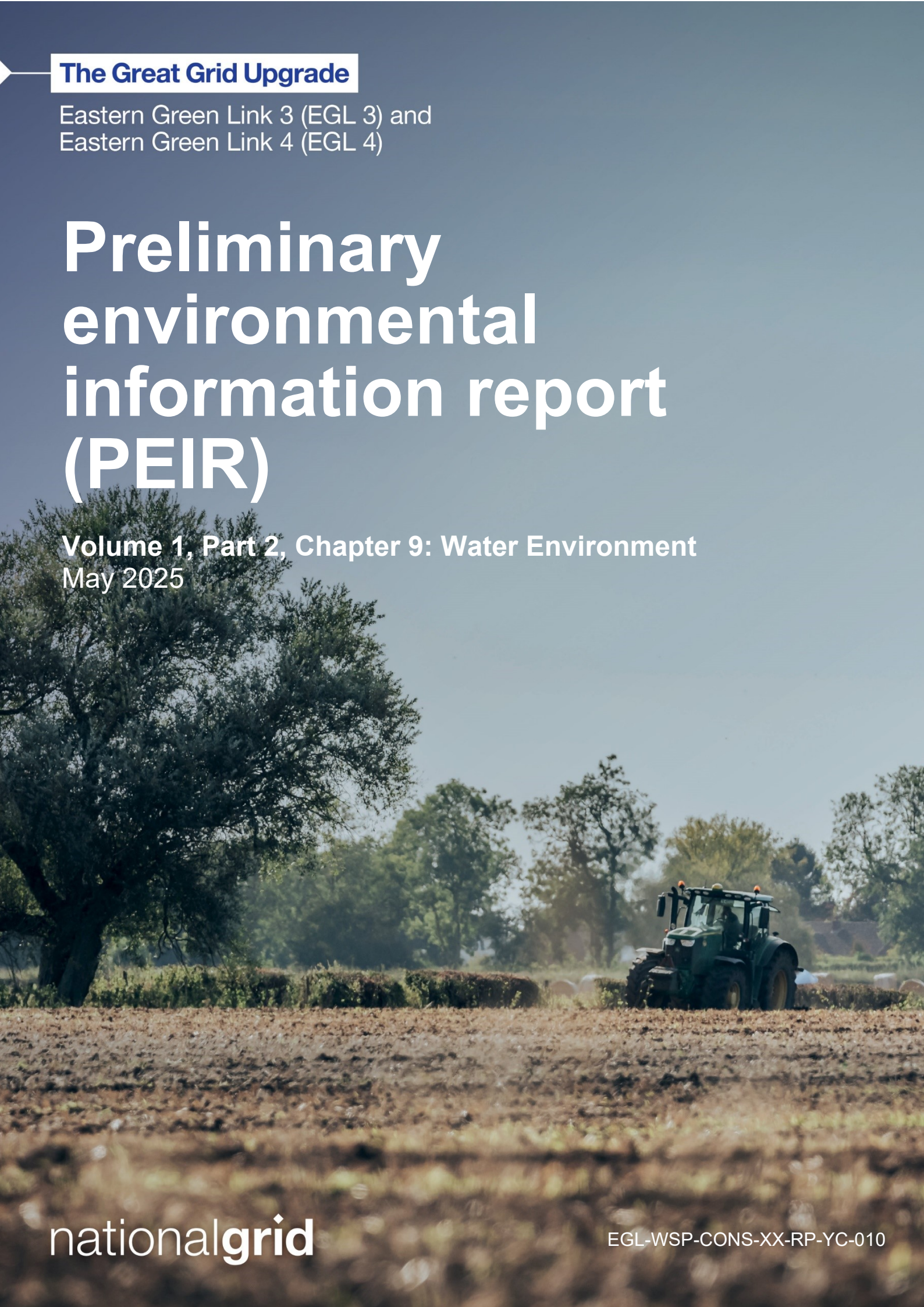
The Great Grid Upgrade

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

Preliminary environmental information report (PEIR)

Volume 1, Part 2, Chapter 9: Water Environment

May 2025



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Contents

9. Water Environment

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9. Water Environment

9.1. Introduction

9.1.1. This chapter presents the preliminary findings of the Environmental Impact Assessment (EIA) undertaken to date for the Eastern Green Link 3 (EGL 3) and Eastern Green Link 4 (EGL 4) English Onshore Scheme, with respect to the water environment, including flood risk and land drainage. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the description of the Projects provided in **Volume 1, Part 1, Chapter 4: Description of the Projects.**

9.1.2. This chapter describes the methodology used, the datasets that have informed the preliminary assessment, baseline conditions, environmental measures, and the preliminary water environment effects that could result from the English Onshore Scheme during the construction and operation (and maintenance) phases. Specifically, it relates to the English onshore elements of EGL 3 and EGL 4 (the English Onshore Scheme) landward of Mean Low Water Springs (MLWS).

9.1.3. This chapter should be read in conjunction with:

- **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**;
- **Volume 1, Part 2, Chapter 6: Biodiversity** due to the close association between water environment features and the biodiversity that they support and the potential for overlapping embedded environmental measures;
- **Volume 1, Part 2, Chapter 7: Cultural Heritage (**due to the potential for impacts on heritage assets outside the English Onshore Scheme by changes to drainage, and preservation conditions);
- **Volume 1, Part 2, Chapter 8 Landscape and Visual Amenity** due to the close association between some landscape receptors and water environment features (fluvial and coastal waterbodies) and the potential for overlapping embedded environmental measures;
- **Volume 1, Part 2, Chapter 10: Geology and Hydrogeology,** which presents an assessment of potentially significant effects on sensitive groundwater receptors, due to the close association between local hydrology, hydrogeology and water environment features (surface waterbodies);
- **Volume 1, Part 2, Chapter 11: Agriculture and Soils** due to the close association between soils, land management and the land drainage regime;
- **Volume 1, Part 2, Chapter 12: Traffic and Transport** due to the potential for traffic/plant emissions associated with the English Onshore Scheme to adversely affect water environment receptors**;**
- **Volume 1, Part 2, Chapter 16: Health and Wellbeing** (due to the potential for water availability and quality, as well as contamination, to affect human health);
- **Volume 1, Part 4, Chapter 27: Greenhouse Gas** due to the influence of climate change on flood risk and the land drainage regime; and
- **Volume 1, Part 4, Chapter 28: Cumulative Effects.**

9.1.4. There is also spatial overlap with the offshore assessments that are being progressed for the English Offshore Scheme (see **Volume 1, Part 3 English Offshore Scheme**), with the intertidal zone being a common receptor with regards to the Water Framework Directive (WFD). This chapter should also therefore be read in conjunction with the following chapters found in Volume 1:

- **Volume 1, Part 3, Chapter 18: Coastal and Marine Physical Processes;** and
- **Volume 1, Part 3, Chapter 20: Fish and Shellfish Ecology.**

9.1.5. This chapter is supported by the following figures:

- **Volume 3, Part 2, Figure 9-1: Water Environment Study Area and Features;**
- **Volume 3, Part 2, Figure 9-2: Water Framework Surface Waterbody Status;** and
- **Volume 3, Part 2, Figure 9-3: Water Framework Groundwater Body Status;** and
- **Volume 3, Part 2, Figure 9-4: Flood Risk from Rivers and the Sea;** and
- **Volume 3, Part 2, Figure 9-5: Risk of Flooding from Surface Water.**

9.1.6. This chapter is supported by the following appendices:

- **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context;**
- **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**;
- **Volume 2, Part 1, Appendix 1.5.B: Outline Code of Conduction Practice;**
- **Volume 2, Part 2, Appendix 2.9.A: Water Environment Baseline Data;**
- **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report;**
- **Volume 2, Part 2, Appendix 2.9.C: Site Walkover Survey Notes and Photographs;**
- **Volume 2, Part 2, Appendix 2.9.D: Preliminary Water Environment Design Principles; and**
- **Volume 2, Part 2, Appendix 2.9.E: Preliminary Watercourse Crossing Schedule.**

Limitations

9.1.7. The information provided in this PEIR is preliminary, the final assessment of potential significant effects will be reported in the Environmental Statement (ES). The PEIR has been produced to fulfil National Grid Electricity Transmission plc (NGET's) consultation duties in accordance with Section 42 of the PA2008 and enable consultees to develop an informed view of the preliminary potential significant effects of the English Onshore Scheme.

9.1.8. Limitations relating to the water environment that affect the robustness of the preliminary assessment of the potential significant effects of the English Onshore Scheme come from uncertainty surrounding design and ongoing assessment. The full evaluation at the ES stage will be informed by:

- full review and assessment of Environment Agency flood models and their outputs, with additional modelling simulations completed as necessary;

- the evolved design of the Projects;
- land drainage surveys; and
- continued stakeholder engagement.

9.1.9. These limitations will be resolved before submission of the ES.

Preliminary significance conclusions

9.1.10. For ease of reference, a summary of the significant and potential significant effects from the preliminary water environment assessment is provided in **Table 9-1.** All other effects in relation to the water environment have been assessed as not significant. Further details of the methodology behind the assessment, and a detailed narrative of the assessment itself are provided within the sections below.

Table 9-1 – Preliminary summary of significance of effects

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Attribute: Water quality Ordinary watercourses / IDB drains: effects on water quality due to watercourse diversions	Medium to low	Minor to moderate adverse	Minor to moderate adverse (Significant)	Watercourse diversions in the indicative zone for converter stations have the potential for significant effects on water quality attributes of the affected watercourses.
Attribute: Flow storage and conveyance Land drainage regime (ditches, land drains etc): reduced flow conveyance and storage capacity due to watercourse diversions	Medium	Minor to moderate adverse	Minor to moderate adverse (Significant)	Watercourse diversions in the indicative zone for converter stations have the potential for significant effects on the flow storage and conveyance attributes of the affected watercourses and on the land drainage regime.
Attribute: Water quality River Nene: effects on water quality associated with construction of a temporary quay on the bank of the river to facilitate transport of construction materials.	High	Minor to moderate adverse	Moderate to major adverse (Significant)	Associated with in channel construction works and the potential need for excavation. The magnitude of impact would depend on the quay design and degree of any excavation requirements.
Attribute: Hydromorphology River Nene: effects on the flow and sediment transport regimes of the river associated with a temporary quay on the bank of the River Nene to facilitate transport of construction materials.	Medium	Moderate adverse	Moderate adverse (Significant)	This represents a preliminary and precautionary assessment of impact. The degree of physical disturbance to the Nene channel, bed and its flow and sediment transport regimes would also depend on the quay design and degree of any excavation requirements.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 9.9** and is defined as [low, medium, high and very high].
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 9.9** and is defined as [Major Adverse, Moderate Adverse, Minor Adverse, Negligible, Minor Beneficial, Moderate Beneficial, Major Beneficial, No change].
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 9.9**.

9.2. Relevant technical guidance

9.2.1. The legislation and planning policy which has informed the assessment of effects with respect to the water environment is provided within **Volume 2, Part 1, Appendix 1.2.A: Regulatory and Planning Context**. Further information on policies relevant to the English Onshore Scheme is provided in **Volume 1, Part 1, Chapter 2: Regulatory and Policy Overview.** Relevant technical guidance, specific to the water environment, that has informed this PEIR and will inform the assessment within the ES is summarised below.

