table 5B.2** and **Table 5B.3**. The screened in water bodies are all of those within the ZoI. In addition, protected areas that have a known or potential surface or groundwater dependency within the Project's ZoI have been identified. These are also screened in for Stage 2.

5B.5.4 Activities that pose a risk to the WFD status of water bodies within the ZoI, and WFD compliance of these water bodies, prior to mitigation, have been identified. These include general construction activities and several specific construction activities such as watercourse crossings and drilling for watercourse crossings, as well as operational and maintenance activities.

5B.5.5 Engagement with the Environment Agency and other statutory bodies regarding WFD will be undertaken as part of the Stage 2 Consultation. Stage 2 (WFD Scoping) and Stage 3 (Impact Assessment) will be reported as part of the WFD assessment which will be submitted as an appendix to the Environmental Statement (ES) as part of the DCO application.

References

Ref 1 Planning Inspectorate (2024). Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive [online]. Available at: https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-advice-on-the-water-framework-directive (Accessed 17th March 2025).

Ref 2 Environment Agency (2023). Clearing the Waters for All / Water Framework Directive Assessment: estuarine and coastal waters [online]. Available at: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters (Accessed 17th March 2025)

Ref 3 Environment Agency (2016). Water Framework Directive Risk Assessment – How to Assess the Risk of your Activity [online]. Available at: https://www.gov.uk/government/publications/water-framework-directive-how-to-assess-the-risk-of-your-activity (Accessed 17th March 2025)

Ref 4 Environment Agency (2023). Catchment Data Explorer [online]. Available at: https://environment.data.gov.uk/catchment-planning/ (Accessed 17th March 2025)

Ref 5 Environment Agency (2022a). Anglian River Basin Management Plan [online]. Available at: https://www.gov.uk/guidance/river-basin-management-plans-updated-2022 (Accessed 17th March 2025)

Ref 6 Measures data for Anglian TraC Management Catchment (2024). Available at: https://environment.data.gov.uk/catchment-planning/ManagementCatchment/3003/measures (Accessed 17th March 2025)

Ref 7 Environment Agency (2022b) River Basin Management Plan Humber River Basin District [online]. Available at: https://assets.publishing.service.gov.uk/media/5a7ce326ed915d7c849add6e/gene0910bsqr-e-e.pdf (Accessed 17th March 2025)

Ref 8 UK Technical Advisory Group (2024) Groundwater Quantitative Classification for the purposes of the Water Framework Directive [Online]. Available at: https://www.wfduk.org/sites/default/files/UKTAG%20Paper%2011b%28ii%29%20-%20Guidance%20on%20Groundwater%20Quantitative%20Classification_v3_2.pdf

Annex A Water Framework Directive Water Body Status and Objectives

A.1.1. The Water Framework Directive (WFD) watercourses that may be affected by the Project are described in Table A.1 below. These have been identified on the basis of their direct hydrological connectivity with the draft Order Limits and the Refined Siting Zone, where any part of their catchment area coincides with Section 1 to Section 7 of the Project and its 500 m buffer. Please note, that for the chemical status of WFD waterbodies within Table A.1, Cycle 2 (2019) data is provided as opposed to Cycle 3 (2022). This is due to all of the WFD waterbodies at Cycle 3 being stated as ‘does not require assessment’.

Table A.1 2022 baseline, Cycle 3, WFD data for all water bodies in the ZoI. Please note, for the chemical status Cycle 2 (2019) data is used.

