The Great Grid Upgrade

Sea Link

Sea Link

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Executive Summary

Ex1.1 Purpose of this Report

Ex1.1.1 National Grid Electricity Transmission plc (here on referred to as National Grid) is making an application for development consent to reinforce the transmission network in the South East and East Anglia. The Sea Link Project (hereafter referred to as the 'Proposed Project') is required to accommodate additional power flows generated from renewable and low carbon generation, as well as an addition to new interconnection with mainland Europe. The reinforcement would be achieved via the construction and operation of a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400 kV overhead line close to Richborough in Kent.

Ex1.1.2 This report documents the Water Framework Directive (WFD) assessment undertaken for the proposed reinforcement. The assessment has followed a staged approach in accordance with Planning Inspectorate WFD Advice, updated in September 2024, and has been informed by extensive engagement with the Environment Agency.

Ex1.2 Scope of the Assessment

Ex1.2.1 For the onshore parts of the Proposed Project, the study area (or Zone of Influence (ZOI)) includes land within the Order Limits, in addition to surface and groundwaters within 500 m of the Order Limits and extending to 1 nautical mile from the Proposed Project landfall locations in Suffolk and Kent. This ZOI is justified based on the nature of the proposed project activities and has been agreed with the Environment Agency. The surface waterbodies within the ZOI are the Hundred River (GB105035046260) and the River Fromus (GB105035045980) in Suffolk, and Monkton and Minster Marshes (GB107040019621) and Ash Level (GB107040019600) in Kent. The groundwater bodies within the ZOI are Waveney and East Suffolk Chalk and Crag groundwater body (GB40501G400600) and East Kent Tertiaries (GB40702G501600).

Ex1.2.2 With regard to the offshore parts of the Proposed Project and the works to transition between the marine and terrestrial environments, a ZOI has also been agreed with the Environment Agency. The transitional and coastal waterbodies within the ZOI in Suffolk are the Alde & Ore Waterbody (GB520503503800) and the Suffolk Waterbody (GB650503520002). In Kent these are the Stour (Kent) Water Body (GB520704004700) and Kent North Waterbody (GB650704510000).

Ex1.2.3 The Ash Level waterbody in Kent was screened out of further assessment due to the very limited interaction with the Proposed Project and the lack of source-pathway linkages between this waterbody and the activities associated with the Proposed Project. All of the other surface, transitional, and coastal waterbodies were screened into the WFD assessment, following the Clearing the Waters for All methodology (Environment Agency, 2016).

Ex1.2.4 All of the groundwater bodies within the ZOI were screened out of the WFD assessment owing to the very limited interactions with the Proposed Project and based on the committed good practice measures e.g. linked to foundation design and construction, which would be put in place in accordance with good practice measure GH02 from **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice** which requires a Foundation Works Risk Assessments for these activities.

Ex1.2.5 Some watercourses within the ZOI are not designated as WFD waterbodies but are located within the WFD operational catchments and drain towards the screened in waterbodies. Any potential effects on these watercourses have been considered cumulatively within the assessment of the WFD waterbodies, which is a precedent approach.

Ex1.3 Results of the Assessment

Ex1.3.1 The initial assessment of the Proposed Project, undertaken in Stages 1 to 3, concluded the potential for negative effects linked to specific construction activities and a limited number of operational activities associated with the Suffolk and Kent Onshore Schemes and the Offshore Scheme. These include:

- construction works in, under or adjacent to waterbodies to create crossings for construction access or for cable trenches and for outfalls from temporary surface water drainage systems;
- cable installation in the marine and intertidal environments causing direct loss of subtidal benthic habitats and species due to placement of hard substrates on the seabed and having the potential to introduce and spread Invasive Non-Native Species (INNS) and underwater noise impacts;
- construction and use of the permanent crossing of the Fromus waterbody for access to the Saxmundham converter station; and
- thermal impacts to fish such as smelt (Osmeridae).

Ex1.3.2 These activities were taken forward to Stage 4 which provides an assessment of these activities and the potential for effects on waterbodies.

Ex1.3.3 Stage 4 concluded that the residual effects of the screened in activities on the screened in waterbodies would be negligible following implementation of the embedded and good practice measures outlined in this report. It also showed that there would be no effects allowing for flexibility within the Limits of Deviation, due to the embedded measures regarding the trenchless crossings and bridges.

Ex1.3.4 This assessment concludes that the Proposed Project is compliant with the objectives of the WFD and on this basis, no further assessment is proposed.

1. Introduction

1.1 Overview

1.1.1 The Sea Link Project (hereafter referred to as the 'Proposed Project') is a proposal by National Grid Electricity Transmission plc (hereafter referred to as National Grid) to reinforce the transmission network in the South East and East Anglia. The Proposed Project is required to accommodate additional power flows generated from renewable and low carbon generation, as well as accommodating additional new interconnection with mainland Europe.

1.1.2 National Grid owns, builds and maintains the electricity transmission network in England and Wales. Under the Electricity Act 1989, National Grid holds a transmission licence under which it is required to develop and maintain an efficient, coordinated, and economic electricity transmission system.

1.1.3 This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400 kV overhead line close to Richborough in Kent.

1.1.4 National Grid is also required, under Section 38 of the Electricity Act 1989, to comply with the provisions of Schedule 9 of Act 1989. Schedule 9 requires licence holders, in the formulation of proposals to transmit electricity, to:

Schedule 9(1)(a) "*…have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites*, buildings and objects of architectural, historic or archaeological interest;" and

Schedule 9(1)(b) '…*do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects'*.

1.1.5 The Proposed Project is proposed to reinforce the transmission system in the South East of England and East Anglia. This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400 kV overhead line close to Richborough in Kent.

1.1.6 This Water Framework Directive (WFD) assessment has been produced in line with the current WFD guidance (Planning Inspectorate, 2024) to support the Proposed Project's application for development consent and the accompanying Environmental Statement (ES) under the Planning Act 2008.

1.1.7 Order Limits have been defined to encompass the land required temporarily to build the Proposed Project and permanently to operate it. The Order Limits include the Limits of Deviation (LoD), which represent the maximum deviation for the location of permanent infrastructure, such as converter stations and substation, overhead line pylons and underground cables. Therefore, the permanent aspects of the Proposed Project could be located anywhere within the LoD.

1.1.8 The assessment presented within this report is based on the indicative alignments and locations shown on the General Arrangement Plans (**Application Document 2.14.1 Indicative General Arrangement Plans – Suffolk**, **Application Document 2.14.2**

Indicative General Arrangement Plans – Kent and **Application Document 2.14.3 Indicative General Arrangement Plans - Offshore**). However, a sensitivity assessment has also been applied to consider whether there would be any different, greater or new effects if the flexibility provided by the LoD and Order Limits were to be utilised.

1.2 WFD Requirements

1.2.1 The Water Environment (England and Wales) Regulations 2017 (as amended) (2017 Regulations) implemented the WFD in England and Wales. Under Section 2 of the European Union (Withdrawal) Act 2018, the 2017 Regulations continue to have effect in domestic law following the UK's withdrawal from the European Union.

1.2.2 The purpose of the WFD is to establish a framework for the protection of inland surface waters, transitional waters, coastal waters, and ground waters. The Directive aims to prevent further deterioration in, and enhance, water quality, and promote sustainable water use. The 2017 Regulations require the 'appropriate agency' i.e. the Environment Agency, for England, to prepare River Basin Management Plans (RBMP) for each river basin district, for approval by the Secretary of State.

1.2.3 The RBMP describes the current state of the water environment for each river basin district, the pressures affecting the water environment, the objectives for protecting and improving it, and the programme of measures needed to achieve the statutory environmental objectives of the WFD (i.e. to enable waterbodies to achieve 'Good' status). The overarching requirement was that they should reach at least 'Good' status (or potential) by 2015. This date has been extended to 2027 for many waterbodies.