Technical guidance

9.2.2. A summary of the technical guidance for the water environment is given in **Table 9-2.**

Table 9-2 – Technical guidance relevant to the water environment assessment

Technical guidance document	Context
Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (Ref 9.1)	Explains the information that the Planning Inspectorate considers an Applicant must provide with their application in order to clearly demonstrate that the WFD and the Water Environment (Water Framework Directive) Regulations (2017) have been appropriately considered.
Various Construction Industry Research and Information Association (CIRIA) publications, for example, C532: Control of water pollution from construction sites (Ref 9.2)	Provide construction good practice for preventing pollution of the water environment
Guidance for Pollution Prevention Series (Ref 9.3)	Provide environmental good practice and environmental regulatory guidance for a range of topics, for example, GPP5 Works and maintenance in and near watercourses.
Design Manual for Roads and Bridges (DMRB) LA 113: Road drainage and the water environment (Ref 9.4)	Describes a methodology for assessing the effects of linear infrastructure development on the water environment, including criteria for classifying receptor sensitivity (importance) and impact magnitude.
Local flood risk management guidelines published by Lead Local Flood Authorities (LLFAs) (Ref 9.5, Ref 9.6 and Ref 9.7)	These provide baseline flood risk data, design guidance and criteria for the management of surface water runoff from new developments.
Flood Risk and Coastal Change (Ref 9.8) and Water Quality and Supply planning practice guidance (Ref 9.9)	The Flood Risk and Coastal Change guidance provides recommended allowances for climate change effects on future peak river flows, sea levels and rainfall intensities. These allowances will be taken forward to the Flood Risk Assessment (FRA). The Water Quality and Supply guidance sets out approaches for

Technical guidance document	Context
	protecting water quality and ensuring sustainable water use within a project's extents.
LLFA guidance on Sustainable Drainage Systems (SuDS) (Ref 9.10, Ref 9.11)	Describes requirements relating to surface water drainage and SuDS.

9.3. Consultation and engagement

Overview

9.3.1. The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Volume 1, Part 1, Section 5.9** of **Chapter 5: EIA Approach and Methodology**.

Scoping Opinion

9.3.2. A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 05 September 2024. A summary of the relevant responses received in the Scoping Opinion in relation to the water environment and confirmation of how these have been addressed within the assessment to date is presented in **Table 9-3.**

9.3.3. Since issue of the Scoping Opinion changes to the Projects design has resulted in Fenland District Council and Cambridgeshire County Council falling withing the draft Order Limits. Whilst the preliminary assessment has taken account of the relevant baseline information for these local planning authorities the scope of the assessment remains unchanged.

9.3.4. The information provided in the PEIR is preliminary and not all of the Scoping Opinion comments have been addressed fully at this stage, however all comments will be addressed within the ES.

Table 9-3 – Summary of EIA Scoping Opinion responses for the water environment

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate	The Planning Inspectorate is in agreement that pollution due to soil stripping, earthworks and excavations and use and refuelling of plant during construction can be scoped out of the ES, given that the conditions outlined in the Scoping Opinion have been satisfied. The Planning Inspectorate provided the following caveat: "*The Planning Inspectorate would expect however a soil management plan and other mitigation measures relied upon for this to be included in the application documents and secured within the DCO*."	The Planning Inspectorate's agreement is noted, and this matter has been scoped out of further assessment. The mitigation measures relied upon will be documented in **Volume 2, Part 1, Appendix 1.5.B: Outline Code of Construction Practice (CoCP)**. An Outline Soil Management Plan will also be prepared to support the Development Consent Order (DCO) application.

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate	The Planning Inspectorate is in agreement that pollution due to discharges of operational surface water drainage during operation, can be scoped out of the ES, given that the conditions outlined in the Scoping Opinion have been satisfied. The Planning Inspectorate provided the following caveat: "*The Planning Inspectorate would expect however a drainage strategy and the other mitigation measures relied upon for this to be included in the application documents and secured within the DCO*."	The Planning Inspectorate's agreement is noted, and this matter has been scoped out of further assessment. The mitigation measures relied upon will be documented in **Volume 2, Part 1, Appendix 1.5.B: Outline Code of Construction Practice (CoCP)**. Further detail will be provided in an outline drainage strategy that will be produced to support the DCO application.
Planning Inspectorate	The Planning Inspectorate is in agreement that physical disturbance and change to flow regime and hydromorphology during operation can be scoped out of the ES, given that the conditions outlined in the Scoping Opinion have been satisfied.	The Planning Inspectorate's agreement is noted, and this matter has been scoped out of further assessment.
Planning Inspectorate	The Planning Inspectorate is in agreement that pollution and physical disturbance during operation can be scoped out of the ES, given that the conditions outlined in the Scoping Opinion have been satisfied. The Planning Inspectorate provided the following caveat: "*The Planning Inspectorate would expect the ES however to refer to the specific sections of the operational management procedures where this type of maintenance is defined*."	The Planning Inspectorate's agreement is noted, and this matter has been scoped out of further assessment. The ES will provide specific information regarding operational management procedures that would safeguard water environment receptors during operation of the Projects, including for maintenance activities.
Planning Inspectorate	"*The Planning Inspectorate notes the response provided by the Environment Agency which indicates that it is not clear whether the Scoping Report proposes that the ES will assess ordinary watercourses as receptors for all potential impacts. For clarity, the Planning Inspectorate considers that ordinary watercourses should be assessed where relevant for all impacts scoped in*."	Ordinary watercourses are included as receptors in this preliminary assessment and will be included in the ES where relevant for all impacts scoped in.
Planning Inspectorate	"*Whilst it is noted that the presence of works and infrastructure (where required) within the floodplain are to be assessed within the ES, the specific details of the*	These aspects will be covered in the Flood Risk Assessment (FRA) that will be prepared in support of the DCO

Consultee	Consideration	How addressed in this PEIR
	assessment are not given. The Planning Inspectorate considers that the assessment should include information relating to the area of flood zones 3a and 3b and quantify the temporary and permanent loss of functional floodplain."	application. The FRA scope and methodology is being agreed through engagement with the Environment Agency and LLFAs.
Planning Inspectorate	"*The Planning Inspectorate notes that a description of the relevant WFD surface waterbodies is not given within the water environment chapter as has been presented for the groundwater bodies considered within the hydrogeology chapter (Table 10.9). The ES should present a description of the WFD waterbodies considered*."	Relevant WFD surface waterbodies are described in this PEIR chapter and baseline status information is provided in **Volume 2, Part 2, Appendix 2.9.A: Water Environment Baseline Data.** Further information will be included in the ES chapter and the supporting WFD assessment that will be produced for the application.

Technical engagement

9.3.5. Technical engagement with consultees in relation to the water environment is ongoing. A summary of the technical engagement undertaken to date is outlined in **Table 9-4**.

Table 9-4 – Technical engagement on the environmental aspect assessment

Consultee	Consideration	How addressed in this PEIR
Environment Agency	Technical Meeting between the Projects EIA disciplines and Environment Agency teams held on 10 December 2024. Points raised around water consumption, water resource assessments and floodplain compensation at sites situated on defended floodplain. It was agreed that bridge designs can be assessed on a case-by-case basis, and that site specific hydraulic modelling may be avoided for certain structures (i.e. single span bridges with abutment set-backs agreed, or using simple hydraulic calculations to understand water/soffit levels). Structure soffit levels to be set using the 1 in 100 +CC levels, where temporary structures can be set using the present-day levels.	Preliminary information regarding water consumption and effects on water resources, as well as floodplain compensation requirements are provided in this Chapter, and further information will be included within the ES and accompanying FRA. Continued engagement with the Environment Agency is proposed, to agree other key water environment design principles.

Consultee	Consideration	How addressed in this PEIR
Internal Drainage Boards (IDBs) (Witham Fourth District, Welland and Deepings, Water Management Alliance, North Level Internal, Lindsey Marsh)	Technical Meeting between the Projects EIA disciplines and several IDB representatives held on the 11 July 2024. An overview was given to the relevant IDB stakeholders and an update on Project progress was reported. Points raised included FRA proposals, asset interface design, land drainage, surface water drainage. It was agreed that a minimum of 2 m clearance is to be maintained below the hard bed of IDB drains at any trenchless crossings. A minimum of 9 m is to be maintained from the top of bank to construction activities.	The design requirements are shaping the evolving Projects design and continued engagement with the IDBs is proposed to agree other key water environment design principles and to gather information to inform the ES and FRA assessments.
Internal Drainage Boards (Witham Fourth District, Welland and Deepings, Water Management Alliance, South Holland, North Level Internal, Lindsey Marsh)	Technical Meeting between the Projects EIA disciplines and several IDB representative teams held on the 25 September 2024. An update on Project progress was provided. Information on land drainage proposals was provided for different design cases.	Continued engagement with the IDBs is proposed via regular meetings, to agree key land drainage principles.
Environment Agency and Lead Local Flood Authorities (Norfolk and Lincolnshire County Councils)	An FRA Scoping Technical Note was shared on 27 January 2025 with the Environment Agency and 05 February 2025 with the Lead Local Flood Authorities. The note covers policy and guidance related to flood risk assessment on a Nationally Significant Infrastructure Project (NSIP), the sources of baseline data reviewed, and the resultant identified potential sources of flood risk to be assessed. It also covers the approach to assessing flood risk to the Projects and arising from the Projects during their construction and operational (including maintenance) phases.	Feedback provided will shape the scope of the FRA that will be prepared alongside the ES.
Environment Agency	WFD Stage 1 assessment, shared 27 January 2025 (**Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report**). This set out the intended approach to undertaking a WFD assessment for both the onshore and	Feedback provided will shape the scope of the next stages (stage 2, 3 and 4) of the WFD assessment that will be prepared alongside the ES.

Consultee	Consideration	How addressed in this PEIR
	offshore components of the Projects, including the methodology and findings of Stage 1 of the WFD assessment. Waterbodies and protected areas within the Anglian River Basin District (RBD) within the proposed Zone of Influence (ZoI) of the Projects were identified and screened for the potential to be impacted by activities associated with construction and operation of the Projects.	
Anglian Water	Technical Meeting between the Projects EIA and design disciplines and Anglian Water held on 13 February 2025. An update on Project progress was provided and the teams discussed Project interactions with Anglian Water assets, including proposals for permanent connections.	Continued engagement with Anglian Water is proposed via regular meetings, to agree key design principles and the Projects water supply and drainage strategies.

9.3.6. Engagement with the Environment Agency, LLFAs and IDBs will continue to inform the ES. Statements of Common Ground will be used to record engagement and ongoing discussions with these stakeholders throughout the DCO process. In advance of the ES, engagement will also be undertaken with the following key stakeholders relevant to the water environment to discuss the proposed assessment methodology:

- Canal and River Trust as the navigation authority of the River Witham;
- Cambridgeshire County Council (acting as LLFA);
- Marine Management Organisation; and
- Port of Wisbech Authority.

9.4. Data gathering methodology

9.4.1. The known or predicated current and future baseline environment described in this section has been characterised from desk study and data collection from several stakeholders. The data sources and stakeholders are detailed in **Table 9-5.**

9.4.2. All of the further information received from stakeholders will be incorporated into future stages of the assessment.

Study area

9.4.3. As defined in the EIA Scoping Report (Ref 9.12) the study area for the EIA is proposed to include all land within the draft Order Limits, and in addition, a buffer of 500 m from this boundary. The study area, illustrated in **Figure 9-1: Study Area and Water Environment Features**, is considered appropriate based on technical knowledge of

similar schemes and has been set following consideration of the distance over which likely significant effects can reasonably be expected to occur.