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
Mawnbridge Drain (GB104029067540)	1 and 2	Within draft Order Limits	1.31	27.55	Heavily modified	Fail	Moderate	Moderate	Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Other (not in list) Flow: No further action Measures delivered to address reason, awaiting recovery.	N/A
Laceby Beck/River Freshney Catchment (to N Sea) (GB104029067530)	1 and 2	Within draft Order Limits	15.62	101.16	Heavily Modified	Fail	Poor	Poor	Fish, Macrophytes and Phytobenthos Combined, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous and intermittent); Trade/Industry discharge. Physical modification: Flood protection – structures; Barriers – ecological discontinuity; Land drainage; Other (not in list) Diffuse source: Poor soil and nutrient management (agriculture and rural land management); Urbanisation – urban development Flow: Groundwater abstraction	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment). Improve farm manure and slurry management plans and promote fertiliser best practice. Identify culverts to be removed through redevelopment. Opportunities, where culverts are removed, encourage naturalisation of engineered channels, where culverts cannot be removed, improve substrate to encourage new habitat. Improve land drainage and management practices: improve modified habitats, implement changes to operation and maintenance, change operation regime of locks and weirs. Control diffuse source inputs, reduce diffuse pollution pathways and improve surface run-off and drainage management. Work with IDBs and riparian owners to improve the maintenance regime.
Buck Beck from Source to N Sea	2	Within 500 m buffer of draft Order Limits	10.15	24.15	Heavily Modified	Fail	Moderate	Moderate	Invertebrates, Benzo(g-h-i)perylene, Benzo(b)fluoranthene, PBDE*, Phosphate, Fish, Mitigation Measures Assessment,	Physical modification: Flood protection, Other (not in list) Diffuse source: Urbanisation, Poor nutrient management Point Source: Sewage discharge. Measures delivered to address	Mitigation Measures Assessment/Measures delivered to address reason, awaiting recovery

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
									Mercury and Its Compounds	reason, awaiting recovery	
Waith Beck lower catchment (to Tetney Lock) (GB104029062100)	2	Within draft Order Limits	18.59	69.76	Heavily modified	Fail	Moderate	Moderate	Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Other (not in list) Measures delivered to address reason, awaiting recovery	Mitigation Measures Assessment/Measures delivered to address reason, awaiting recovery
New Dike Catchment (tributary of Louth Canal) (GB104029062030)	2	Within draft Order Limits	3.04	21.94	Heavily modified	Fail	Moderate	Moderate	Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Other (not in list) Measures delivered to address reason, awaiting recovery	Mitigation Measures Assessment/Measures delivered to address reason, awaiting recovery
Land Dike Drain to Louth Canal (West) (GB104029062162)	2	Within draft Order Limits	1.48	20.12	Heavily modified	Fail	Moderate	Moderate	Possible invertebrates, Dissolved oxygen, pH, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Land drainage; Other (not in list) Diffuse source: Poor nutrient management (agriculture and rural land management) Natural: Natural conditions – other Measures delivered to address reason, awaiting recovery	Improve land drainage and management practices: improve modified habitats, implement changes to operation and maintenance, change operation regime of locks and weirs. Control diffuse source inputs, reduce diffuse pollution pathways and improve surface run-off and drainage management. Work with IDBs to develop a more sympathetic maintenance regime. Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment). Improve farm manure and slurry management plans and promote fertiliser best practice.
Poulton Drain Catchment (tributary of Louth Canal) (GB104029062010)	2	Within draft Order Limits	6.93	32.62	Heavily modified	Fail	Moderate	Moderate	Invertebrates, Phosphate, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Flow: Land drainage Physical modification: Land drainage Measures delivered to address reason, awaiting recovery	Improve land drainage and management practices: improve modified habitats, implement changes to operation and maintenance, change operation regime of locks and weirs.