1.2.4 Under the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009, an application for a Development Consent Order (DCO) must be accompanied by a plan with accompanying information identifying waterbodies in the relevant RBMP, together with an assessment of any effects on such waterbodies likely to be caused by the development (regulation 5). The relevant waterbodies are presented in **Application Document 2.11.1 Waterbodies in the River Basin Management Plan - Suffolk** and **Application Document 2.11.2 Waterbodies in the River Basin Management – Kent**. The assessment of effects is documented in this report.

1.2.5 This report uses the term 'WFD waterbody' to describe a waterbody that is assigned a WFD waterbody identifier code within a RBMP.

1.3 Purpose of this Report

1.3.1 This report has been prepared further to the WFD Screening Assessment that was prepared to inform statutory consultation in October 2023.

1.3.2 It summarises Stages 1 to 4 of the WFD assessment as follows:

- Stage 1: Defining the ZOI and identifying WFD waterbodies within the ZOI;
- Stage 2: Collating baseline data for those waterbodies;
- Stage 3: Screening project components and activities to identify those with the potential to impact on WFD quality elements of waterbodies within the ZOI; and

- Stage 4: Comprises the assessment of the components of the project screened in at Stage 3 against the WFD quality elements that make up the overall WFD status of screened in waterbodies. If this stage concludes potential for non-compliance with WFD objectives, a further stage of detailed assessment is required.

1.3.3 Measures have been embedded into the design of the Proposed Project to avoid or reduce significant effects that may otherwise be experienced during construction and operation. Embedded measures are those that are intrinsic to and built into the design of the Proposed Project. These are described in Appendix B of the Outline Onshore Construction Environmental Management Plan (CEMP) **Application Document 7.5.3.2 CEMP Appendix B Register of Environmental Actions and Commitments**.

1.3.4 Several good practice measures, which generally comprise measures imposed through legislative requirements or represent standard sector good practices, have also been identified. These include measures to reduce nuisance from construction activities. The good practice measures are set out in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice (CoCP)**, which is Appendix A of the Outline Onshore CEMP. Each measure has been assigned a code e.g. GG01.

1.3.5 Embedded and good practice measures relevant to the WFD assessment are summarised in a.i.Appendix A. As noted above, the embedded measures and good practice measures both form part of the Outline CEMPs for the Onshore and Offshore Schemes, which are secured through Requirement 4 of the DCO (**Application Document 3.1**).

1.4 Structure of this Report

1.4.1 The structure of the report is as follows:

- Chapter 1: Introduction: Background information on the Proposed Project and WFD requirements.
- Chapter 2: Project Description: Description of the components of the Proposed Project, including operational features and temporary features during construction.
- Chapter 3: Summary of Stages 1 to 3: An overview of Stages 1 to 3 of the WFD screening assessment.
- Chapter 4: Stage 4: WFD Assessment: Sets out the approach to Stage 4 of the WFD assessment, WFD mitigation measures assessment, and the assessment of residual impacts.
- Chapter 5: Conclusion: Conclusions of the WFD assessment including whether any further stages of assessment are required.

2. Proposed Project Description

2.1.1 The Proposed Project would comprise the following elements:

The Suffolk Onshore Scheme

- A connection from the existing transmission network via Friston Substation, including the substation itself. Friston Substation already has development consent as part of other third-party projects. If Friston Substation has already been constructed under another consent, only a connection into the substation would be constructed as part of the Proposed Project.
- A high voltage alternative current (HVAC) underground cable of approximately 1.9 km in length between the proposed Friston Substation and a proposed converter station (below).
- A 2 GW high voltage direct current (HVDC) converter station (including permanent access from the B1121 and a new bridge over the River Fromus) up to 26 m high plus external equipment (such as lightning protection, safety rails for maintenance works, ventilation equipment, aerials, similar small scale operational plant, or other roof treatment) near Saxmundham.
- A HVDC underground cable connection of approximately 10 km in length between the proposed converter station near Saxmundham, and a transition joint bay (TJB) approximately 900 m inshore from a landfall point (below) where the cable transitions from onshore to offshore technology.
- A landfall on the Suffolk coast (between Aldeburgh and Thorpeness).

The Offshore Scheme:

- Approximately 122 km of subsea HVDC cable, running between the Suffolk landfall location (between Aldeburgh and Thorpeness), and the Kent landfall location at Pegwell Bay.

The Kent Onshore Scheme

- A landfall point on the Kent coast at Pegwell Bay.
- A TJB approximately 800 m inshore to transition from offshore HVDC cable to onshore HVDC cable, before continuing underground for approximately 1.7 km to a new converter station (below).
- A 2 GW HVDC converter station (including a new permanent access off the A256),up to 28 m high plus external equipment such as lightning protection, safety rails for maintenance works, ventilation equipment, aerials, and similar small scale operational plant near Minster. A new substation would be located immediately adjacent.
- Removal of approximately 2.2 km of existing HVAC overhead line, and installation of two sections of new HVAC overhead line, together totalling approximately 3.5 km, each connecting from the substation near Minster and the existing Richborough to Canterbury overhead line.

2.1.2 The Proposed Project also includes modifications to sections of existing overhead lines in Suffolk (only if Friston Substation is not built pursuant to another consent) and Kent, diversions of third-party assets, and land drainage from the construction and operational footprint. It also includes opportunities for environmental mitigation and compensation . The construction phase will involve various temporary construction activities including overhead line diversions, use of temporary towers or masts, working areas for construction equipment and machinery, site offices, parking spaces, storage, accesses, bellmouths, and haul roads, as well as watercourse crossings and the diversion of public rights of way (PRoWs) and other ancillary operations.

2.2 Construction Assumptions

2.2.1 Subject to gaining development consent, construction works would be expected to start in 2026 and be functionally completed by the end of 2031 with reinstatement potentially continuing into 2032. Certain advance works (such as archaeological trial trenching or protected species mitigation) may take place in advance of the main construction period.

2.2.2 At the Suffolk landfall the HVDC will be installed via trenchless techniques between the subtidal exit pit and the onshore, thereby completely avoiding any activities in the Suffolk intertidal zone. At the Kent landfall the HVDC will emerge from trenchless installation between the onshore and offshore schemes, exiting in the intertidal zone. The trenchless technique to be used has not been finalised but is likely to be via HDD, considered to be the worst-case scenario and assumed for all pathways assessed in Section 4 of this report.

2.2.3 The construction schedule would be developed as the Proposed Project progresses and would take account of seasonal constraints such as protected species breeding or hibernation seasons and to reduce impacts associated with working on land that is prone to waterlogging and flooding. Commitments have been secured within the DCO via requirements and management plans.

3. Summary of Stages 1 to 3

3.1 Stage 1: Defining the Zone of Influence and Screening WFD Waterbodies

3.1.1 This stage of the assessment defines the ZOI of the Proposed Project and identifies which WFD surface water, transitional, coastal and groundwater waterbodies are present within the ZOI. It also screens those waterbodies to focus further stages of assessment only on those waterbodies having the potential to deteriorate because of Proposed Project activities.

3.1.2 The ZOI is determined by considering the distance between waterbodies and construction and operation activities and the hydrological connectivity between the waterbodies and these activities. Waterbodies that are not considered to have the potential to be impacted, due to lack of direct or indirect connectivity, or due to distance, are screened out at this stage.

3.1.3 The ZOI for this assessment has been defined to include land within the terrestrial Order Limits, in addition to land within 500 m of this boundary, extending to 1 nautical mile from the Proposed Project landfall locations at Suffolk and Kent. This reflects the surrounding water environment and is sufficient for the inclusion of all potentially affected waterbodies. The ZOI have also been agreed with the Environment Agency following comments raised in the EIA Scoping Opinion (**Application Document 6.2.1.6 Part 1 Introduction Chapter 6 Scoping Opinion and EIA Consultation**).

3.1.4 Within the ZOI, there are several WFD surface, transitional, coastal and groundwater bodies that are managed under the Anglian and South East RBMPs, which are described in the following sub-sections.