9.4.4. The ES assessment will consider terrestrial waterbodies to Mean High Water Springs (MHWS).

9.4.5. The FRA that will be prepared to inform the EIA will cover a larger study area where necessary, for example assessing the potential for changes to baseline flood risk at the local catchment scale or within a floodplain cell which may cover areas up to several square kilometres.

9.4.6. The study area for the WFD assessment is defined by a Zone of Influence (ZoI). ZoIs are set following consideration of the nature, scale and duration of a projects' construction and operational activities. The ZoI proposed, has been agreed with the Environment Agency and is consistent with other recent similar linear DCO projects. The ZoI proposed for the WFD assessment can be seen in **Volume 3, Part 2, Figure 9-1: Study Area and Water Environment Features.**

9.4.7. As described in **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report**, for the terrestrial activities proposed by the Projects, the proposed ZoI will include all surface and groundwater bodies regulated by the WFD that could be directly impacted (i.e., within the direct footprint of the Projects) and those within 500 m of the draft Order Limits to account for potential indirect impacts. Protected areas with a surface or groundwater dependency within 500 m of the draft Order Limits will also be included in the scope of the assessment following consideration of the distance over which the Projects activities can reasonably have the potential to cause significant effects/influence the achievement of the WFD status. To address the Projects' offshore activities, transitional/coastal waterbodies up to 1 nautical mile will be considered within the WFD assessment.

Desk study

9.4.8. A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 9-5.**

Table 9-5 – Data sources used to inform the water environment assessment

Organisation	Data source	Data provided
Environment Agency	Statutory Main River map for England (Ref 9.13)	Main River map for England
Environment Agency	Catchment data explorer database of Cycle 2 and 3 Water Framework Directive information (Ref 9.14)	Waterbody status under Cycles 2 and 3 of the Water Framework Directive.
Environment Agency	Flood Map for Planning (Ref 9.15)*	Spatial Flood Zone Information
Environment Agency	Long term flood risk mapping from the National Assessment of Flood Risk** (Ref 9.16)	Risk of flooding from surface water mapping, risk of flooding from rivers and the sea mapping, inclusive of climate change allowances.

Organisation	Data source	Data provided
Environment Agency	AIMS Spatial Flood Defences (inc. standardised attributes) (Ref 9.17)	Information on existing flood defence infrastructure
Environment Agency	Reduction in Risk of Flooding from Rivers and Sea due to Defences database	Information on areas benefiting from flood defences.
Environment Agency	Various flood models and associated data provided by the Environment Agency as a response to request NR362462 sent on the 30 May 2024.	Flood modelling outputs (flood extent, depth and hazard data) from the several models. Fluvial flood models covering baseline, climate change allowances and defended and undefended scenarios (where relevant) for the following catchments: • Saltfleet and Great Eau • Willoughby High Drain • Woldgrift Drain • Lower Nene (2013) • Wash Model (2018) • Welland Glen (2016) Tidal overtopping and tidal breach models for both baseline and climate change scenarios at the Projects landfall.
Environment Agency	Consented Discharges to Controlled Waters dataset from the Environment Agency's Public Register (Ref 9.18)	Data on consented discharges to surface waters (tabulated in **Volume 2, Part 2, Appendix 2.9.A: Water Environment Baseline Data**).
Environment Agency	Provided by email from the Environment Agency	Data on licenced and exempted (private) abstractions from surface waters (tabulated in **Volume 2, Part 2, Appendix 2.9.A: Water Environment Baseline Data**).
Department for Environment, Food & Rural Affairs (DEFRA)	Multi-Agency Geographic Information for the Countryside (MAGIC) website (Ref 9.19)	Information on Drinking Water Protected Areas and Nitrate Vulnerable Zones (NVZs).

*This dataset will be updated in Spring 2025 and relevant changes within the study area will be reflected in the ES and FRA. **This dataset was updated in January 2025. A full review of the new dataset will be undertaken and will inform the future ES and FRA.**

Survey work

9.4.9. The desk study has also been supported by information gathered during site walkovers conducted in September 2024. The site walkovers were focused on the landfall and Walpole areas, and observations were made to improve the understanding of local topography, land drainage regimes and watercourse conditions. The surveys consisted of visual surveys only, with photographs taken shown in **Volume 2, Part 2, Appendix 2.9.C: Site Walkover Survey Notes and Photographs**.

9.5. Overall baseline

Sites Designated for Nature Conservation

9.5.1. There are numerous ponds and lakes within the draft Order Limits, some of which are part of sites designated for nature conservation, details of which are provided in **Volume 1, Part 1, Chapter 6: Biodiversity**. Where surface waters play a key role in sustaining the designated interest features, these sites will be identified in the ES and will be included as a receptor in the assessment presented in the ES.

Existing Water Interests

9.5.2. Data to characterise existing water interests has been collected from the Environment Agency. Watercourses in the study area receive, transport and dilute consented and informal discharges and support abstractions of water for a range of uses. Details of consented discharges and permitted and private surface water abstractions are shown in **Volume 2, Part 2, Appendix 2.9.A: Water Environment Baseline Data** and are shown in **Volume 3, Part 2, Figure 9-1: Study Area and Water Environment Features.**

9.5.3. Information on private water supplies and permitted abstractions supported by groundwater resources is provided in **Volume 1, Part 1, Chapter 10: Geology and Hydrogeology.**

Current baseline

9.5.4. The study area crosses the catchments of numerous watercourses and is located within the Anglian River Basin District. The features of the water environment are illustrated on:

- **Volume 3, Part 2, Figure 9-1: Study Area and Water Environment Features**;
- **Volume 3, Part 2, Figure 9-2: Water Framework Surface Waterbody Status**
- **Volume 3, Part 2, Figure 9-4: Flood Risk from Rivers and the Sea**; and
- **Volume 3, Part 2, Figure 9-5: Risk of Flooding from Surface Water**.

9.5.5. For reporting purposes, the draft Order Limits have been subdivided into three sections: Landfall / Landfall to Walpole / Indicative zone for converter stations. The current baseline is described below for each of these.

9.5.6. For the purposes of this assessment, with regard to the WFD, surface water, groundwater and transitional/coastal water bodies within the ZoI have been identified and screened within the WFD Stage 1 assessment report in **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report**. This report contains additional information on the baseline status of these water bodies.

Landfall

Surface Water Features

9.5.7. Within the Landfall area there are no main rivers that would be crossed by the draft Order Limits or within the study area. However, there are numerous ordinary watercourses (including the Huttoft Main Drain and the North Outmarsh drains) and many of these provide a land drainage function. The catchments of these watercourses tend to be rural in their land use, with flat topography.

9.5.8. Other water features within the Landfall area include numerous natural and artificial ponds. The landfall location is on the Lincolnshire coast of the North Sea. In this area is Huttoft Beach which is part of the stretch of sand from Mablethorpe to Skegness.

9.5.9. The Landfall area is wholly within the Lindsey Marsh IDB area.

Surface Water Quality

9.5.10. In the Landfall section of the Projects, the study area covers the catchments of several WFD surface waterbodies: Anderby Main Drain, Boygrift Drain and Lincolnshire Transitional and Coastal (TraC), as illustrated in **Volume 3, Part 2, Figure 9-2: Water Framework Surface Waterbody Status.** The baseline status of these is described in **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report.** Whilst this appendix also identifies the WFD groundwater bodies within the study area, groundwater quality information is provided in **Volume 1, Part 2, Chapter 10: Geology and Hydrogeology**.

9.5.11. The WFD classifications for the waterbodies are informed by monitoring a range of parameters that are indicators of water quality from Environment Agency monitoring sites. These waterbodies have a moderate ecological status and a chemical status of fail due to exceedance of priority hazardous substances. Multiple reasons for not achieving good (RNAG) status are reported for these waterbodies, with polybrominated diphenyl ethers (PBDE) and mercury and its compounds being common to all. Other RNAGs include physical modification, sewage discharge and poor agricultural management.

Hydromorphology

9.5.12. The Anderby Main Drain and Boygrift Drain waterbodies have a hydromorphological designation of artificial, with the Lincolnshire TraC waterbody designated as heavily modified. Many of the watercourses/drains in this part of the study area have been subject to modifications for the purposes of land drainage and flood defence. Watercourses that serve a land drainage function tend to have relatively low hydromorphological diversity, typically having uniform channel profiles and straightened channel forms.

Flood Risk and Land Drainage

9.5.13. Based on the online Flood Maps (Ref 9.15) the majority of the Landfall area is at high risk of flooding, with the draft Order Limits crossing large extents of coastal floodplain (initially defined by the extents of Environment Agency Flood Zone 2 (medium risk; between a 1 in 1000 (0.1%) and 1 in 100 (1%) annual probability of flooding from rivers and the sea) and Flood Zone 3 (high risk; 1 in 100 (1%) or greater annual probability of flooding from rivers or 1 in 20 (5%) or greater annual probability of flooding from the

sea). This is shown on **Volume 3, Part 2, Figure 9-4: Flood Risk from Rivers and the Sea**.

9.5.14. According to the Environment Agency Asset Information and Maintenance (AIMS) database (Ref 9.17), flood defences are situated along the coastal frontage of this landfall area. These comprise raised embankments and dunes, which reduce the risk of tidal flooding. The Environment Agency flood model outputs that have been received confirm this. Model simulations of present day scenarios (not accounting for climate change) show that the land within the draft Order Limits is subject to flooding only during events with a low annual chance, associated with overtopping of the defences. There is a greater residual risk associated with a defence breach, and future climate change is predicted to increase flood risk.

9.5.15. The Risk of Flooding from Surface Water map (Ref 9.20) shows that most of the land in this section is at very low risk of surface water flooding (annual chance of flooding of less than 0.1%). There are isolated areas of high risk, concentrated around land drainage pathways and watercourses.

9.5.16. The previously described network of watercourses and drainage ditches are key to the land drainage regime in this area. Formal drainage systems include those serving existing roads and agricultural land is also understood to be served by piped and open drainage systems.

Landfall to Walpole

Surface Water Features

9.5.17. As illustrated in **Volume 3, Part 2, Figure 9-1: Study Area and Water Environment Features**, within the Landfall to Walpole section of the English Onshore Scheme, there are ten main rivers crossed by the draft Order Limits:

- **Willoughby High Drain** flows from west to east, discharging to the North Sea at Chapel St Leonards;
- **The River Lymm / Steeping River** flows in a southwesterly direction across the draft Order Limits;
- **Lady Wath's Beck**, a tributary of the Steeping River, flows in a southeasterly direction across the draft Order Limits;
- **East Fen Catchwater Drain** flows in a westerly and southerly direction before it combines with the West Fen Catchwater Drain to form the Stone Bridge Drain;
- **West Fen Catchwater Drain** flows in a southerly direction through the draft Order Limits before it combines with the East Fen Catchwater Drain to form the Stone Bridge Drain;
- **Stone Bridge Drain** originates at the confluence of the East and West Fen Catchwater Drains and flows south towards Boston where it joins the River Witham;
- The **River Witham** crosses the draft Order Limits and flows southeast towards Boston where it joins the Stone Bridge and South Forty Foot Drains, discharging into The Wash;
- **South Forty Foot Drain** flows eastwards past Hubbert's Bridge towards Boston where it joins the River Witham;

- **The River Welland** flows northeast into The Wash, and is tidal at the point it crosses the draft Order Limits; and
- **The River Nene** flows north into The Wash and is tidal at the point it crosses the draft Order Limits.