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
Black Dyke Catchment (tributary of Louth Canal) (GB104029062000)	2	Within draft Order Limits	11.02	20.88	Heavily modified	Fail	Moderate	Moderate	Possible fish, Invertebrates, Phosphate, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Land drainage; Other (not in list) Flow: Land drainage Measures delivered to address reason, awaiting recovery	Improve land drainage and management practices: improve modified habitats, implement changes to operation and maintenance, change operation regime of locks and weirs.
Louth Canal (GB104029061990)	2	Within draft Order Limits	20.55	26.55	Heavily modified	Fail	Poor	Poor	Fish, Macrophytes and Phytobenthos Combined, Phosphate, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*, PFOS**	Point source: Sewage discharge (continuous) Physical modification: Land drainage; Other (not in list) Diffuse source: Urbanisation – urban development; Poor Livestock Management Invasive non-native species: Noth American signal crayfish Measures delivered to address reason, awaiting recovery	Action to remove assets identified through asset review programme, best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment), (3) Field and Crop – Arable soils. Develop project to alter flap valves. Investigate use of flap valves to ensure Eel Reg compliance. Farm manure and slurry management and promotion of fertiliser best practice, to control rural diffuse pollution, store and contain potential pollutants (chemicals and waste) and ensure safe storage practices. Also, to use fertilisers and chemicals resourcefully and without excess.
South Dike and Grayfleet Drain (GB105029061680)	2	Within draft Order Limits	25.07	61.87	Heavily modified	Fail	Moderate	Moderate	Invertebrates, Mitigation Measures Assessment, Mercury an Its Compounds, PBDE*	Physical modification: Land drainage; Other (not in list) Natural: Natural conditions – other Measures delivered to address reason, awaiting recovery	Improve land drainage and management practices
Long Eau (GB105029061670)	2	Within draft Order Limits	16.93	41.00	Heavily modified	Fail	Moderate	Moderate	Fish, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Urbanisation – transport; Land drainage – operational management; Other (not in list) Diffuse source: Poor Livestock	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment). Farm manure and slurry management and promotion of fertiliser best practice, to control rural diffuse

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
										Management; Poor soil management.	pollution, store and contain potential pollutants (chemicals and waste) and ensure safe storage practices. Also, to use fertilisers and chemicals resourcefully and without excess.
Great Eau (downstream of South Thoresby) (GB105029061660)	2	Within draft Order Limits	23.89	55.02	Heavily modified	Fail	Poor	Poor	Fish, Macrophytes and Phytobenthos Combined, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Point source: Trade/Industry discharge Physical modification: Barriers – ecological discontinuity; Other (not in list) Diffuse source: Poor nutrient and soil management; Poor Livestock Management Invasive non-native species: North American signal crayfish Measures delivered to address reason, awaiting recovery	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment). Farm manure and slurry management and promotion of fertiliser best practice, to control rural diffuse pollution, store and contain potential pollutants (chemicals and waste) and ensure safe storage practices. Also, to use fertilisers and chemicals resourcefully and without excess.
Trusthorpe Pump Drain (GB105029061641)	2	Within 500 m buffer of draft Order Limits	17.34	45.79	Artificial	Fail	Moderate	Moderate	Biochemical Oxygen Demand, Dissolved Oxygen, Phosphate, Mercury and Its Compounds, PBDE	N/A	N/A
Woldgrift Drain (GB105029061750)	2 and 3	Within draft Order Limits	14.56	43.37	Artificial	Fail	Moderate	Moderate	Dissolved oxygen, Phosphate, pH, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous) Physical modification: other (not in list) Diffuse source: Poor nutrient management; Poor Livestock Management	Farm manure and slurry management and promotion of fertiliser best practice, to control rural diffuse pollution, store and contain potential pollutants (chemicals and waste) and ensure safe storage practices. Also, to use fertilisers and chemicals resourcefully and without excess.
Boygrift Drain (GB105029061720)	3 and 4	Within draft Order Limits	8.79	23.76	Artificial	Fail	Moderate	Moderate	Mitigation Measures Assessment, Mercury and Its	Physical modification: Other (not in list)	N/A