Suffolk Onshore Surface Waterbody Screening

3.1.5 The surface waterbodies within the Suffolk Onshore ZOI are listed below with their WFD waterbody ID and are shown in **Application Document 2.11.1 Waterbodies in the River Basin Management Plan – Suffolk**.

- Hundred River (GB105035046260).
- Fromus (GB105035045980).

3.1.6 In addition to the WFD surface waterbodies listed above, there are also several watercourses within the ZOI which are not assigned WFD identifiers in the RBMP. These are illustrated in **Application Document 6.4.2.4.1 Study Area and Water Environment Receptors** and include ordinary watercourses and drainage ditches. As these watercourses are situated in WFD operational catchments and drain to WFD surface waterbodies, Proposed Project activities with the potential to influence the attributes of these watercourses have also been considered in the assessment.

3.1.7 The Hundred River and Fromus waterbodies were screened into the WFD assessment because they are situated within the ZOI and both flow through the Order Limits.

3.1.8 An overview of the hydrological relationship between the Proposed Project and the screened in waterbodies is included below in Table 3.1.

Table 3.1 Screened in Suffolk WFD surface waterbodies

Waterbody name (WFD Waterbody ID)	Hydrological Relationship to the Proposed Project
Hundred River (GB105035046260)	This waterbody flows to the east of the Order Limits and areas of land within the Order Limits drain to the waterbody. The Proposed Project only directly interacts with the waterbody in one very localised area. This is to the east of the proposed Friston Substation at School Road, which crosses the Hundred River via an existing bridge. No works are proposed to this existing crossing. There is one proposed temporary surface water drainage outfall to the Hundred River at this location, which would be removed after construction. During operation of the Proposed Project there would be no discharges to the waterbody and no other interactions with it. Proposed Project activities at the Suffolk landfall site are within the catchment of this waterbody, however, a trenchless crossing of the floodplain of the river and three of its tributaries is proposed for the underground marine cable installation, in order to avoid disturbance of designated sites and protected areas (Leiston-Aldeburgh Site of Special Scientific Interest (SSSI), North Warren Royal Society for the Protection of Birds (RSPB) Reserve).
Fromus (GB105035045980)	This waterbody flows through land within the north-western extent of the Order Limits. The proposed Saxmundham Converter Station is located within the catchment of this waterbody, however approximately 1 km away to the east from its channel and outside the floodplain of the waterbody. One new crossing of the Fromus is proposed to facilitate access to the proposed Saxmundham Converter Station during its construction and operation. This would be a clear span 24 m bridge with minimum of 8 m set back abutments and either a 6 m or 4 m clearance of the bridge soffit from the Q95 flow level of the river (outlined in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**). Eleven temporary culverts (seven box culverts and four pipe culverts) and two permanent box culverts (each culvert at approximately 12 m long) would be situated on unnamed ordinary watercourses draining to this waterbody. Construction compounds are proposed adjacent to the proposed Saxmundham Converter Station and permanent access route across the River Fromus. During construction and operation of the Proposed Project there would be several drainage discharges to the waterbody via its tributaries.

3.1.9 Some of the other watercourses (i.e. not designated as WFD waterbodies) within the ZOI would be crossed by the underground cable trenches using opencut techniques. In addition, a number of these minor watercourses would need to be temporarily culverted to provide for construction access (outlined in **Application Document 6.3.1.4.A Appendix 1.4.A Crossing Schedules**). The assumptions regarding these crossings (locations, lengths, and durations) based on the indicative alignment as shown within **Application Document 2.14.1 Indicative General Arrangement Plans – Suffolk**, can be found in **Application Document 6.3.1.4.A Appendix 1.4.A Crossings Schedules**. Typical cross section plans for the proposed bridges are provided in **Application Document 2.13.1 Design Drawings - Suffolk**. These assumptions form the basis of the assessment.

Kent Onshore Surface Waterbody Screening

3.1.10 The surface waterbodies within the Kent Onshore ZOI are listed below with their WFD waterbody ID and are shown in **Application Document 2.11.2 Waterbodies in the River Basin Management Plan – Kent**.

- Monkton and Minster Marshes (GB107040019621).
- Ash Level (GB107040019600).

3.1.11 The Monkton and Minster Marshes waterbody has been screened into the WFD Assessment as the waterbody flows through both the ZOI and Order Limits and the Proposed Project would interact with the waterbody at several locations.

3.1.12 The Ash Level waterbody does not pass through either of these boundaries, and only a small part of the ZOI drains to the Ash Level waterbody catchment. This waterbody has therefore been **screened out** due to the lack of potential for direct or indirect impacts.

3.1.13 In addition to the WFD surface waterbodies listed above, there are also several watercourses within the ZOI which are not assigned WFD identifiers in the RBMP. These are illustrated in **Application Document 6.4.3.4.1 Study Area and Water Environment Receptors** and include ordinary watercourses and drainage ditches. As these watercourses are situated in WFD operational catchments and drain to WFD surface waterbodies, Proposed Project activities with the potential to have an effect on the attributes of these watercourses have also been considered in the assessment.

3.1.14 An overview of the hydrological relationship between the Proposed Project and the screened in waterbody is included below in Table 3.2.

Table 3.2 Screened in Kent WFD surface waterbodies

Waterbody Name (WFD Waterbody ID)	Hydrological Relationship to the Project
Monkton and Minster Marshes (GB107040019621)	Comprising of a network of watercourses, this waterbody flows through the Kent Onshore Scheme Order Limits and the majority of land within the Order Limits to the north of the River Stour drains to this waterbody.

Waterbody Name (WFD Waterbody ID)	Hydrological Relationship to the Project
	The waterbody would be crossed by an underground cable section of the Proposed Project in addition to construction and permanent access routes, with a total of 26 temporary box culverts proposed and five trenchless crossings, as outlined in **Application Document 6.3.1.4.A Appendix 1.4.A Crossing Schedules**. There are also construction compounds within the catchment, which would discharge drainage to the waterbody. The proposed Minster Converter Station and Substation would also be located within the catchment of this waterbody and works to overhead lines would oversail seven tributaries of this waterbody. Operational drainage discharges from the converter station and substation to the waterbody are proposed. Three permanent box culverts (each approximately 12 m in length) are proposed to remain in-situ during operation.

3.1.15 Some of the other watercourses (i.e. not designated as WFD waterbodies) within the ZOI would be crossed by the underground cable trenches using opencut techniques. In addition, a number of these minor watercourses may need to be temporarily culverted for access (outlined in **Application Document 6.3.1.4.A Appendix 1.4.A Crossing Schedule**). The assumptions regarding these crossings (locations, lengths, and durations) based on the indicative alignment as shown within **Application Document 2.14.2 Indicative General Arrangement Plans – Kent**, can be found in **Application Document 6.3.1.4.A Appendix 1.4.A Crossing Schedules**. Typical cross section plans for bridges are provided in **Application Document 2.13.1 Design Drawings - Kent**. These assumptions form the basis of the assessment.

Groundwater Bodies Screening

3.1.16 The groundwater bodies within the ZOI for both Suffolk and Kent are listed below with their WFD waterbody ID:

- Waveney and East Suffolk Chalk and Crag groundwater body (GB40501G400600); and
- East Kent Tertiaries (GB40702G501600).

3.1.17 Table 3.3 presents a summary of the hydrological relationship between the groundwater bodies and the Project and information on the current status of these waterbodies.

Table 3.3 WFD Groundwater Bodies within the ZOI

Waterbody Name (WFD Waterbody ID) and Status	Hydrogeological Relationship to the Project
Waveney and East Suffolk Chalk and Crag groundwater body (GB40501G400600). Overall status: Poor Quantitative status: Poor Chemical status: Poor	Underlies the whole of the Order Limits associated with the Suffolk Onshore Scheme and would therefore be crossed by underground cable sections, as well as temporary and permanent access routes, the proposed Saxmundham Converter Station and the proposed Friston Substation.
East Kent Tertiaries (GB40702G501600) Overall status: Poor Quantitative status: Poor Chemical status: Good	Underlies the whole of the Order Limits associated with the Kent Onshore Scheme and would therefore be crossed by both overhead line and underground cable sections, as well as temporary and permanent access routes, and the proposed Minster Converter Station and Substation.