9.5.18. There is an extensive network of ordinary watercourses (including IDB and landowner drainage ditches) that function at a local scale located throughout the Landfall to Walpole section. In some places these are managed to facilitate land drainage and control flood risk. The catchments of the watercourses can be categorised as generally rural in their land use, with some small urban areas, and relatively flat topography.

9.5.19. The Landfall to Walpole section of the draft Order Limits is located within the following IDB areas:

- Lindsey Marsh IDB;
- Witham Fourth IDB;
- Black Sluice IDB;
- South Holland IDB;
- Welland & Deepings IDB; and
- North Level IDB.

9.5.20. These IDBs manage several watercourses within the draft Order Limits, with the exception of North Level, who's boundary runs alongside the draft Order Limits. Although the North Level IDB area is not crossed by the draft Order Limits it is within the study area.

9.5.21. Other water features within the Landfall to Walpole section include numerous natural and artificial ponds.

Surface Water Quality

9.5.22. The draft Order Limits are located within the following WFD Operational Catchments:

- Fens East and West;
- South Forty Foot Drain;
- Steeping and Eaus;
- Welland Lower;
- Nene Lower; and
- Wash TraC.

9.5.23. The ZoI covers the following WFD waterbody catchments:

- **Anderby Main Drain**, moderate ecological status;
- **Boygrift Drain**, moderate ecological status;
- **Willoughby High Drain**, moderate ecological status;
- **Ingoldmells Main Drain,** moderate ecological status;
- **Lymn / Steeping**, moderate ecological status;

- **East and West Fens Drains**, bad ecological status due to its biological quality (fish);
- **Maud Foster and Fen Catchwater**, moderate ecological status;
- **Black Sluice IDB draining to the South Forty Foot Drain**, poor ecological status due to invertebrates and fish;
- **Fosdyke Bridge Outfall**, bad ecological status due to invertebrates and fish;
- **Risegate Eau**, poor ecological status due to invertebrates and fish;
- **Welland TraC**, moderate ecological status;
- **Whaplode River**, moderate ecological status;
- **South Holland Main Drain**, moderate ecological status;
- **North Level Main Drain**, moderative ecological status**;** and
- **Nene TraC**, moderate ecological status.

9.5.24. Further information is provided in **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report**, which summarises baseline WFD status data (Ref 9.14) for those watercourses within the ZoI, and are illustrated in **Volume 3, Part 2, Figure 9-2: Water Framework Surface Waterbody Status.**

9.5.25. RNAGs vary, with a wide range of issues cited, including poor physio-chemical and biological quality, poor livestock and nutrient management, point source pollution from sewage discharges and physical modification.

9.5.26. All WFD waterbodies listed above share a chemical status of 'fail' due to mercury and its compounds and PBDE, with the East & West Fen Drains WFD waterbody also failing due to perfluorooctane sulphonate (PFOS).

9.5.27. The draft Order Limits are partially located within Nitrate Vulnerable Zones. They are not within a surface water Drinking Water Protected Area or Safeguard Zone.

Hydromorphology

9.5.28. All of the WFD waterbodies that are crossed by the draft Order Limits have a hydromorphological designation of artificial or heavily modified. Many of the water features have been subject to modifications for the purposes of land drainage and flood defence. The ordinary watercourses in the study area, particularly those within the IDB areas, serve a land drainage function and have a relatively low hydromorphological diversity.

Flood Risk and Land Drainage

9.5.29. Based on the online Flood Maps (Ref 9.15) large parts of the study area are at high risk of flooding from rivers and/or the sea, with the draft Order Limits crossing large extents of fluvial and coastal floodplain (initially defined by the extents of Environment Agency Flood Zone 2 and Flood Zone 3). This is shown on **Volume 3, Part 2, Figure 9-4: Flood Risk from Rivers and the Sea**.

9.5.30. According to the Environment Agency AIMS database (Ref 9.17), there are flood defences along the downstream end of the Anderby Main Drain in the form of embankments acting to reduce the risk of tidal flooding. Although these defences are outside of the draft Order Limits, the EA's Reduction in Risk of Flooding from Rivers and Sea due to Defences database (Ref 9.21) shows that large areas of the draft Order

Limits benefit from these defences. There are also flood defences along the Willoughby High Drain, Steeping River, Lady Wath's Beck, East Fen Catchwater Drain, West Fen Catchwater Drain, Stone Bridge Drain and River Witham comprising of natural high ground and embankments. These reduce the risk of fluvial flooding.

9.5.31. The River Welland is tidal up to 14 miles inland and has flood defences, in the form of earth embankments, within the draft Order Limits. The surrounding drainage ditches are pumped into the River Welland. It is understood that the ditches are heavily managed in the area. The River Nene is tidal up to 28 miles inland and has flood defences in the form of earth embankments along its length throughout the draft Order Limits. South Holland Main Drain discharges into the River Nene via a sluice gate which acts to reduce tidal flood risk upstream.

9.5.32. Outputs from Environment Agency flood models will be used to refine understanding of the protection afforded to the land within the draft Order Limits and to characterise any residual flood risks. This information will be used to inform the FRA that will be prepared alongside the ES.

9.5.33. The Risk of Flooding from Surface Water map (Ref 9.20) shows that most of the land in this section is at very low risk of surface water flooding (annual chance of flooding of less than 0.1%). There are isolated areas of high risk, concentrated around land drainage pathways and watercourses. There will not be any permanent Above Ground Infrastructure (AGI) in this section.

9.5.34. The previously described network of watercourses and drainage ditches are key to the land drainage regime in this area. Formal drainage systems, including those serving existing roads and agricultural land, are also understood to be served by piped and open drainage systems.

Indicative zone for converter stations

Surface Water Features

9.5.35. The River Nene is the only main river in the indicative zone for converter stations and has been described in the previous section. There are several small watercourses and drainage ditches, that function at a local scale, located throughout the section. Their catchments can be categorised as generally rural in their land use, with relatively flat topography.

9.5.36. The indicative zone for the converter stations is within the King's Lynn IDB district, which manages numerous watercourses including the Ingleborough Drain.

9.5.37. There are some small ponds in this Section.

Surface Water Quality

9.5.38. The indicative zone for the converter stations is located within The Wash TraC and Great Ouse WFD Operational Catchments. The WFD waterbodies in this Section are the Nene (TraC) and Great Ouse (TraC). These are listed in **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report** which summarises baseline WFD status data (Ref 9.14) for those watercourses within the study area, and illustrated in **Volume 3, Part 2, Figure 9-2: Water Framework Surface Waterbody Status** The former is covered under the Landfall to Walpole section. The Great Ouse waterbody has an ecological status of poor due to phytoplankton and a chemical status of 'fail' due to exceedances of priority hazardous substances.

9.5.39. The indicative zone for the converter stations is not within a surface water Drinking Water Protected Area or Safeguard Zone nor a Nitrate Vulnerable Zone.

Hydromorphology

9.5.40. The WFD waterbodies within the indicative zone for the converter stations have a hydromorphological designation of heavily modified. The River Nene has been subject to modifications for example, for the purposes of land drainage and flood defence, as well as navigation. The ordinary watercourses in this Section, particularly those within the IDB area, also serve a land drainage function and have a relatively low hydromorphological diversity.

Flood Risk and Land Drainage

9.5.41. Based on the online Flood Maps (Ref 9.15) land within the draft Order Limits in the indicative zone for the converter stations crosses large extents of fluvial and coastal floodplain (initially defined by the extents of Environment Agency Flood Zone 2 and Flood Zone 3). This is shown on **Volume 3, Part 2, Figure 9-4: Flood Risk from Rivers and the Sea**. However, these flood zones and associated risks of flooding do not account for the presence and functioning of flood defences.

9.5.42. The River Nene and its flood defences are previously described under the Landfall to Walpole section. Environment Agency flood model outputs indicate that the defences provide a high degree of protection against inundation of most of the land within the draft Order Limits. There is a greater residual risk associated with a defence breach, and future climate change is predicted to increase flood risk also.

9.5.43. The Risk of Flooding from Surface Water map (Ref 9.20) shows that most of the land in this section is at very low risk of surface water flooding (annual chance of flooding of less than 0.1%). There are isolated areas of high risk, concentrated around land drains and watercourses and reflecting topographical low spots. The previously described network of watercourses and drainage ditches are key to the land drainage regime in this area. Formal drainage systems include those serving existing roads and agricultural land is also understood to be served by piped and open drainage systems.

Future baseline

9.5.44. The future baseline relates to known or anticipated changes to the current baseline in the future which would be assessed as part of the English Onshore Scheme in the ES.

9.5.45. With regard to flood risk and land drainage, future baseline conditions would be forecast, drawing on current best practice guidelines (Ref 9.22) taking into account the likely impacts of climate change on rainfall intensities, and where applicable, peak river flows and sea level rise. These future conditions would be considered to factor climate change resilience into the design of the English Onshore Scheme.

9.5.46. It is expected that the WFD legislation will drive future improvements in the ecological and chemical quality of waterbodies. The effects of the implementation of future cycles of river basin management plans would therefore also be considered when assigning value to water environment receptors.

9.5.47. It is recognised that there are several other proposed and committed developments within the surrounding area that could alter the future baseline in the absence of the Projects. For water environment, this includes future developments that share the same hydrological catchments as the study area. The potential for cumulative effects will be

considered later in the EIA process according to the approach outlined within **Volume 1, Part 4, Chapter 28: Cumulative Effects.**

9.5.48. Future baseline conditions relating to coastal processes and the intertidal zone are addressed for the Offshore Scheme in **Volume 1, Part 3, Chapter 18: Marine Physical Processes**.

9.6. Environmental measures

9.6.1. As set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, environmental measures are characterised as design measures or mitigation measures. A range of environmental measures would be implemented as part of the English Onshore Scheme and will be secured in the DCO as relevant.

9.6.2. **Table 9-6** outlines how these design and control measures will influence the water environment assessment. In addition to the measures listed in **Table 9-6**, standard mitigation measures, comprising management activities and techniques, would be implemented during the construction of the Projects to limit effects through adherence to good site practices and achieving legal compliance. These are listed in **Volume 2, Part 1, Appendix 1.5.B: Outline CoCP** and are not repeated below. Measures listed in **Table 9-6** have been assigned references, for example (GG01). These align with the references provided in **Volume 2, Part 1, Table 3.1 of Appendix 1.5.B: Outline CoCP** for ease of cross-reference. Any references identified with ID MT (for example, MT01) include measures which may also be listed in other aspects considered as part of this PEIR and, therefore have been identified as measures which apply to multiple aspects.

9.6.3. Design measures identified through the EIA process have also been applied to avoid or reduce potential significant effects. Design measures included that a relevant to water receptors are included in **Table 9-6** below under Design and Operation and are also included in **Volume 2, Part 1, Appendix 1.5.A: Outline Register of Design Measures**.

9.6.4. In addition to the measures outlined in **Table 9-6** below, a series of initial water environment design and construction principles are set out in **Volume 2, Part 2, Appendix 2.9.D: Preliminary Water Environment Design Principles**. The assigned references in this table follow the same approach as the documents referenced above. These are included to gain feedback from key water environment stakeholders, with the aim of agreeing a suite of principles that would apply in the majority of cases; with other instances being dealt with by exception.

9.6.5. Environmental measures relating to groundwater and fauna/flora in the riparian zone are summarised in **Volume 1, Part 1, Chapter 10: Geology and Hydrogeology** and **Volume 1, Part 1, Chapter 6: Biodiversity,** respectively. Compliance with these measures will be secured by the way of a requirement in the DCO/via DCO submission.