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
									Compounds, PBDE*	Measures delivered to address reason, awaiting recovery	
Anderby Main Drain (GB105029061730)	4	Within draft Order Limits	8.09	35.29	Artificial	Fail	Moderate	Moderate	Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous) Physical modification: Other (not in list) Diffuse source: Poor nutrient management; Poor Livestock Management Flow: No further action Measures delivered to address reason, awaiting recovery	Improve farm manure and slurry management plans and promote fertiliser best practice. Improve IDB operation and management, to improve habitats and operation/maintenance.
Willoughby High Drain (GB105029061710)	4	Within draft Order Limits	9.18	65.16	Artificial	Fail	Moderate	Moderate	Fish, Dissolved oxygen, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Land drainage; Other (not in list) Measures delivered to address reason, awaiting recovery	Improve land drainage modifications, thereby improving habitat, operations and management and water level management.
Ingoldmells Main Drain (GB105029061700)	4	Within draft Order Limits	6.13	29.31	Artificial	Fail	Moderate	Moderate	Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Other (not in list) Measures delivered to address reason, awaiting recovery	N/A
Wedlands and North Drains (GB105030056441)	4	Within draft Order Limits	8.14	15.24	Heavily Modified	Fail	Moderate	Moderate	None listed	N/A	N/A
Cow Bank Drain (GB105030056442)	4	Within 500 m buffer of draft Order Limits	4.76	13.76	Heavily modified	Fail	Moderate	Moderate	Invertebrates, Dissolved oxygen, Phosphate, Mercury and Its Compounds, PBDE*	N/A	N/A
Lymn/Steeping (GB105030062430)	4	Within draft Order Limits	45.03	170.30	Heavily modified	Fail	Moderate	Moderate	Fish, Macrophytes and	Point source: Sewage discharge (continuous)	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
									Phytobenthos Combined, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Land drainage – operational management; Flood protection – structures; Other (not in list) Diffuse source: Poor Livestock Management; Poor soil and nutrient management; Riparian/in-river activities (inc bankside erosion) Invasive non-native species: North American signal crayfish Flow: No further action Measures delivered to address reason, awaiting recovery	and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment). Improve farm manure and slurry management plans and promote fertiliser best practice. Identify culverts to be removed through redevelopment. Opportunities, where culverts are removed, encourage naturalisation of engineered channels, where culverts cannot be removed, improve substrate to encourage new habitat. Work with partners and riparian owners to increase in channel morphology.
East and West Fen Drains (GB20503005 6405)	4	Within draft Order Limits	69.85	371.78	Artificial	Fail	Bad	Bad	Fish, Biochemical Oxygen Demand (BOD), Dissolved oxygen, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*, PFOS**	Physical modification: Land drainage; Other (not in list) Flow: Land drainage – operational management; No further action Unknown (pending investigation) Measures delivered to address reason, awaiting recovery	More sympathetic land drainage operational management regime. Non mains drainage campaign. Work with IDBs to develop a more sympathetic maintenance regime.
Maud Foster and Fen Catchwater Drain (GB20503005 6465)	4	Within draft Order Limits	48.86	99.95	Artificial	Fail	Moderate	Moderate	Fish, Dissolved oxygen, Phosphate, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous) Physical modification: Land drainage Diffuse source: Poor Livestock Management; Poor	Assess and improve private sewage discharges to control point source discharges. Amend permit limits at Sewage Treatment Works (STW) and ensure STW improvements. Improve land drainage and management practices.

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
										nutrient and soil management	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment), (3) Field and Crop – Arable soils.
Lower Witham – conf Bain to Grand Sluice (GB20503006 2426)	4	Within draft Order Limits	17.44	1.71	Heavily modified	Fail	Moderate	Moderate	Dissolved oxygen, Phosphate, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*, PFOS**	Point source: Sewage discharge (continuous) Physical modification: Other (not in list) Diffuse source: Poor Livestock Management, Poor nutrient management Measures delivered to address reason, awaiting recovery	Improve farm manure and slurry management plans and promote fertiliser best practice. Control diffuse source inputs, reduce diffuse pollution pathways and improve surface run-off and drainage management.
Black Sluice IDB draining to the South Forty Foot Drain (GB20503005 1515)	4	Within draft Order Limits	34.71	447.22	Heavily modified	Fail	Poor	Poor	Fish, Dissolved oxygen, Hydrological Regime, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous); Private Sewage Treatment; Sewage discharge (intermittent) Physical modification: Land drainage – operational management; Flood protection – water level management; Barriers – ecological discontinuity; Other (not in list) Diffuse source: Poor Livestock Management; Poor nutrient management; Urbanisation – urban development Natural: Saline or other intrusion Invasive non-native species: Other invertebrates	Improve land drainage and management practices. Improve modified habitats Implement changes to operation and maintenance Change operation regime of locks and weirs. Control diffuse source inputs, reduce diffuse pollution pathways Improve surface run-off and drainage management. Work with IDBs to develop a more sympathetic maintenance regime.