3.1.18 Groundwater bodies within the ZOI have been screened out, in agreement with the EA, for the following reasons:

- The Proposed Project has a very small footprint in the context of the groundwater bodies (land enclosed by the Order Limits covers less than 1% of the total area of the waterbodies) and interactions with them would be limited. Excavation works to create the underground cable sections would be near surface, with a typical excavation depth of around 1.5 m and trench width of approximately 2.5 m, and therefore generally are not anticipated to intercept groundwater (outlined in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**).
- Deeper excavations would be confined to localised areas, for example, if piled foundations are required for pylons at the proposed Friston substation, proposed Saxmundham Converter Station in Suffolk, or the proposed Minster Converter Station and Substation in Kent, or at trenchless crossings and landfalls.
- The groundwater risk assessment presented in **Application Document 6.3.2.5.B Appendix 2.5.B Qualitative Groundwater Risk Assessment** has assessed the potential risks to groundwater quality from the connection of different aquifer units at trenchless crossings. For the Suffolk Onshore Scheme, the assessment concluded that the horizontal directional drill (HDD) bore is unlikely to connect two aquifer units as the works would remain within the Crag Formation for its full length. As described within the groundwater risk assessment there is a low/moderate risk of existing contamination in the groundwater. Commitment GH02 in **Application Document 7.5.3.1 CEMP Appendix A Code of Construction Practice** requires a Foundation Works Risk Assessment to be undertaken at all locations where trenchless

crossings are proposed, and therefore risks associated with creation of new flow/contamination pathways from the connection of aquifer units are expected to be very low. Similar conclusions were drawn for the Kent Onshore Scheme.

- Commitment GH08 sets out the requirement to develop a protocol for dealing with unexpected contamination if encountered. These measures would help to safeguard groundwater flow paths and quality and reduce the potential for breakouts of drilling muds. It is also noted that, the preliminary contamination risk assessments and groundwater risk assessments that have been undertaken for the Kent and Suffolk Onshore Schemes (**Application Document 6.3.3.5.A Appendix 3.5.B Contamination Risk Assessment** and **Application Document 6.3.3.5.B Appendix 3.5.B Groundwater Risk Assessment**) have identified generally a very low/low risk of contamination to be present within the Order Limits and conclude no significant effects on groundwater quality or flows.
- In accordance with commitment GH07, any dewatering activities would be undertaken in accordance with EA guidance and, if required, an Abstraction Licence and Environmental Permit. Therefore, discharge of heavily silted or otherwise contaminated waters to the ground, during construction or operation of the Proposed Project, is not anticipated.
- With regard to the potential for changes to groundwater levels and/or recharge rates from the introduction of impermeable surfaces, the proposed Friston Substation, proposed Saxmundham Converter Station in Suffolk, and the proposed Minster Converter Station and Substation in Kent, are located on Tidal Flat Deposits which are generally low permeability clays, therefore the effect on recharge is likely to be negligible. In addition, commitment W06 states that, where ground conditions allow, surface water runoff would be infiltrated to ground, recharging underlying aquifers.
- During construction, temporary effects on groundwater quality would be avoided or reduced by the commitments made within the **Application Document 7.5.3 Onshore Construction Environmental Management Plan**.

3.1.19 Potential for minor and localised effects on groundwater quality and flows are reported in **Application Document 6.2.2.5 Part 2 Suffolk Chapter 5 Geology and Hydrogeology** and **Application Document 6.2.3.5 Part 3 Kent Chapter 5 Geology and Hydrogeology**. The assessments conclude that the good practice measures secured by the DCO would avoid any likely significant effects. It is therefore concluded that the Proposed Project does not have the potential to cause further deterioration of the current Poor status of the Waveney and East Suffolk Chalk and Crag (Suffolk) or East Kent Tertiaries (Kent) groundwater bodies, and these waterbodies are screened out of the assessment.

Suffolk Transitional and Coastal Waterbody Screening

3.1.20 The coastal water bodies within the ZOI for Suffolk and screened into the assessment, in agreement with the EA, are listed below with their WFD waterbody ID and are shown in **Application Document 2.11.1 Waterbodies in the River Basin Management Plan - Suffolk**.

- Suffolk Waterbody (GB650503520002).
- Alde & Ore Waterbody (GB520503503800).

3.1.21 The Suffolk Waterbody is a coastal waterbody along the coastline in the vicinity of the ZOI, one nautical mile in width. This is the start of the cable route at the Suffolk Landfall and marks the transition between the marine and terrestrial environment in Suffolk.

3.1.22 The Alde & Ore Waterbody is a transitional waterbody, containing the Butley River, River Ore, and River Alde over the area in which this watercourse becomes tidal dominated, up to the coastline where water discharges through Orford Haven. While this is not located within the ZOI, it is within 2 km of the Order Limits and is downstream of the Fromus waterbody. Hence the requirement for assessment due to the potential for indirect impacts from the Proposed Project.

3.1.23 Table 3.4 presents a summary of the hydrological relationship between the coastal waterbodies and the Proposed Project.

Table 3.4 Screened in Suffolk WFD Coastal & Transitional Waterbodies

Waterbody Name (WFD Waterbody ID)	Hydrological Relationship to the Project
Suffolk Coastal Waterbody (GB650503520002)	The Offshore Scheme falls within the Suffolk waterbody between approximately kilometre point (KP) 0.5 and KP 2.75. The primary method of cable installation in this waterbody is burial and trenchless installation techniques such as horizontal directional drilling (HDD) at the landfall.
Alde & Ore Transitional Waterbody (GB520503503800)	The Offshore Scheme falls outside the Alde & Ore waterbody. However, due to the presence of smelt (Osmeridae) in the Alde & Ore River, this waterbody has been screened into the assessment. One operational drainage outfall, to a tributary of the River Alde at Church Road is proposed.

Kent Transitional and Coastal Waterbody Screening

3.1.24 The coastal and transitional waterbodies within the ZOI for Kent and screened into the assessment are listed below with their WFD waterbody ID and are shown in **Application Document 2.11.2 Waterbodies in the River Basin Management – Kent**.

- Kent North waterbody (GB650704510000).
- Stour (Kent) waterbody (GB520704004700).

3.1.25 The Kent North waterbody is a coastal waterbody along the coastline in the vicinity of the ZOI. This is the coast before the Kent landfall and is the transition between the marine and terrestrial environment in Kent.

3.1.26 The Stour (Kent) waterbody is a transitional waterbody of the River Stour; the Little Stour, Great Stour and other ordinary watercourses and drains feed into this waterbody. It passes through the ZOI and the Order Limits of the Offshore and Kent Onshore

Schemes and becomes tidally dominated past the confluence with the North and South Streams in the Lydden Valley, south of the ZOI.

3.1.27 Table 3.5 presents a summary of the hydrological relationship between the coastal and transitional waterbodies and the project.

Table 3.5 Screened in Kent WFD Coastal and Transitional Waterbodies

Waterbody Name (WFD Waterbody ID)	Hydrological Relationship to the Project
Kent North Coastal Waterbody (GB650704510000)	The Order Limits of the Offshore Scheme fall within the Kent North Waterbody between KP 110 and KP 118.75. The primary method of cable installation in this waterbody is burial.
Stour (Kent) Transitional Waterbody (GB520704004700)	The Order Limits of the Offshore Scheme falls within the Stour (Kent) waterbody between KP 118.75 and KP 120.75. The primary method of cable installation in this waterbody is burial and trenchless installation techniques such as HDD at the landfall. The Onshore Scheme also interacts with this waterbody. It would be crossed by a section of the proposed overhead line, with temporary netting and scaffolding would be installed at three locations during restringing of the overhead line conductors, however there would only be very limited and localised physical disturbance to the riparian corridor of the waterbody during construction of the overhead line. A temporary crossing of the watercourse would be needed to facilitate access for construction materials and plant. The crossing structure would be an open span bridge with a soffit height set 4 m above Mean High Water Springs level to satisfy navigation requirements and set backs from the banks of a minimum of 8 m to avoid impacts on the river channel and its features. There would be some works within its tidal floodplain. During operation of the Proposed Project there would be no discharges to the waterbody and no other interactions with it.