Table 9-6 – Summary of the environmental measures

Receptor	Potential changes and effects	Embedded measures	ID reference
Construction			
Watercourses, surface waterbodies, associated protected areas, existing water interests	Associated risk of pollution from general construction including construction traffic / plant.	Good practice measures during construction. For example, fuels, oils and chemicals will be stored responsibly, away from sensitive water receptors. All refuelling, oiling and greasing of construction plant and equipment will take place above drip trays (or similar) and also away from drains as far as is reasonably practicable. Appropriate spill kits will be made easily accessible for these activities. Wastewater generated from construction compound welfare facilities will be discharged to sewer, subject to the agreements with the utility providers, or in locations where a sewer connection is not reasonably practicable, collected and tankered off site for disposal at a licensed treatment facility.	W01
Existing water interests	Impact on water resources	Measures to encourage water use efficiency during construction, for example, aerated taps and waterless urinals in site offices; rainwater harvesting for use in dust suppression, would be implemented in order to reduce consumptive water use.	W02
Watercourses	Risk of disturbance of sensitive locations along watercourses due to access requirement.	Where watercourses are to be crossed by construction traffic, measures to be applied include the use of temporary culverts or temporary spanned bridges. Temporary culverts will be sized appropriately to ensure the watercourse's capacity is maintained and to prevent any local constriction of the flow, and maintain natural riverine connectivity throughout the year, at both high and low flows and kept free from debris. The inlets and outlets of culverts will be designed such that there is no ledge or disruption to flow into or out of the culvert. They will also be designed to maintain natural slope/water velocities and have buried inlet/outlets. For crossings of smaller ditches, these	MT06

Receptor	Potential changes and effects	Embedded measures	ID reference
		culvert design criteria may be varied, in agreement with the relevant authority (IDB/LLFA). 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 bridges, which are expected to be used to cross EA main rivers/IDB main drains and designated WFD waterbodies, will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross the bridge.	
All water environment receptors	Pollution risk, potential impacts on land drainage and groundwater.	The Contractor would comply with all relevant consent conditions or DCO requirements regarding de-watering and other discharge activities. This will particularly be with regard to volumes and discharge rates and will include discharges to land, waterbodies or third-party drains/sewers. All water discharges to be undertaken under the correct Environment Agency permits, with appropriate pre-treatment (e.g. de-silting) where required.	W03
Existing land drainage (ditches and underground pipes)	Risk of removal / reduction in land drainage capacity due to construction activities.	Any field (land) drainage assets affected during the construction period would be diverted to maintain continuity of the land drainage system. Existing land drainage systems impacted by the Projects during its construction would be re-provided to maintain the land drainage regime.	W04
Receptors vulnerable to flooding	Risk of reduction in effectiveness of existing flood defences due to construction activities.	Where works are proposed to cross beneath flood defences, appropriate construction methodologies would be adopted. The Contractor would agree with the relevant party any relevant monitoring requirements to ensure no effects on their integrity.	W05
Receptors vulnerable to flooding	Construction activities with the potential to	Where construction haul roads pass through floodplains, the haul road design will include for flood mitigation/drainage to reduce any impediment to floodplain flow paths.	W06

Receptor	Potential changes and effects	Embedded measures	ID reference
	impede floodplain flow paths.	Spoil storage/stockpiling will be avoided in Flood Zone 3 where practicable. Where this cannot be avoided, stockpiles would be aligned to avoid creating continuous barriers to floodplain flows (other measures have been included in **Volume 2, Part 1, Appendix 1.5.B: Outline CoCP**. If possible, construction compounds will be located in Flood Zone 1. Where this is not practicable, additional measures will be identified within a flood risk action plan. Temporary haul routes within Flood Zone 3 and areas of high and medium risk of flooding from surface water will be removed at the end of the construction phase and the ground surface will be reinstated to pre-Project levels.	
Watercourses	Construction activities with the potential to impede in channel and floodplain flows, as well as impact on water quality.	All works within main rivers or ordinary watercourses will be in accordance with a method approved under environmental permits issued under the Environmental Permitting Regulations and the Land Drainage Act (1991) (Ref 9.23), or the protective provisions of the DCO for the benefit of the Environment Agency and the Lead Local Flood Authorities and Internal Drainage Boards.	W07
Watercourses	Construction activities with the potential to impede in channel and floodplain flows, as well as impact on water quality.	For open cut watercourse crossings and installation of vehicle crossing points, good practice measures will include but not be limited to, where practicable: 1. reducing the working width for open cut crossings of a main or ordinary watercourse whilst still providing safe working; 2. installation of a pollution boom downstream of open cut works; 3. the use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens as required; 4. have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident; 5. the use of all static plant such as pumps in appropriately sized spill trays;	W08

Receptor	Potential changes and effects	Embedded measures	ID reference
		6. prevent refuelling of any plant or vehicle within 15 m of a watercourse; 7. prevent storing of soil stockpiles within 15 m of a main river; 8. inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and 9. reinstating the riparian vegetation and natural bed of the watercourse, using the material removed when appropriate, on completion of the works and compacting as necessary. If additional material is required, appropriately sized material of similar composition will be used.	
Receptors vulnerable to flooding	Risk of damage to construction plant and materials and disruption of activities. Compromise to the safety of construction site personnel.	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 will include appropriate evacuation procedures should a flood occur or be forecast.	W09
Existing land drainage (ditches and underground pipes) and receptors vulnerable to flooding	Waterlogging or flooding of working areas and detriment to surrounding land drainage.	Where appropriate, pre-construction field drainage will be installed within the working area to help prevent possible water-logging of the working area and therefore the need for temporary dewatering during construction. This will also enable current drainage systems to continue working throughout the period of construction. Landowners will be consulted on the design of the land drainage proposals. The design would pay particular attention to the need to reduce the risk that the drains do not act as pathways for contamination or cause flooding off-site, consulting with the Lead Local Flood Authorities where necessary. A specialised drainage contractor will review the designs and provide advice to NGET and its Contractor during relevant construction and reinstatement activities.	W10

Receptor	Potential changes and effects	Embedded measures	ID reference
Watercourses, associated protected areas[1]	Risk of residual damage to riparian vegetation and watercourses post construction.	Riparian vegetation and the natural bed materials of the watercourses would be reinstated, using the material removed when appropriate on completion of the works. If additional material is required, appropriately sized material of similar composition would be used.	W11
Land drainage regime	Changes to the land drainage from land used during construction	Upon completion of the Projects, the working areas will be removed, and the sites will be reinstated to their pre-construction condition. Stripped topsoil will be reinstated, and sites would be restored to their original function, subject to any planting constraints or agreements established with landowners. Where required, replacement land drainage systems will be installed. A specialist drainage contractor will undertake a detailed review of the drainage designs and provide technical advice to NGET and the Contractor throughout all relevant construction and reinstatement phases.	W12
Watercourses	Risk of hydromorphological change due to watercourse diversion / access requirements.	Upon completion of construction activities, the working areas will be removed, and the sites will be reinstated to their pre-construction condition. Temporary construction haul roads, including associated temporary structures such as bridges and culverts, would typically be decommissioned and removed unless identified during the design process as providing long-term environmental or land-use benefits, subject to agreement with the landowner.	W13
Design and Operation			
Watercourses, surface waterbodies, associated protected areas, existing water	Risk of adverse effects relating to surface water runoff at AGI sites.	Surface water drainage from permanent above ground infrastructure would be managed using SuDS in accordance with policy and guidance requirements of the relevant Lead Local Flood Authorities. The drainage systems will be designed to accommodate runoff from	W01

[1] Including sites with ecological designations, drinking water protected areas and Nitrate Vulnerable Zones

Receptor	Potential changes and effects	Embedded measures	ID reference
interests, land drainage regime		the 1 in 100 year storm, inclusive of the recommended 40% allowance for climate change.	
Receptors vulnerable to flooding	Disruption or impediment of floodplain flows and loss of storage for floodwaters due to placement of above ground Project infrastructure	In discussion with the Environment Agency, where placement of above ground Projects infrastructure cannot avoid floodplains, measures to suitably mitigate flood risk effects would be provided.	W02
Watercourses	Disruption or impediment to flows and effects on hydromorphology	Where watercourses are crossed the cable burial depth will be minimised as far as is practicable to reduce the impact on soils during construction whilst preventing potential future exposure due to hydromorphological change.	W03
Receptors vulnerable to flooding	Increase in rates and volumes of rainfall runoff and subsequent increase in flood risk	Suitable flood resilience and surface water drainage provisions would be embedded within the design for any Above Ground infrastructure (AGI) in line with national and local policy. Where new, permanent areas of impermeable land cover are created, the drainage design will be in accordance with the requirements of the relevant Internal Drainage Board, in addition to Norfolk County Council (2025) Drainage design standards (Ref 9.10) and the Lincolnshire County Council (2025) Guidance for developers: CMP and SuDS method statement (Ref 9.11) and will include allowances for climate change in accordance with current (May 2022) Environment Agency requirements. The drainage infrastructure will provide the storage necessary to achieve discharges at greenfield rates and will not significantly alter groundwater recharge patterns by transferring a significant recharge quantity from one catchment to another. A specialised drainage contractor will review the designs and will provide advice to NGET and its contractor during relevant construction and reinstatement activities.	W04

9.7. Scope of the assessment

Spatial scope and study area

9.7.1. The spatial scope of the assessment of the water environment covers the area of the English Onshore Scheme contained within the draft Order Limits, together with the ZoI and study area described in **Section 9.4**. The study area for the water environment is shown in **Figure 9-1: Study Area and Water Environment Features**. Since the submission of the Scoping Report, the Scoping Boundary has been refined, and the Theddlethorpe landfall option has been removed. There have also been other minor changes and updates to form the draft Order Limits, for example the inclusion of localised areas of highway improvements along access routes.

Temporal scope

9.7.2. The temporal scope of the assessment of the water environment is consistent with the period over which the English Onshore Scheme would be carried out. It covers the construction of the Projects, which is associated with the potential for typically short and medium term effects on water environment receptors. Short term is defined as having a duration of one year or less, and medium term effects having a duration of between one and three years. The operation of the Projects over their lifespan has also been assessed, with 75 years being applied as a lifespan for the purposes of assessing climate change resilience, in accordance with the requirements of the National Planning Policy Framework (NPPF) (Ref 9.24).

9.7.3. The English Onshore Scheme is expected to have a life span of more than 40 years. If decommissioning is required at this point in time, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works, albeit with a lesser duration of two years. Acknowledging the complexities of completing a detailed assessment for decommissioning works up to 40 years in the future, it is considered that the significance of effects relating to the decommissioning phase would be no greater than those from the construction phase and decommissioning effects are not discussed in detail in this chapter; however, **Table 4.21** in **Volume 1, Part 1, Chapter 4: Description of the Projects** provides a high level summary assessment of the likely significant effects associated with decommissioning. Furthermore, should decommissioning take place, it is expected that an assessment in accordance with the legislation and guidance at the time of decommissioning would be undertaken.

Identification of receptors

9.7.4. The principal water environment receptors that have been identified as being potentially subject to significant effects are summarised in **Table 9-7** and are shown in **Volume 3, Part 2, Figure 9.1: Study Area and Water Environment Features.** These are features that would be physically disturbed by the Projects, would receive discharges from the Projects and / or are hydrologically connected and situated downstream of large scale construction work sites.