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
										Measures delivered to address reason, awaiting recovery	
Fosdyke Bridge Outfall (GB205031055535)	4	Within draft Order Limits	7.20	35.456	Artificial	Fail	Bad	Bad	Invertebrates, Ammonia, Biochemical Oxygen Demand, Dissolved oxygen, Phosphate, Hydrological Regime, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous) Physical modification: Land drainage Natural: Natural mineralisation Flow: No further action Measures delivered to address reason, awaiting recovery	Improve land drainage and management practices: improve modified habitats, implement changes to operation and maintenance, change operation regime of locks and weirs
Risegate Eau (GB205031055525)	4 and 5	Within draft Order Limits and the Refined Siting Zone	4.27	38.68	Artificial	Fail	Poor	Poor	Invertebrates, Macrophytes and Phytobenthos Combined, Dissolved oxygen, Phosphate, Hydrological Regime, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (continuous) Diffuse source: Poor soil management Natural: Natural mineralisation Flow: No further action Measures delivered to address reason, awaiting recovery	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment).
Welland (GB530503100400)	4 and 5	Within draft Order Limits and the Refined Siting Zone	N/A	1.37	Heavily modified	Fail	Moderate	Moderate	Dissolved Inorganic Nitrogen, Mercury and Its Compounds, PBDE*	Diffuse source: Poor nutrient management Measures delivered to address reason, awaiting recovery	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment).
Glen (GB105031050720)	4 and 5	Within draft Order Limits and the Refined Siting Zone	26.94	57.04	Artificial	Fail	Moderate	Moderate	PBDE, Fish, Dissolved Oxygen, Mercury and Its Compounds, Macrophytes and Phytobenthos Combined, Mitigation	Physical modification: Barriers – ecological discontinuity, Land drainage, Flood Protection Diffuse source: Poor nutrient management, Point source:	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment), (3) Field and Crop – Arable soils. Comply with Eel Regulations (2009) to improve habitat, operations and

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
									Measures Assessment	Monitoring Site Changed (River Flow Data (RFD) only) Measures delivered to address reason, awaiting recovery	maintenance and water level management strategy.
Vernatt's Drain	5	Within 500 m buffer of the Refined Siting Zone	34.62	160.7	Artificial	Fail	Moderate	Moderate	PBDE, Mercury and Its Compounds, PFOS	Measures delivered to address reason, awaiting recovery	N/A
Moulton River (GB20503105 0755)	5 and 6	Within the Refined Siting Zone and draft Order Limits	5.56	24.28	Artificial	Fail	Moderate	Moderate	Ammonia, Dissolved oxygen, Phosphate, Temperature, Mercury and Its Compounds, PBDE*	Point source: Private Sewage Treatment Diffuse source: Poor nutrient management Other pressures: Unknown (pending investigation) Measures delivered to address reason, awaiting recovery	Assess and improve private sewage discharges to control point source discharges. Amend permit limits at STW and ensure STW improvements. Improve IDB operation and management, to improve habitats and operation/maintenance. Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment).
South Holland Main Drain (GB20503205 0405)	6	Within draft Order Limits	36.12	169.37	Artificial	Fail	Moderate	Moderate	Fish, Dissolved oxygen, Mercury and Its Compounds, PBDE*	Measures delivered to address reason, awaiting recovery	N/A
Whaplode River (GB20503105 5495)	5 and 6	Within the Refined Siting Zone and draft Order Limits	9.61	68.76	Artificial	Fail	Moderate	Moderate	Invertebrates, Ammonia, Dissolved oxygen, Phosphate, Mercury and Its Compounds, PBDE*	Point source: Sewage discharge (intermittent and continuous); Private Sewage Treatment Diffuse source: Poor nutrient management Measures delivered to address reason, awaiting recovery	Assess and improve private sewage discharges to control point source discharges. Amend permit limits at STW and ensure STW improvements. Improve IDB operation and management, to improve habitats and operation/maintenance. Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment).