3.2 Stage 2: Collating Baseline Data

3.2.1 Baseline data has been collected to characterise the screened in waterbodies. An overview of this data is provided below, with additional water quality data provided in **Application Document 6.3.2.4.A Appendix 2.4.A Suffolk Water Environment Baseline** and **Application Document 6.3.3.4.A Appendix 3.4.A Kent Water Environment Baseline**.

3.2.2 The WFD waterbodies that have been screened into the assessment are described within this section along with their current WFD status, their specific objectives and any mitigation measures in place or planned are detailed. The information has been taken from the Anglian and South East RBMPs (Environment Agency, 2022) and the Environment Agency's Catchment Data Explorer website, Cycle 3 (2022 to 2027) data, (Environment Agency, 2023c).

3.2.3 Data has also been obtained from a range of site surveys of the Fromus waterbody. These surveys include Modular River Physical (MoRPh) surveys, aquatic invertebrate surveys at the proposed crossing location of the River Fromus (November 2023, May 2024 and November 2024), macrophyte surveys and a fish survey (July 2024). Aquatic ecological surveys have been completed at all potentially affected watercourses across the Order Limits of the Suffolk and Kent Onshore Schemes, details are provided within **Application Document 6.3.2.2.F Appendix 2.2.F Riparian Mammals Report** and **Application Document 6.3.3.2.HAppendix 3.2.H Aquatic Ecology Report**.

Suffolk Baseline Data

Hundred River Waterbody

3.2.4 The Hundred River waterbody is designated as a heavily modified waterbody which achieves an overall Bad status, limited by its ecological quality (fish), and its physico-chemical quality elements (dissolved oxygen). It has a Chemical status of fail due to levels of mercury and its compounds, and polybrominated diphenyl ethers (PBDE) which have been used in the manufacture of a wide range of products, including plastics.

3.2.5 Table 3.6 presents a summary of Cycle 3 data for the Hundred River Waterbody.

Table 3.6 Baseline Data for the Hundred River Waterbody

Waterbody ID	**GB105035046260**
Length (km)	11.07
Catchment area (km^2)	26.10
Overall status	**Bad**
Ecological status	**Moderate**
- Biological quality	Bad
- Hydromorphology	Supports Good
- Physico-chemical	Moderate
- Specific pollutants	High

Waterbody ID	GB105035046260
Chemical Status	**Fail**
- Priority substances	Good
- Other pollutants	Does not require assessment
- Priority hazardous substances	Fail

Field Notes:

The Hundred River was originally proposed to be surveyed centred on National Grid Reference (NGR) TM 42764 61351 where an outfall is proposed, however at the time of survey this reach was found to be dry and entirely colonised by a terrestrial plant community suggesting it is ephemeral in nature. Consequently, a separate survey was undertaken downstream where the Hundred River was consistently wet and possessed an aquatic macrophyte community. Fish survey was not completed on the Hundred River as it was dry at the survey location and not wetted for >500 m downstream.

Macrophyte survey was conducted between TM 43297 60893 and TM 43408 60828 as the channel was dry at the crossing location. Approximately 50% broken shading was observed on the right and left banks of the survey reach, with the remainder of both banks unshaded. The channel substrate primarily comprised 70% silt/clay, with 30% sand. The invasive non-native species (INNS) Himalayan balsam (Impatiens glandulifera) was recorded within the Hundred River.

3.2.6 The reason for the Hundred River not achieving Good status is reported as pollution from waste water, such as sewage discharge.

3.2.7 The Hundred River has an ecological status objective of Moderate by 2027 (with low confidence), and a chemical status objective of Good by 2063**.**

Fromus Waterbody

3.2.8 The Fromus is not designated as artificial or heavily modified and currently achieves a Poor overall status. This status is limited by its ecological quality (fish), and its physico-chemical quality elements (dissolved oxygen). It has a Chemical status of fail due to levels of mercury and its compounds, and PBDEs which have been used in the manufacture of a wide range of products, including plastics.

3.2.9 Table 3.7 presents a summary of Cycle 3 data for the Fromus River Waterbody as well as field notes and photographs recorded during surveys.

Table 3.7 Baseline Data for the Fromus Waterbody

Waterbody ID	GB105035045980
Length (km)	13.28

Waterbody ID	GB105035045980
Catchment area (km^2)	34.57
Overall status	**Poor**
Ecological status	**Poor**
- Biological quality	Poor
- Hydromorphology	Supports Good
- Physico-chemical	Moderate
- Specific pollutants	High
Chemical Status	**Fail**
- Priority substances	Good
- Other pollutants	Does not require assessment
- Priority hazardous substances	Fail

Field Notes:

Steep vegetated banks, channel width 1 m (approximated). Banks of earth vegetated with mature line of trees. Low flows with exposed stoney bed. Banks of earth with scrub, tall herbs, mature oak trees, and Himalayan balsam. Adjacent SI grassland with variety of vegetation.

Plate 3.1 (left) River Fromus, (right) Fromus Waterbody Floodplain

3.2.10 Reasons for the River Fromus not achieving Good status are reported as physical modifications introducing ecological discontinuity and preventing fish movement, and pollution from urban areas and transport.

3.2.11 The Fromus has an ecological status objective of Good by 2027 (with low confidence), and a chemical status objective of Good by 2063.

Fromus Waterbody: Aquatic Macroinvertebrates Surveys

3.2.12 Invertebrate surveys at the proposed crossing location of the River Fromus were completed on 20 November 2023, 28 May 2024 and 28 November 2024 at the locations shown in Table 3.8. Further macroinvertebrate surveys were completed at additional locations upstream and downstream of the proposed bridge location on 28 November 2024 within the autumn sampling season.

Table 3.8 Macroinvertebrate sampling locations

Survey site	National Grid Reference	Relation to proposed bridge crossing	Autumn survey date	Spring survey date
WBN2 River Fromus	TM 38861 62093	190 m downstream	20/11/2023 28/11/2024	28/05/2024
WBNx2 R. Fromus	TM 38702 61084	1210 m downstream	28/11/2024	-
WBNx1 R. Fromus	TM 38771 63161	880 m upstream	28/11/2024	-

3.2.13 The combined taxa list of all survey samples included a total of five riverfly taxa; specifically, the mayflies *Cloeon dipterum* (WBN2 only) and *Baetis rhodani/atlanticus* (WBNx1 R. Fromus only), and the caddisflies *Lype* sp. (WBN2 only), *Limnephilus lunatus* (WBN2 only) / Limnephilidae (WBN2 and WBNx2 only), and *Glyphotaelius pellucidus* (WBN2 only). All taxa are common and widespread throughout the UK where appropriate habitat is available to support their presence.

3.2.14 A relatively diverse aquatic beetle fauna comprising 10 species was also recorded, including the beetle *Anacaena bipustulata* (current CCI species conservation score 5 – Local, current scores provided by the EA via the EA Ecology and Fish Data Explorer) which attained the highest CCI species conservation score within the AECOM River Fromus dataset. At the US (WBNx1) R. Fromus site in autumn 2024, the riffle beetle *Elmis aenea* was recorded, the only riffle beetle recorded at any site.

3.2.15 With the exception of the flatworm *Polycelis felina* and the Limnephilidae caddisfly larva *Glyphotaelius pellucidus* (current CCI species conservation score 3 - Frequent), all

other recorded species had CCI Species conservation scores of 1 or 2, equating to Common or Very Common species.

3.2.16 All macroinvertebrate samples from the River Fromus resulted in an assessment of Low Conservation Value on the CCI index.