9.7.5. The sensitivity values assigned in **Table 9-7** have been assigned using currently available data.

9.7.6. Groundwater and ecological receptors are addressed in **Volume 1, Part 1, Chapter 10: Geology and Hydrogeology** and **Volume 1, Part 1, Chapter 6: Biodiversity** respectively.

Table 9-7 – Water environment receptors subject to potential effects

Receptor (sensitivity / value)	Reason for consideration
Attribute: Hydromorphology Statutory main rivers (medium value) Ordinary watercourses / IDB drains (medium to low value)	Where open cut crossing methods are proposed for cable installation and where culverts are required for construction access, a temporary impact pathway would be created, due to temporary physical disturbance and changes to channel planform and temporary changes to watercourse flow regimes. Impacts would range in duration. There is also potential for watercourse diversions within the draft Order Limits.
Attribute: Surface water quality Statutory main rivers (high to medium value) Ordinary watercourses / IDB drains (medium to low value) Other surface waterbodies (medium to low value)	Temporary impacts at watercourse crossings for the cables and for access, and at construction work sites, for example, arising from generation of silted runoff and associated dewatering activities. There is also limited potential for break out of drilling muds at trenchless crossings. The impacts would be greatest on receptors crossed by the Projects and/or located immediately adjacent to construction work sites.
Protected areas / nature conservation sites with a hydrological link to Project activities (very high to high value)	Potential for effects linked to reasons provided in above rows. Impacts on water quality and flows for example could impact qualifying features for which the protected areas are designated.
Attribute: Flood flow storage and conveyance Statutory main rivers (high to medium value) Ordinary watercourses / IDB drains (medium to low value)	Parts of the construction working width and temporary construction compounds would be located within flood extents associated with watercourses (including Flood Zone 3). This could result in temporary changes in floodplain storage or flow routes, and consequently changes to baseline fluvial flood risk.
Attribute: Existing surface water abstractions and discharges Licence holder / user (medium to low value)	No large-scale consumptive water usage is proposed during construction or operation of the Projects and hence no major impacts on water resource availability are anticipated. However, construction activities and requirements such as wheel washing, trenchless crossings of watercourses and infrastructure and welfare facilities would all require a water supply.

Receptor (sensitivity / value)	Reason for consideration
Flood defences (high to medium value) People, property and infrastructure (e.g. sluices, pumps) (high to medium value)	Construction works could impact on the structural integrity of flood defences during construction and/or conflict with planned flood risk management projects and capital works.
Attribute: Flow storage and conveyance Land drainage regime (ditches, land drains etc) (medium value)	The existing land drainage regime could be impacted directly by construction activities causing severance of drainage routes or by damage caused to the soil structure. AGI would be constructed on greenfield land, so changes to existing rainfall infiltration and runoff patterns would be induced. Temporary increases in impermeable land cover (e.g., construction compounds) could cause localised changes to the land drainage regime, resulting in ponding of water or waterlogging of soils. Areas with a sloping topography where topsoil has been stripped would be particularly vulnerable to these changes.

Potential effects considered within this assessment

9.7.7. The effects on water environment receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in **Table 9-8**.

Table 9-8 – Water environment receptors scoped in for further assessment

Receptor	Likely significant effects
Construction	
Statutory main rivers Ordinary watercourses / IDB drains Existing water interests – licence holders / users Protected areas / nature conservation sites	**Physical disturbance and change to flow regime and hydromorphology** The English Onshore Scheme will cross numerous watercourses, with potential for temporary physical disturbance, a water supply requirement and impacts on flow regimes.
Statutory main rivers Existing water interests – licence holders / users Protected areas / nature conservation sites	**Pollution risks (e.g. bentonite breakout) and water consumption** The English Onshore Scheme will cross some watercourses and would make landfall using trenchless techniques.
People, property and infrastructure Existing land drainage regime	**Increased flood risk and detriment to land drainage** Large swathes of floodplain within the draft Order Limits, temporary works in the floodplain cannot be avoided. New areas of temporary impermeable land cover would be created.

Receptor	Likely significant effects
Flood defences People, property and infrastructure	**Temporary works in the floodplain / in proximity to flood defences** Construction works could impact on the structural integrity of flood defences during construction and/or conflict with planned flood risk management projects and capital works. The Projects will engage with the Environment Agency and IDBs to understand the potential for effects and to integrate design measures to avoid impacts on the integrity of flood defence infrastructure.
Operation	
People, property and infrastructure Existing land drainage regime	**Increased flood risk and detriment to land drainage** Due to the large swathes of floodplain within the draft Order Limits, some AGI in the floodplain cannot be avoided. New permanent areas of impermeable land cover would be introduced. AGI would be constructed on greenfield land, so changes to existing rainfall infiltration and runoff patterns would be induced.

9.7.8. The receptors/effects detailed in **Table 9-9** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

Table 9-9 – Summary of effects scoped out of the water environment assessment

Receptors/potential effects	Justification
Construction	
Attribute: Surface water quality (sediments and oils/fuels) Statutory main rivers Ordinary watercourses / IDB drains Other surface waterbodies Existing water interests – licence holders / users Protected areas / nature conservation sites	As agreed by the Planning Inspectorate, pollution due to soil stripping, earthworks and excavations and use and refuelling of plant during construction has been scoped out of further assessment. Measures outlined in **Section 9.6** would act to manage work site runoff to ensure watercourses are not polluted, nor their flow capacities reduced due to these activities, and the function of existing land drainage routes and systems are retained. Soil management measures will be contained in the Outline CoCP.
Operation	

Receptors/potential effects	Justification
Attribute: Surface water quality Statutory main rivers Ordinary watercourses / IDB drains Other surface waterbodies Existing water interests – licence holders / users Protected areas / nature conservation sites	As agreed by the Planning Inspectorate, pollution due to discharges of operational surface water drainage has been scoped out of further assessment. This is agreed on the basis that there would be no operational discharges to surface watercourses with the exception of rainfall runoff from AGI. These flows would be sustainably attenuated and treated prior to discharge to the receiving water environment using suitable forms of SuDS.
Attribute: Hydromorphology / flow regimes Statutory main rivers Ordinary watercourses / IDB drains	The Planning Inspectorate agreed that physical disturbance and change to flow regime and hydromorphology during operation can be scoped out further assessment. This is on the basis that land and associated land drainage would be reinstated after construction of the Projects, there would be no permanent impacts on watercourse flow regimes or their hydromorphology. Maintenance activities would be low impact, generally limited to nonintrusive inspections undertaken in line with the Applicant's operational management procedures.

9.8. Key parameters for assessment

Realistic worst-case design scenario

9.8.1. The assessment has followed the Rochdale Envelope approach as outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects** and **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology of the PEIR.** The assessment of effects has been based on the description of the Projects and parameters outlined in **Volume 1, Part 1, Chapter 4: Description of the Projects**. However, where there is uncertainty regarding a particular design parameter, the realistic worst-case design parameters are provided below with regards to the water environment along with the reasons why these parameters are considered worst-case. The preliminary assessment for the water environment has been undertaken on this basis. Effects of greater adverse significance are not likely to arise should any other development scenario, based on details within the Rochdale Envelope (e.g., different infrastructure layout within the draft Order Limits), to that assessed here be taken forward in the final design scheme.

9.8.2. In relation to the water environment the following assumptions are made regarding the Projects design parameters in order to ensure a realistic worst-case assessment has been undertaken.

- Installation of the cables via a trenchless crossing technique has been assumed at all crossings of main rivers and at the landfall site. Where the cable installation needs to cross ordinary watercourses, whilst a trenchless crossing technique may

be adopted in some locations, this initial preliminary assessment has assumed an open cut crossing technique, representing the reasonable worst case. Lateral deviation of the route within the draft Order Limits would not be expected to result in a change in significance of reported effects. No new receptors would be impacted and although watercourses may be crossed at a different location, the same watercourses would be affected in the same reach lengths.

- Temporary crossings are required where the construction haul road crosses existing watercourses. It has been assumed that ditches, field drains, dykes and small watercourses would be temporarily culverted. Works associated with culverting would be undertaken in line with the environmental measures previously described in **Table 9-6** and documented in the Outline CoCP. Where the construction haul road crosses a watercourse for which a culvert solution is not reasonably practicable or where specifically specified by the relevant stakeholder, bridges would be used. For the preliminary assessment it has been assumed that all ordinary watercourse construction haul road crossings would use culverts and all main river construction haul road crossings would use bridges and that temporary crossings would be removed once construction works were complete unless replacing an existing structure in a poor state of repair.
- Where watercourse diversions cannot be avoided, for example, in the indicative zone for the converter stations , this preliminary assessment is based on the current design and assumes that diversion channels would satisfy the environmental measures described in **Section 9.6** and documented in the Outline CoCP. Given the number and density of local watercourses and drainage ditches, watercourse diversions will be required in the indicative zone for the converter stations for all design options.
- With regard to land drainage and management of construction worksite runoff and operational drainage, detailed information is not currently available with regard to how land drainage routes would be maintained and how runoff would be managed, the preliminary assessment is therefore based on the initial principles set out in **Volume 2, Part 2, Appendix 2.9.D: Preliminary Water Environment Design Principles**.
- With regard to the use of the River Nene Temporary Quay for transportation of construction materials, this preliminary assessment has assumed construction of a newly constructed temporary quay on the riverbank, together with some interaction with existing flood defences and the potential need for excavation of the Nene channel. If this option is taken forward as part of the proposals for the Projects, a full assessment of effects on water environment receptors would be included in the ES. Aspects would be covered in the water environment assessment, FRA and WFD where relevant.

9.8.3. As set out in **Volume 1, Part 1, Chapter 4: Description of the Projects**, and specifically in **Section 4.4**, at this stage in the design process, four options have been identified with regards to the proposed siting of the Walpole converter stations. All four options (Options A-D) have been included within the baseline study. Where an option or options affects the findings of the water environment assessment reference to the specific option(s) is made in **Section 9.10**.

Consideration of construction scenarios

9.8.4. As detailed in **Volume 1, Part 1, Chapter 4: Description of the Projects**, the timing of construction activities set out within this PEIR is indicative.

9.8.5. There are certain elements of the Projects that would be undertaken concurrently, including civils works (e.g. construction compounds, haul roads) and works at the landfall. Optionality remains regarding whether the cables would be installed concurrently (i.e. EGL 3 and EGL 4 at the same time) or sequentially. Given that the previously described environmental measures associated with construction would be in place until commission and testing was complete, effects relating to pollution risk, flooding and impacts on the land drainage regime are anticipated to be materially the same whether elements of the Projects were to be installed concurrently or sequentially.

9.9. Assessment methodology

Overview

9.9.1. The generic project-wide approach to the assessment methodology is set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology**, and specifically in **Sections 5.4** to **5.6**. However, whilst this has informed the approach that has been used in this water environment assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this water environment assessment. Details are provided below.

9.9.2. Where the preliminary assessment of effects, presented below, refers to construction, this includes all aspects of the English Onshore Scheme, such as the cables, AGI and access roads. The preliminary assessment of effects is applicable to all of the options at the indicative zone for the converter stations (Options A, B, C and D), and where there are any differentiators between the options, this is stated.