Water body (ID)	Section	Site boundary or 500 m buffer	Approx. length of principal watercourse (km)	Catchment area (km^2)	Hydro-morphological designation	Chemical Status (Cycle 2, 2019)	Ecological status/potential	Overall water body status	Classification element not achieving good	Reasons for not achieving good status	Objective
North Level Main Drain (GB205032050395)	6	Within draft Order Limits	26.84	164.68	Artificial	Fail	Moderate	Moderate	Dissolved oxygen, Phosphate, Mercury and Its Compounds, PBDE*	Physical modification: Land drainage – structures Measures delivered to address reason, awaiting recovery	Improve land drainage and management practices: improve modified habitats, implement changes to operation and maintenance, change operation regime of locks and weirs. Control diffuse source inputs, reduce diffuse pollution pathways and improve surface run-off and drainage management.
Nene (GB530503200200)	6	Within draft Order Limits	N/A	1.94	Heavily Modified	Fail	Moderate	Moderate	Dissolved Inorganic Nitrogen, Mitigation Measures Assessment, Mercury and Its Compounds, PBDE*	Physical modification: Other (not in list) Diffuse source: Poor nutrient management Measures delivered to address reason, awaiting recovery	Best practice land management to reduce soil and sediment loss to rivers: (1) Reduce diffuse pollution at source and (2) Reduce diffuse pollution pathways (i.e. control entry to water environment).

* Polybrominated diphenyl ethers (PBDE)

** Perfluorooctane sulphonate (PFOS)

Annex B Infrastructure Located in Water Framework Directive Waterbodies

B.1.1. The construction and operational activities associated with the Water Framework Directive (WFD) watercourses that are affected by the Project in Section 1 to Section 7 are described in Table B.1. This is based on the latest iteration of the draft Order Limits and Refined Siting Zone.

Table B.1 Activities associated with the Project within each Water Framework Directive water body catchment. Only waterbodies within the draft Order Limits (included in Table A.1 above) are included within this table as infrastructure is not proposed outside of the draft Order Limits. There is potential for water bodies within the wider ZoI to be impacted by the below activities indirectly. This will be considered in Stage 2 (WFD Scoping).

Water Framework Directive Water Body Catchment (ID)	New watercourse crossings	New pylon	New substation	Temporary access track	Construction compound	Scaffold working area	Vegetation Clearance
Section 1 New Grimsby West Substation							
Mawnbridge Drain (GB104029067540)	5 Assumed Closed Culverts	X	X	X	X		X
Laceby Beck (GB104029067530)	N/A						X
North Lincolnshire Chalk Unit (GB40401G401500)	N/A	X	X				
Section 2 New Grimsby West Substation to New Lincolnshire Connection Substation A							
Mawnbridge Drain (GB104029067540)	N/A	X		X			X
Laceby Beck (GB104029067530)	17 Assumed Closed Culverts	X		X	X	X	X
Waith Beck lower catchment (to Tetney Lock) (GB104029062100)	2 Single Span Bridge, 10 Assumed Closed Culverts	X		X	X	X	X
New Dike Catchment (tributary of Louth Canal) (GB104029062030)	1 Single Span Bridge, 1 Assumed Closed Culvert	X		X		X	X

Water Framework Directive Water Body Catchment (ID)	New watercourse crossings	New pylon	New substation	Temporary access track	Construction compound	Scaffold working area	Vegetation Clearance
Land Dike Drain to Louth Canal (West) (GB104029062162)	9 Assumed Closed Culverts	X		X		X	X
Poulton Drain Catchment (GB104029062010)	7 Assumed Closed Culverts	X		X		X	X
Black Dyke Catchment (tributary of Louth Canal) (GB104029062000)	3 Assumed Closed Culverts	X		X		X	X
Louth Canal (GB104029061990)	2 Assumed Closed Culverts	X		X		X	X
South Dike and Greyfleet Drain (GB105029061680)	1 Single Span Bridge, 7 Assumed Closed Culverts	X		X		X	X
Long Eau (GB105029061670)	1 Single Span Bridge, 9 Assumed Closed Culverts	X		X		X	X
Great Eau (downstream of South Thoresby) (GB105029061660)	1 Single Span Bridges, 11 Assumed Closed Culverts	X		X	X	X	X
Woldgrift Drain (GB105029061750)	1 Assumed Closed Culverts	X	X	X			X
North Lincolnshire Chalk Unit (GB40401G401500)	N/A	X					
South Lincolnshire Chalk Unit (GB40501G401600)	N/A	X					