3.2.17 Summary metrics for the samples are presented in Table 3.9 below. The metrics demonstrate the community sampled is of low to moderate conservation value (based on CCI metrics) and resides in a heavily sedimented and low flow velocity habitat (from LIFE and PSI data).

Table 3.9 Macroinvertebrate metrics for the River Fromus

Index	Autumn 2023 (WBN2)	Spring 2024 (WBN2)	Autumn 2024 (3 sites)
NTAXA (WHPT)	10	17	WBNx2: N B WBN2 N B 0 WBNx1: B: 3
ASPT (WHPT)	4.23	4.16	WBN: B: .9 WBN2: N: B: .8 WBNx1: 4.2
PSI Score (species)	20.00 – Sedimented	24.14 – Sedimented	WBNx2: 0.0 – Heavily Sedimented WBN2: 6.7 – Heavily Sedimented WBNx1: 36.4 – Sedimented
LIFE Score (species)	6.29 – Low sensitivity	6.06 – Low sensitivity	WBNx2: 6.0 – Low sensitivity WBN2: 6.5 – Moderate sensitivity

Index	Autumn 2023 (WBN2)	Spring 2024 (WBN2)	Autumn 2024 (3 sites)
			WBNx1: 7.1 – Moderate Sensitivity
CCI Score	1.1 – Low conservation value	7.1 – Moderate conservation value	WBNx2: 1.0 – Low conservation value WBN2: 4.7 – Low conservation value WBNx1: 1.0 – Low conservation value

3.2.18 RICT analysis using environmental variables derived by the RICT Location Checker for Model 44 Input Variables (DEFRA, 2024) and in accordance with best practice WFD classification methodology (WFD-UKTAG, 2023), available on the DEFRA portal, resulted in an overall WFD invertebrate classification of **Moderate** (based on the combination of the modelled distributions for each of WHPT-ASPT and WHPT-NTAXA across all classes in both spring and autumn). In this case, macroinvertebrate surveys from the bridge crossing location are used to give an 'equivalent WFD classification', to support the WFD assessment alongside the EA WFD classification data, which has also been used as described elsewhere.

3.2.19 RICT analysis of the autumn 2024 survey data provided WFD status equivalent of **Moderate** for the upstream (WBNx1) survey location, and **Bad** for the Mid (WBN2) and downstream (WBNx2) survey locations. While this is indicative only and should be treated with caution as single-season sampling, autumn data is most reliable in providing accurate single-season results (Hill, et al., 2016).

3.2.20 In this case the Moderate equivalent WFD status at the crossing point, and as low as Bad status elsewhere, indicates that habitat at these locations is less optimal for macroinvertebrates than elsewhere in the WFD water body, i.e., at the EA monitoring site downstream used for WFD classification.

3.2.21 The conclusion here is not that the WFD status of the WFD water body as a whole is Moderate or otherwise, but that variations in macroinvertebrate communities present indicate a range of WFD status-equivalents that demonstrate habitat variability, i.e., macroinvertebrate communities are not uniform throughout.

Fromus Waterbody: Macrophyte Survey

3.2.22 Macrophyte surveys at the proposed crossing location on the River Fromus were completed on 22 July 2024, within the optimal survey season for aquatic macrophytes. The surveyed reach extended 100 m, from NGR TM 38847 61988 to TM 38859 62097, which encompassed the proposed crossing point.

3.2.23 The channel at the survey location was heavily shaded for the majority of its length, including at the proposed crossing point, which limited macrophyte growth considerably. The upstream approximate 20 m was unshaded, where the majority of macrophyte growth was present within the surveyed reach.

3.2.24 The macrophyte taxa present at the time of survey included eight species, presented in Table 3-10 below. Of the species present, only two taxa score for LEAFPACS: broad-leaved pondweed *Potamogeton natans* and water starwort *Callitriche sp*. None of the taxa present are notable, rare or protected; all taxa recorded are very common and likely to be present in the wider landscape where suitable conditions are present. However, the Wildlife and Countryside Act 1981 (as amended) Schedule 9 invasive non-native species Himalayan balsam *Impatiens glandulifera* was found to be growing sporadically throughout the site.

Table 3.10 Macrophyte survey results for the River Fromus

Scientific name	Common name	TCV (Taxon Cover Value)	LEAFPACS scoring
Sparganium erectum	Branched bur-reed	C6	N
Phalaris arundinacea	Reed canary grass	C4	N
Solanum dulcamara	Bittersweet	C3	N
Carex pseudocyperus	Cyperus sedge	C1	N
Conocephalum conicum	Great scented liverwort	C2	N
Potamogeton natans	Broad-leaved pondweed	C1	Y
Impatiens glandulifera	Himalayan balsam	C5	N
Callitriche sp.	Water starwort	C1	Y

3.2.25 Table 3.11 presents a summary of the results of LEAFPACS analysis. These results demonstrate that there are fewer scoring taxa (NTAXA) and functional groups (NFG) than would be expected compared to estimated reference conditions, while slightly less algae cover (ALG) and the macrophyte community reflected lower nutrient content (RMNI) than might be expected compared to estimated reference conditions. The River Fromus has achieved an equivalent WFD classification of **High**.

Table 3.11 Macrophyte LEAFPACS metrics for the River Fromus

RMNI EQR	NTAXA EQR	NFG EQR	ALG EQR	Final EQR	Classification

1.332	0.212	0.335	1.001	0.987	High

3.2.26 It should be noted, however, that only two scoring taxa were present. The minimum requirement for LEAFPACS2 classification is three scoring macrophyte taxa (WFD-UKTAG, 2014b). Consequently, these results should be treated with caution, and this does not therefore constitute an accurate estimate of WFD status.

Fromus Waterbody: Fish Survey and Baseline

3.2.27 A fish survey was undertaken on 22 July 2024 near the proposed crossing point on the River Fromus, at NGR TM 38838 61982 (refer to Table 3.12). A semi-quantitative electric fishing survey was completed by a team of four aquatic ecologists at the River Fromus where safely accessible. Sampling procedure followed standard Environment Agency guidelines (Beaumont, et al., 2002). The survey was completed over a single run in an upstream direction using a bankside electrofishing kit consisting of an Electracatch WFC4 control box with Pramac 4000 generator and single anode. This equipment was chosen after careful consideration of water depth and stream width (i.e., depth < 0.8 m and stream width being an average of 4 m). The river reach surveyed was approximately 60 m in length between natural barriers (fallen tree and debris build up). Fish that were caught were placed in well aerated holding buckets on the river margins and identified to species level. Their fork length was measured to the nearest mm before being released safely and unharmed back into the watercourse.

3.2.28 Only one species was captured, three-spined stickleback (*Gasterosteus aculeatus*; n = 45). Three-spined stickleback are a ubiquitous species and deemed a High tolerance species as per the Fisheries Classification Scheme (FCS)[1].

Table 3.12 Fish survey locations – River Fromus

Survey reach	National Grid Reference Start (downstream)	National Grid Reference Centre	National Grid Reference End (upstream)	Survey date	Method
River Fromus	TM3880861988	TM3886262110	TM3883762041	22 July 2024	Semi-quantitative electric fishing

3.2.29 It is important to note that this survey is representative of fish assemblage and habitat conditions at the crossing point - the intention is not to provide a WFD classification equivalent for the entire WFD water body.

3.2.30 EA WFD classification fish data has been used to inform the WFD assessment, together with desk study of fish records at the catchment scale (see below).

3.2.31 The EA has previously completed WFD surveys at four monitoring sites on the Fromus Waterbody between the years of 2006 and 2012 (Table 3.13). This survey site is situated approximately 950 m downstream of the Saxmundham EA monitoring site. Here, both fish assemblages are similar, with Saxmundham being dominated by three-

spined stickled with the addition of a single European eel (*Anguilla anguilla*), only caught in 2012.