Data Sources

9.9.3. In addition to the data sources used to inform this PEIR (**Table 9-5**), the following data sources are proposed to be used to inform the water environment assessment:

- Data from Environment Agency flood models, with model refinements and simulations of flood events incorporating the most recent climate change guidelines undertaken where necessary;
- Drainage and flood data/information from Local Authority Surface Water Management Plans and Strategic Flood Risk Assessments;
- Land drainage data and information from relevant IDBs;
- Anglian River Basin Management Plan (Ref 9.25);
- Data defining surface water catchment areas and hydrological properties (e.g. rainfall, slopes, and soil permeability) from the Flood Estimation Handbook webservice (Ref 9.26);
- Relevant Shoreline Management (Ref 9.27, Ref 9.28) and Water Resources Management (Ref 9.29) Plans; and
- Field notes and photographs collected during further site surveys (e.g. ecology surveys, land drainage surveys) to improve understanding of local topography, land drainage regimes and watercourse conditions and characteristics.

Proposed Methodology

9.9.4. The water environment assessment has been based on the Design Manual for Roads and Bridges (DMRB) LA 113: Road Drainage and the Water Environment (Ref 9.4). Whilst primarily intended for use in assessing the impacts of highway projects on the water environment, the methodology is widely accepted as suitable for assessing the effects of other types of linear infrastructure. DMRB LA 113 promotes assessment that is proportionate to the scale and nature of the proposals and that considers the sensitivity of the local water environment to change.

9.9.5. Given the size of the English Onshore Scheme and the presence of areas of Flood Zone 3 within the draft Order Limits, an FRA of the Projects will be produced in accordance with the requirements of the Overarching National Policy Statement for Energy EN-1 (Ref 9.30) and the National Policy Statement for Electricity Networks Infrastructure EN-5 (Ref 9.31) and local flood risk management guidelines published by the LLFAs. The FRA will consider flood risk from all relevant sources during both construction and operation, incorporating allowance for climate change in accordance with published guidance (Ref 9.24). It will also include details of the measures proposed to adhere to local drainage and flood risk planning policies.

9.9.6. A WFD Screening Assessment will also be produced for the Projects guided by Planning Inspectorate advice on the WFD (Ref 9.1). It is noted that there is an overlap between terrestrial and coastal in the inter-tidal area. As stated in **Paragraph 9.4.9**, transitional/coastal waterbodies up to 1 nautical mile will be considered within the WFD assessment. Stage 1 of the assessment is presented in **Volume 2, Part 2, Appendix 2.9.B: Water Framework Directive Assessment Stage 1 & 2 Report**.

9.9.7. In the next stages of the WFD Assessment, the effects of the English Onshore and Offshore Schemes on the Anglian River Basin Management Plan (Ref 9.29) and the waterbodies therein will be described, and the assessment will set out how the Projects designs have been developed to align with the requirements of the Regulations. A qualitative approach is proposed, and the assessment will identify how the Projects designs will avoid waterbody deterioration, as well as any other mitigation necessary.

9.9.8. The method set out in the DMRB provides guidance on assigning value (sensitivity) to receptors, for example watercourses and floodplains (Table 3.70 of LA113). The values presented in **Table 9-10** will be refined using any new data that has been collected. The DMRB also provides criteria for assigning impact magnitude (Table 3.71 of LA113). These criteria consider the scale/extent of the predicted change and the nature and duration of the impact.

9.9.9. LA113 does not provide a prescriptive assessment methodology for hydromorphology. The criteria within **Table 9-10** and **Table 9-11** below, and the assessment of effects relating to hydromorphology, are informed by published literature, namely the 'Guidebook of Applied Fluvial Geomorphology' (Ref 9.32) and the 'River Hydromorphology Assessment Technique Training Manual' (Ref 9.33).

Receptor sensitivity/value

9.9.10. The preliminary classification of receptor sensitivity has been guided by Table 3.70 of the DMRB LA113 (Ref 9.4). The criteria from Table 3.70 are reproduced below in **Table 9-10**.

Table 9-10 – Assessment of receptor value criteria, adapted from DMRB LA 113

Value / Sensitivity	Typical Criteria	Criteria
Very high	Nationally significant attribute of high importance	Watercourse having a WFD classification shown in a River Basin Management Plan (RBMP) and Q95* ≥ 1.0 m^3/s. Site protected under European legislation for example, special protection area (SPA), special area of conservation (SAC) and Ramsar site with designated interest features dependent on the hydrological/surface water regime. Land uses defined as 'essential infrastructure' or 'highly vulnerable' development under the NPPF. River supporting a regionally important abstraction for potable water supply. Varied morphological features with no sign of channel modification, displaying natural flow regime and fluvial processes. Sediment regime that is in equilibrium and provides a diverse mosaic of habitat types suitable for species sensitive to changes in turbidity.
High	Regionally significant attribute of high importance	Watercourse having a WFD classification shown in a RBMP and Q95 <1.0 m^3/s. Land uses defined as 'more vulnerable' under the NPPF. River supporting a locally important abstraction for potable water supply. Predominantly natural water feature with a range of morphological features. Limited signs of artificial modifications. Sediment regime that provides suitable habitat for species sensitive to changes in turbidity (e.g. migratory salmon, freshwater pearl mussel).
Medium	Locally significant, of moderate quality and rarity	Watercourses not having a WFD classification shown in a RBMP and having a Q95 >0.001 m^3/s. Site protected under UK legislation whose designated interest is dependent on the hydrological/surface water regime e.g. Local Wildlife Site, salmonid waters. Land uses defined as 'less vulnerable' under the NPPF. River supporting abstraction for non-potable water supply at the local scale. Water feature with channel cross-section partially modified in places but exhibiting some morphological features. Varied flow types but with an obviously impacted natural flow regime. Sediment regime that provides some physical habitat for species sensitive to changes in turbidity.
Low	Lower quality	Watercourses not having a WFD classification shown in a RBMP and Q95 ≤0.001 m^3/s. Land uses defined as 'water compatible' under the NPPF.

Value / Sensitivity	Typical Criteria	Criteria
		Water feature that has been extensively modified. Exhibits limited to no morphological diversity, with uniform flow, bed and bank profiles and low energy. Sediment regime that provides for very limited physical habitat for species sensitive to changes in turbidity.

*Flow that is equalled or exceeded 95% of the time, indicative of a summer, low flow, condition.

Magnitude of impact

9.9.11. The preliminary classification of the magnitude of impact has been assigned in line with Table 3.71 of the DMRB LA113 (Ref 9.4). The magnitude of impact criteria considers the expected scale, extent and duration of change, and the magnitude is assigned following consideration of the measures embedded into the design of the Projects to reduce impacts. Temporary effects have been defined as those whereby the receptor can recover within a period of 1 year or less. The criteria from Table 3.71 are reproduced in **Table 9-11** below.

Table 9-11 – Assessment of impact magnitude criteria

Value / Sensitivity	Typical Criteria	Criteria
Major Adverse	Results in loss of attribute and/or quality and integrity of the attribute	Loss or extensive change to a fishery. Loss of regionally important public water supply. Reduction in water body WFD classification. Increase in peak flood level (>100 mm). Significant impacts on the bed, banks, and vegetated riparian corridor, resulting in changes to sediment transport, load, and turbidity. Significant shift away from baseline conditions at the waterbody scale.
Moderate adverse	Results in effect on integrity of attribute, or loss of part of attribute	Partial loss in productivity of a fishery. Degradation of regionally important public water supply or loss of major commercial/ industrial/agricultural supplies. Contribution to reduction in waterbody WFD classification. Increase in peak flood level (>50 mm). Some changes to bed, banks and vegetated riparian corridor, resulting in some changes to sediment transport, load, and turbidity at the multi-reach scale.
Minor adverse	Results in some measurable change in attributes, quality or vulnerability	Potential for a low risk of pollution. Increase in peak flood level (>10 mm). Slight change from baseline conditions of channel bed/banks. Limited impacts on bed, banks, and vegetated riparian corridor resulting in limited changes to sediment characteristics.

Value / Sensitivity	Typical Criteria	Criteria
Negligible	Results in effect in attribute, but of insufficient magnitude to affect the use or integrity	No measurable change to baseline surface water quality or WFD waterbody status. Negligible change to peak flood level (≤ +/- 10 mm). Minimal or no measurable change from baseline conditions. Any impacts highly localized; no impacts at the reach scale.
Minor beneficial	Results in some beneficial effect on attribute or a reduced risk of adverse effect occurring.	Minor contribution to improvement in water body WFD classification. Creation of flood storage and decreased in peak flood level (>10 mm).
Moderate beneficial	Results in moderate improvement of attribute quality	Moderate contribution to improvement in water body WFD classification. Creation of flood storage and decrease in peak flood level (> 50 mm).
Major beneficial	Results in major improvement of attribute quality	Removal of existing polluting discharge or removing the likelihood of polluting discharges occurring to a watercourse. Improvement in water body WFD classification. Creation of flood storage and decrease in peak flood level (<100 mm).
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of effect

9.9.12. In accordance with the assessment methodology, the significance of an effect on a receptor is assigned based on a combination of the sensitivity (or value) of the receptor and the magnitude of change (impact) likely to be caused by the activities of the Projects. The preliminary significance of effects has used the matrix set out in **Volume 1, Part 1, Chapter 5: PEIR Approach and Methodology,** applying professional judgement, which where applicable, has been explained to give the rationale behind the values assigned. Significant effects, in the context of the EIA Regulations, are effects of moderate or greater significance.

Preliminary assessment of cumulative effects

9.9.13. At the current stage of the Projects (PEIR stage), design information for the Projects is insufficient to allow for a robust cumulative assessment to be undertaken. Furthermore, given the current position in relation to baseline data collection, with much of the environmental surveys still to be undertaken during 2025, the baseline identified at this PEIR stage cannot be taken as a complete picture of the potential presence and

significance of sensitive receptors. Therefore, a cumulative assessment has not been undertaken at this stage; however, **Volume 1, Part 4, Chapter 28 Cumulative Effects**, presents the long and short lists of 'other developments' which will be considered at the ES stage, and the methodology which allowed for the identification of these other developments, to allow consultation bodies to form a view and provide comment on the other developments included. The long-list will be reviewed and if necessary, updated, in the lead up to the ES, as the Projects design further evolves and in response to any comments raised at statutory consultation.

9.9.14. Combined effects (sometimes called intra-project effects) result principally from different types of impacts from one development acting in combination on a specific receptor.

9.9.15. In this chapter, the following combined effects have been assessed:

- Combined effects relating to changes in the groundwater regime (assessed in **Volume 1, Part 2, Chapter 10: Geology and Hydrogeology)** on surface water receptors, in particular potential for changes in groundwater quality and quantity of flow to impact on the baseflow (low flow) regimes of watercourses;
- Combined effects relating to changes in soil properties (**assessed in Volume 1, Part 2, Chapter 11: Agriculture and Soils**) on baseline land drainage and rainfall runoff regimes, and subsequent potential for increases in surface water flood risk; and
- Changes to water quality and flow regimes of watercourses that support designated interest features of protected areas/nature conservation sites will be presented in the ES, pending ongoing ecology survey work/awaited data.

9.10. Preliminary assessment of water environment effects

9.10.1. The preliminary likely significant effects of the Projects have been assessed using current available data relating to both the construction and operation (and maintenance) phases of the English Onshore Scheme. The preliminary potential residual effects are outlined below. The assessment assumes that all environmental measures are in place before assessing the effects. It should be noted that this assessment is ongoing and is subject to change through ongoing development of the English Onshore Scheme's proposals. A full detailed assessment will be presented within the ES submitted with the DCO application. This will be informed by an FRA and WFD Assessment.