Water Framework Directive Water Body Catchment (ID)	New watercourse crossings	New pylon	New substation	Temporary access track	Construction compound	Scaffold working area	Vegetation Clearance
Section 3 New Lincolnshire Connection Substations A and B							
Woldgrift Drain (GB105029061750)	2 Single Span Bridge, 9 Assumed Closed Culverts	X	X	X	X	X	X
Boygrift Drain (GB105029061720)	2 Assumed Closed Culverts	X	X	X	X		X
South Lincolnshire Chalk Unit (GB40501G401600)	N/A	X	X				
Section 4 New Lincolnshire Connection Substation B to Refined Weston Marsh Substation Siting Zone							
Boygrift Drain (GB105029061720)	5 Assumed Closed Culverts	X	X	X		X	X
Anderby Main Drain (GB105029061730)	2 Single Span Bridges, 14 Assumed Closed Culverts	X		X		X	X
Willoughby High Drain (GB105029061710)	13 Assumed Closed Culverts	X		X		X	X
Ingoldmells Main Drain (GB105029061700)	11 Assumed Closed Culverts	X		X	X	X	X
Wedlands and North Drains (GB105030056441)	1 Single Span Bridge, 6 Assumed Closed Culverts	X		X		X	X
Lymn/Steeping (GB105030062430)	1 Single Span Bridge, 22 Assumed Closed Culverts	X		X		X	X

Water Framework Directive Water Body Catchment (ID)	New watercourse crossings	New pylon	New substation	Temporary access track	Construction compound	Scaffold working area	Vegetation Clearance
East and West Fen Drains (GB205030056405)	1 Single Span Bridge, 59 Assumed Closed Culverts	X		X		X	X
Maud Foster and Fen Catchwater Drain (GB205030056465)	2 Single Span Bridges, 4 Assumed Closed Culverts	X		X	X	X	X
Lower Witham – conf Bain to Grand Sluice (GB205030062426)	N/A						X
Black Sluice IDB draining to the South Forty Foot Drain (GB205030051515)	1 Single Span Bridge, 42 Assumed Closed Culverts	X		X		X	X
Fosdyke Bridge Outfall (GB205031055535)	20 Assumed Closed Culverts	X		X		X	X
Risegate Eau (GB205031055525)	15 Assumed Closed Culverts	X		X	X	X	X
South Lincolnshire Chalk Unit (GB40501G401600)	N/A	X					
Spilsby Sandstone Unit (GB40501G401700)	N/A	X					
Section 5 Refined Weston Marsh Substation Siting Zone							
Risegate Eau (GB205031055525)							
Welland (GB530503100400)							

Water Framework Directive Water Body Catchment (ID)	New watercourse crossings	New pylon	New substation	Temporary access track	Construction compound	Scaffold working area	Vegetation Clearance
Moulton River (GB205031050755)	It is assumed that there will be temporary watercourse crossings proposed within the Siting Zone, including a design assumption for a crossing of the River Welland with a haul road. The design of Section 5 remains in development with project infrastructure unconfirmed at this stage.						
Section 6 Refined Weston Marsh Substation Siting Zone to New Walpole B Substation							
Moulton River (GB205031050755)	2 Assumed Closed Culverts	X		X		X	X
South Holland Main Drain (GB205032050405)	59 Assumed Closed Culverts	X		X	X	X	X
Whaplode River (GB205031055495)	N/A			X			X
North Level Main Drain (GB205032050395)	43 Assumed Closed Culverts	X		X		X	X
Nene (GB530503200200)	N/A						X
Other	7 Assumed Closed Culverts	X		X	X	X	X
Section 7 New Walpole B Substation							
Other (I.e. no reportable WFD waterbodies)	7 Assumed Closed Culverts	X	X	X	X	X	X

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com