Table 3.13 Environment Agency fish survey data – River Fromus

Site name	Saxmundham	Snape Watering	Abbey Farm B	Abbey Farm A
Site ID	**618**	**619**	**27840**	**27839**
Years surveyed	**2006 & 2012**	**2006 & 2011**	**2007**	**2007**
Brook lamprey (*Lampetra planeri*)		5		
Brown / sea trout (*Salmo trutta*)			1	
Dace (*Leuciscus leuciscus*)			2	
European eels	1	3	4	4
Lamprey sp. (*Petromyzontidae*)		2		12
Roach (*Rutilus rutilus*)				1
Rudd (*Scardinius erythrophthalmus*)			1	6
Stone loach (*Barbatula barbatula*)		17	6	3
Three-spined stickleback	30	8	8	8
Ten-spined stickleback (*Pungitius pungitius*)		1		

Site name	Saxmundham	Snape Watering	Abbey Farm B	Abbey Farm A
Species richness	**2**	**6**	**6**	**6**

3.2.32 Species richness is shown to increase downstream of both the Saxmundham (n = 2) and the AECOM survey site at the proposed crossing point (n = 1), to n = 6 across all further monitoring sites. This increase may be the result of increased habitat heterogeneity (i.e. diverse flow and depth patterns and in-stream macrophytes) which can support a more diverse fish assemblage. It was noted that the habitat quality at the proposed crossing was generally poor with deep silt deposits and near-stagnant water.

3.2.33 Given the location of the proposed crossing point and the similarity of the fish assemblage between the survey site and the EA monitoring site Saxmundham, it is believed that the results presented herein are representative of the River Fromus at the proposed crossing point. This is supported by the Site Classifications for the EA monitoring locations (Table 3-14), whereby Saxmundham has been classified as Poor for the Fish biological quality element across all assessment years between 2009 – 2016, apart from 2010 where fish were classified as Bad.

Table 3.14 Site fish classifications for the EA monitoring locations

	Environment Agency WFD monitoring sites			
Year	**Saxmundham**	**Snape Watering**	**Abbey Farm B**	**Abbey Farm A**
2009	Poor	Moderate	Good	Good
2010	Bad	Moderate	Good	Moderate
2011	Poor	Moderate	Good	Moderate
2013	Poor	Moderate	Good	Moderate
2013	Poor	Moderate	Good	Moderate
2014	Poor	Moderate	--	--
2014	Poor	Moderate	--	--
2015	Poor	Moderate	--	--
2016	Poor	Moderate	--	--

3.2.34 The FCS2 model used to assess the WFD status of the fish fauna in rivers, is not available outside of the EA, and as such only a qualitative assessment of the impact on the WFD status of the Fromus Water Body can be made. Based on the fish assemblage present, it is considered that the site would be classified as either **Poor** or **Bad**. Given

that three-spined stickleback are, as previously mentioned, ubiquitous and a High tolerant species, these species are considered to be unaffected by the potential crossing and any residual impacts would not be significant.

Smelt

3.2.35 No smelt were found in the aquatic ecology survey, nor in any of the previous EA surveys (WFD or routine monitoring sites) completed on the Fromus Waterbody. The closest record for smelt is approximately 7.9 km downstream of the proposed crossing point within the main River Alde, which was recorded at the EA monitoring site U/S Langham Bridge (Site ID: 35) in 2013.

3.2.36 Appendix B provides these survey results of the River Fromus waterbody that have been conducted to inform this assessment.

Suffolk Coastal Waterbodies

3.2.37 The Suffolk Coastal waterbody is designated as heavily modified and has a moderate overall status as of 2019 (Table 3.15). The Alde & Ore Transitional waterbody is designated as heavily modified and has a Moderate overall status as of 2022 (Table 3.16).

Table 3.15 Baseline data for the Suffolk [Coastal] Waterbody

Waterbody ID	**GB650503520002**
Surface area (km^2)	147.387
Overall status	**Moderate**
Hydromorphological designation	**Heavily modified**
Ecological status	**Moderate**
- Biological quality	Good
- Physico-chemical	Moderate
- Supporting elements	Good
Chemical Status	**Fail**
- Priority hazardous substances	Fail
- Other pollutants	N/A
- Priority substances	Good

Table 3.16 Baseline data for the Alde & Ore [Transitional] Waterbody

Waterbody ID	GB520503503800
Surface area (km^2)	11.447
Overall status	**Moderate**
Hydromorphological designation	**Heavily modified**
Ecological status	**Moderate**
- Biological quality	Moderate
- Physico-chemical	Moderate
- Hydromorphological supporting elements	Supports good
- Supporting elements	Good
- Specific pollutants	High
Chemical Status	**Fail**
- Priority hazardous substances	Fail
- Other pollutants	N/A
- Priority substances	Good

Suffolk East Management Catchment measures

3.2.38 The Hundred River, and Fromus waterbodies are in the Suffolk East Combined Management Catchment. A set of measures have been identified to deliver improvements in the status of waterbodies within this catchment. These centre on provision of additional treatment to reduce concentrations of phosphate from wastewater treatment works discharges, and habitat improvement projects to enable fish passage, for example, installation of fish passes.

Other watercourses

3.2.39 Some of the ordinary watercourses that are crossed by the project and drain to the Hundred River, River Alde, and River Fromus were observed during a desktop survey of the management catchment. The effects of screened in Proposed Project activities on these watercourses will therefore be assessed cumulatively with those on the wider WFD catchments they fall into.

3.2.40 Current proposed watercourse crossing locations are shown in **Application Document 6.4.1.4.4.A Watercourse Crossings**.

Kent Baseline Data

Monkton and Minster Marshes

3.2.41 The Monkton and Minster Marshes waterbody is designated as heavily modified with a moderate overall status. This status is limited by its biological quality (macrophytes sub element), and physico-chemical quality elements (dissolved oxygen). It has a Chemical status of fail due to levels of mercury and its compounds, and polybrominated diphenyl ethers (PBDE) which have been used in the manufacture of a wide range of products, including plastics.

3.2.42 Table 3.17 presents a summary of Cycle 3 data for the Monkton and Minster Marshes waterbody, as well as field notes recorded during a site walkover undertaken in June 2023.

Table 3.17 Baseline data for the Monkton and Minster Marshes Waterbody

Waterbody ID	**GB107040019621**
Length (km)	4.992
Catchment area (km^2)	18.092
Overall status	**Moderate**
Ecological status	**Moderate**
- Biological quality	Moderate
- Hydromorphology	Supports Good
- Physico-chemical	Moderate
- Specific pollutants	High
Chemical Status	**Fail**
- Priority substances	Good
- Other pollutants	Does not require assessment
- Priority hazardous substances	Fail
Field Notes:	

Waterbody ID	GB107040019621

Steep sided banks, channel width of between 1 m and 2 m. Banks of earth, vegetated with grasses, thick shrubbery and occasional trees. In-channel vegetation comprising occasional grasses and vegetation debris.

Plate 3.2 Minster Stream, part of the Monkton and Minster Marshes WFD Waterbody

3.2.43 Reasons for the Monkton and Minster Marshes WFD waterbody not achieving Good status are reported to be physical modifications, pollution from waste water, pollution from urban areas and transport, changes to natural flow and water level, and pollution from rural areas.

3.2.44 The Monkton and Minster Marshes waterbody has an ecological status objective of Good by 2027 (with low confidence), and a chemical status objective of Good by 2063.

Kent Coastal Waterbodies

3.2.45 The Kent North Coastal waterbody is designated as heavily modified and has a moderate overall status as of 2022 (Table 3.18). The Stour (Kent) Transitional waterbody is designated as heavily modified and has a moderate overall status as of 2022 (Table 3.19).