Preliminary Phase Effects - Sites Designated for Nature Conservation

9.10.2. The protected areas/nature conservation interest sites with a hydrological dependence are still to be identified and confirmed. However, effects on these receptors would be avoided or mitigated by the environmental control measures that have been identified. A full assessment of effects will be presented in the ES, informed by further data and ecology surveys.

Preliminary Phase Effects - Watercourses

9.10.3. During construction, new crossings of watercourses would be required for temporary access (see **Volume 2, Part 2, Appendix 2.9.E: Preliminary Watercourse Crossing Schedule**) and could result in channel bed/bank modifications causing disruption to flow regimes and increased flood risk. There is also an associated risk of pollution from construction activities that have been scoped in for further assessment include drilling

for trenchless crossings (with potential for outbreaks of drilling muds). These activities have a risk of opening pollution pathways to water environment receptors.

9.10.4. There are multiple main rivers within the draft Order Limits, as detailed in **Section 9.5**. There are also numerous ordinary watercourses within the draft Order Limits. Proposed watercourse crossings are listed in the watercourse crossing schedule (**Volume 2, Part 2, Appendix 2.9.E: Preliminary Watercourse Crossing Schedule**). The method of crossing a watercourse would depend upon several factors and details of proposed watercourse crossings will be confirmed in the ES. Assumptions relating to watercourse crossings are described in ***Realistic worst-case design scenario***.

9.10.5. All watercourse crossing designs would follow the environmental measures set out in the **Volume 2, Part 2, Appendix 1.5.B Outline CoCP.** In addition, the haul road would be put in place in accordance with conditions set out within the consents and permits from the relevant authorities (Environment Agency for main rivers, the LLFA/IDB for ordinary watercourses as required).

9.10.6. Whilst temporary adverse effects on the hydromorphology of the watercourses that are crossed by culverts cannot be avoided, the design of temporary crossings would reduce temporary effects on the watercourses' flow regimes and channel forms.

9.10.7. The degree of physical disturbance to the channels, beds, riparian corridors, or flow regimes of watercourses would also depend on the cable crossing methodology. For example, physical disturbance to the channels, beds, riparian corridors, or flow regimes of main rivers crossed using a trenchless methodology would be avoided. Where open cut methodologies are proposed, adverse effects would be limited by the environmental measures that would be in place.

9.10.8. Temporary effects on the hydromorphology of ordinary watercourses (medium to low value) are hence anticipated to be of minor adverse magnitude and therefore not significant (minor adverse significance). For the main rivers (medium value) the magnitude of effects are expected to be negligible and therefore not significant (negligible significance).

9.10.9. Where permanent infrastructure is proposed in the indicative zone for the converter stations, there will be a need for watercourse diversions on several ordinary watercourses / IDB drains (medium to low value) with potential for temporary impacts on water quality during the works and potential for permanent changes to the land drainage regime (medium value). Considering the environmental measures that would be put in place, the magnitude of impact on these attributes would vary from minor to moderate adverse, depending on the length and nature of the diversions required, with an overall significance of minor to moderate significance. The ES will provide more detailed assessment and clarify which receptors may be significantly affected. The watercourse diversions also have the potential for permanent changes to the hydromorphology (low value) of the watercourses. With the environmental measures that would be put in place, the magnitude of impact on these receptors would be minor to moderate adverse and not significant (minor significance). Based on the current design, watercourse diversions for Option D would impact the fewest watercourses, Option A the most, with Options B and C being broadly similar.

9.10.10. While trenchless crossings would avoid physical disturbance to the flow regime and form of channel and riparian corridors, the technique is not without risk of pollution, associated with inadvertent releases of drilling fluids/muds. This is also applicable to the proposed trenchless crossing at the landfall. Open cut crossings of watercourses could also cause disturbance of bed sediments. The design of the crossing methods

would follow standard practice measures and trenchless crossings would be informed by ground investigation data to reduce the risks of breakout of drilling muds. The designs and installation methods would also accord with any conditions set out within secondary consents and permits for the works from the relevant authorities. These may include for example, seasonal restrictions on the works to avoid key periods for fish migration and specifications for over-pumping to maintain downstream flow in watercourses and manage flood risk during construction.

9.10.11. Consequently, any potential adverse effects on water quality would be temporary and localised. Effects on main rivers (assumed high to medium value) are therefore anticipated to be of a negligible magnitude and not significant (minor adverse significance). For ordinary watercourses (assumed medium to low value), a negligible magnitude of impact is assessed with a minor adverse to negligible significance of effect depending on the watercourse. This is not significant in EIA terms.

9.10.12. Where there is an option to create a temporary quay on the bank of the River Nene to facilitate transport of construction materials, there would be potentially associated temporary effects on several attributes of this receptor. Potential adverse effects on water quality (high value) associated with in channel construction works and the potential need for excavation would be expected to be localised, with a magnitude of impact ranging from minor adverse to moderate adverse, and an overall significance of effect of moderate to major respectively. The degree of physical disturbance to the Nene channel, bed and its flow and sediment transport regimes (medium value) would also depend on the quay design and degree of any excavation requirements. A preliminary and precautionary assessment of impact magnitude equal to moderate adverse has been identified, with an overall significance of effect of moderate, which is considered Significant. Further assessment will be undertaken to determine if this option is taken forward.

9.10.13. Interactions with groundwater in the cable section and where topsoil stripping is required is assessed in **Volume 1, Part 1, Chapter 10: Geology and Hydrogeology**.

Preliminary Phase Effects – Flood Risk and Land Drainage

9.10.14. There is the potential for the English Onshore Scheme to increase flood risk during construction through the creation of soil stockpiles and temporary working areas, which could result in the temporary loss of floodplain storage or could impede flood flows. There would be a small area of land raising behind the defences at landfall to facilitate the proposed trenchless crossing.

9.10.15. There are existing flood defences along numerous watercourses within the draft Order Limits and along the coast at the proposed landfall. There will be further discussions with the Environment Agency to understand the effects of any temporary works on the design and integrity of these, in particular where they may be interaction with defences on the River Nene to create a temporary quay on the riverbank to aid in transport of construction materials. It is anticipated that any requirements in relation to the flood defences would be agreed under the protective provisions secured for the Environment Agency and measures to reduce the effects of any temporary works on the integrity of these assets will be secured within the DCO. Such measures may include construction techniques that reduce ground movement and vibration, and ensuring sufficient depths of cover between defence foundations and any excavation activities.

9.10.16. The FRA will outline the proposed mitigation measures/commitments to ensure no detrimental effects on flood risk from rivers and the sea or the functioning of flood defences. Implementation of these would reduce potential adverse effects on the flood

storage and floodplain flow attributes of watercourses in the study area. Considering the nature and footprint of the English Onshore Scheme and using professional judgement, the effect is anticipated to be not significant.

9.10.17. The English Onshore Scheme would introduce new areas of temporary impermeable land cover, such as construction compounds and haul routes, along with topsoil stripping and earthworks which could disrupt the current land drainage regime. This could locally reduce rainfall infiltration rates, increase runoff rates, and induce overland flow during construction. This could contribute to localised changes to the land drainage regime, resulting in ponding of water or waterlogging of soils. Areas with a sloping topography where topsoil has been stripped would be particularly vulnerable to these changes. The works may also disrupt or sever existing field drainage systems. Temporary measures would be put in place to maintain such drainage routes during construction, then the systems would be reinstated post-construction. Stripped topsoil will be reinstated, and sites would be restored to their original function, subject to any planting constraints or agreements established with landowners.

9.10.18. Access roads, haul roads and compound areas would have suitable drainage provisions, providing for attenuation of runoff and encouraging infiltration of surface water runoff to ground. These components, including associated temporary structures such as bridges and culverts, will typically be decommissioned and removed unless identified during the design process as providing long-term environmental or land-use benefits, subject to agreement with the landowner.

9.10.19. Consequently, adverse effects on the land drainage regime and rainfall infiltration and runoff patterns would be limited on receptors which include local land uses and the English Onshore Scheme itself. In addition, works affecting the land drainage regime would be temporary and localised, with any existing field drainage systems reinstated on completion of construction works. Where required, replacement land drainage systems will be installed. A specialist drainage contractor will undertake a detailed review of the drainage designs and provide technical advice to NGET and the Contractor throughout all relevant construction and reinstatement phases. Comprehensive records of the land drainage networks will be documented and transferred to the respective landowners or occupiers for future reference.

9.10.20. Considering the nature and footprint of the Projects and the environmental measures that would be in place, effects relating to the land drainage regime and surface water flood risk are anticipated to be of negligible magnitude resulting in effects of minor adverse significance for receptors of medium value and of negligible significance for receptors of low value, both of which would be not significant.

9.10.21. During operation (and maintenance), interactions with Flood Zone 3 are limited to parts of the indicative zone for the converter stations. The FRA will outline the proposed mitigation measures/commitments to ensure the Projects are safe from flooding over their lifetime and that there are no detrimental effects on flood risk from rivers and the sea because of these interactions. The exact requirements for any potential mitigation measures have not been fully developed at this stage but may include flood compensation proposals if necessary. Subject to the implementation of such measures, if required, potential adverse effects on flood risk from rivers and the sea are expected to be not significant. The FRA will also consider the resilience of the Projects' infrastructure located within Flood Zone 3 that would need to remain operational in the event of a flood.

9.10.22. There would be a permanent impermeable footprint associated with the AGI in the indicative zone for the converter stations, including their associated permanent access

routes. The designs of these elements of the English Onshore Scheme would incorporate appropriate surface water drainage measures and suitable drainage provisions would also be included for accesses. Due to the robust design and environmental measures that would be adopted, no likely significant effects on flood risk and land drainage in this part of the Projects are anticipated.

9.11. Further work to be undertaken

9.11.1. The information provided in this PEIR is preliminary, the final assessment of potential significant effects will be reported in the ES. This section describes the further work to be undertaken to support the water environment assessment presented in the ES.

Baseline

9.11.2. An extensive programme of ecological desk study and field survey is ongoing. In particular surveys and desk study of datasets for aquatic invertebrates, fish and macrophytes will inform the assessment provided in the WFD Assessment and ES.

9.11.3. Further understanding of baseline flood risk over the lifetime of the Projects will be developed through interrogation, and where necessary refinement, of existing Environment Agency flood models. Engagement regarding the scope of the FRA with technical stakeholders is ongoing to agree these requirements.

Assessment

9.11.4. The assessment undertaken for the PEIR will be reviewed following stakeholder consultation feedback and further design refinement, in particular to aid in the assessment of the effects of the Projects on water resource use and Anglian Water assets and interactions with key flood risk and land drainage assets.

9.11.5. Full details of the assessment methodology will be presented within the ES, together with further assessment detail. The ES will be informed by the FRA and WFD assessment which will be prepared in parallel to the impact assessment. The ES will also be informed by ongoing collaborative discussions with the Projects' aquatic ecologists and the ecological/water specialists working on the English Offshore Scheme, particularly with reference to matters relating to the WFD assessment.

Further environmental measures

9.11.6. As described in ***Preliminary Phase Effects – Flood Risk and Land Drainage***, there is an option to use the River Nene for transportation of construction materials. If this option is taken forward as part of the proposals for the Projects, further environmental measures may be required depending on the nature and scale of construction activities to create the temporary quay on the riverbank. For example, environmental measures may be required relating to any potential excavation required to install the temporary quay. This will be addressed in the ES, and more detail will be provided, if this option is taken forward.

9.11.7. On the basis of ongoing discussions with Environment Agency it is also expected that an environmental measure will be shaped for the ES with regard to floodplain compensation storage requirements.

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