Table 3.18 Baseline data for the Kent North Coastal Waterbody

Waterbody ID	GB650704510000
Surface area (km^2)	450.777
Overall status	**Moderate**

Waterbody ID	GB650704510000
Hydromorphological designation	**Heavily modified**
Ecological status	**Moderate**
- Biological quality	Good
- Physico-chemical	Good
- Supporting elements	Moderate
- Specific pollutants	High
Chemical Status	**Fail**
- Priority hazardous substances	Fail
- Other pollutants	N/A
- Priority substances	Good

Table 3.19 Baseline data for the Stour (Kent) Waterbody

Waterbody ID	GB520704004700
Surface area (km^2)	5.113
Overall status	**Moderate**
Hydromorphological designation	**Heavily modified**
Ecological status	**Moderate**
- Biological quality	Moderate
- Physico-chemical	Moderate
- Hydromorphological supporting elements	Supports good
- Supporting elements	Moderate
- Specific pollutants	High

Waterbody ID	GB520704004700
Chemical Status	**Fail**
- Priority hazardous substances	Fail
- Other pollutants	Good
- Priority substances	Good

Stour Management Catchment measures

3.2.46 The Monkton and Minster Marshes waterbody is within the Stour Management Catchment. Whilst no specific set of measures have been identified to deliver improvements in the status of waterbodies within this catchment, the RBMP describes general measures including river and lake restoration, removing barriers to fish movement, tackling Invasive Non Native Species and enacting farm nutrient management plans.

Other watercourses

3.2.47 Stoneless Stream does not have a WFD waterbody ID, nor specific objectives or status data. However, the watercourse is located within the same operational catchment as the Monkton and Minster Marshes waterbody. The effects of screened in Proposed Project activities on this watercourse will therefore be assessed cumulatively with those on the Monkton and Minster Marshes waterbody.

3.2.48 Other ordinary watercourses, that are crossed by the Proposed Project and drain into the Monkton and Minster Marshes and Ash Level waterbodies, were observed during site walkover surveys in 2024. They generally share similar physical characteristics and serve a function of facilitating land drainage, with networks of these watercourses under the management of the Kent (Stour) Internal Drainage Board.

3.2.49 Current proposed watercourse crossing locations are shown in **Application Document 6.4.1.4.4 Watercourse Crossings**.

3.3 Stage 3: Screening Project Components and Activities

3.3.1 Stage 3 of the assessment identified relationships between the components of the Proposed Project and screened in WFD waterbodies. Any components and activities with the potential to influence the screened in waterbodies were screened in for further assessment.

3.3.2 Thorough an iterative process of design development detailed in **Application Document 6.2.1.3 Part 1 Introduction Chapter 3 Main Alternatives Considered**, the Proposed Project has sought to avoid environmental constraints, such as areas supporting valuable habitats and designated sites, and avoiding larger residential communities. The route corridor and alignments were selected based on balancing technical, environmental, and economic constraints. The Proposed Project also includes embedded measures, such as trenchless installation of the cables at the landfalls and open span crossings of the Stour (Kent) and Fromus (Suffolk) waterbodies for access.

3.3.3 The Proposed Project consists of three main components, as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**:

- Suffolk Onshore Scheme comprising HVDC/HVAC underground cable connections a converter station and substation and associated infrastructure.
- Offshore Scheme comprising mainly a subsea HVDC cable.
- Kent Onshore Scheme comprising HVDC underground cable, a converter station and substation and new HVAC overhead cables.

3.3.4 To facilitate construction of these permanent components there would also be several temporary components, such as construction compounds and temporary access routes, removal of and works to existing overhead lines and activities such as soil stripping, excavations and drainage works.

3.3.5 Table 3.20 details the activities and components associated with the Proposed Project. These activities/components are based on the Project Description (**Application Document 6.2.1.4 Description of the Proposed Project**) and proposed construction methodologies. The table also refers to the proposed good practice measures that are detailed in the **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice** and summarised in Appendix A, that would be put in place to prevent deterioration of the water environment as a result of these activities.

3.3.6 Proposed Project activities that are not considered to have the potential to cause waterbody deterioration nor prevent implementation of any planned measures, are screened out at this stage. The screening outcomes have been agreed with the EA and the assessment has been informed by the water environment impact assessment presented in **Application Document 6.2.2.4 Part 2 Suffolk Chapter 4 Water Environment** and **Application Document 6.2.3.4 Part 3 Kent Chapter 4 Water Environment** and relevant assessments of the marine environment presented in **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**.

3.3.7 The activities associated with the construction phase assume a linear rolling construction programme following completion of site enabling works. The screened in activities from Table 3.20 have been taken forward for further assessment at Stage 4, details of which are included in Chapter 4 of this report.

Table 3.20 Screening of Proposed Project components and activities

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
Suffolk Onshore Scheme: Construction Phase		
Pollution risk associated with general construction activities.	Adoption of good practice measures to prevent pollution (GG16, GG17), including in an emergency scenario (GG24). Measures to manage worksite	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction**

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
	runoff/drainage (GG15) and biosecurity (B04), as well as commitments regarding re-instatement (GG07).	**Practice**, general construction would have negligible impacts on the screened-in waterbodies.
Consumptive use of water resources	Adoption of water use use efficiency and leakage reduction measures (W16) to reduce consumptive water use.	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, consumptive water use during construction would be managed to have negligible impacts on the screened-in waterbodies.
Construction works in the floodplain of the Fromus and Hundred River waterbodies (for construction access and cable installation and drainage).	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, except in instances where the ground level has been adjusted as part of the Proposed Project subject to the provisions of the draft DCO in Article 27. No construction materials should be stored within Flood Zone 3 (W06). At landfall cables would be brought onshore using trenchless techniques, avoiding any physical disturbance to the Hundred River and its floodplain.	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice** and their small footprint, the temporary works in Flood Zone 3 would have negligible impacts on the screened-in waterbodies.
Construction of foundations.	No foundations are proposed in close proximity to the screened in waterbodies. Also, foundations would be designed and constructed in accordance with Foundation Works Risk Assessments (GH02) and informed by ground investigations (GH01).	**Screened out** - given the distance between this activity and the waterbodies and implementation of the good practice measures proposed, this activity would have negligible impacts on the screened in waterbodies.

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
Soil stripping, handling and storage resulting in silted runoff to waterbodies and changes to runoff rates/patterns.	Management, storage and reinstatement of soils in accordance with good practice (AS01).	**Screened out** - given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, this activity would have negligible impacts on the screened-in waterbodies.
Establishment and use of construction compounds, with associated pollution risks from receipt of site drainage and potential for physical disturbance of riparian corridors.	Compounds would be located to avoid encroaching into the floodplains and riparian corridors of screened-in waterbodies. Adoption of good practice for construction compound establishment and use (GG15, GG16). Suitable surface water and foul water drainage provision (GG15).	**Screened out** - given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, construction compounds would have negligible impacts on the screened-in waterbodies.
Construction works in, over, under or adjacent to waterbodies to create crossings for construction access and outfalls from temporary surface water drainage systems, with effects on hydromorphology (physical change), flow regimes and water quality.	Undertaking works in accordance with relevant consents / permits (W01). Temporary crossing designs in accordance with good practice (W02, W04). Retaining riparian vegetation and natural substrates through temporary crossing structures (W03).	**Screened in** - this development activity carries some risk of causing deterioration (albeit temporary) of waterbody status and is taken forward to Stage 4 for further consideration.
Construction works in, over, under or adjacent to waterbodies for cable trenching with potential effects on water quality associated with soil strip and drilling muds breakout risks.	Undertaking works in accordance with relevant consents / permits (W01). Open cut crossings following good practice techniques (W02). Implementation of measures to manage frac-out risk (B09)	**Screened in** - this development activity carries some risk of causing deterioration (albeit temporary) of waterbody status and is taken forward to Stage 4 for further consideration.
Suffolk Onshore Scheme: Operational and Maintenance Phase		
General maintenance activities.	Maintenance activities would include visual and physical inspections plus testing, repairing and replacing	**Screened out** – due to the nature of the maintenance activities there is a negligible associated risk of causing

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
	substation and converter station equipment as necessary. Maintenance activity along the proposed cable routes would generally be limited to non-intrusive inspections and cable repairs. Any works involving breaking ground would be subject to similar environmental safeguards as described for construction.	deterioration of waterbody status.
Permanent outfalls and drainage discharges from proposed Friston Substation and the proposed Saxmundham Converter Station, including potential for discharge of fire fighting runoff.	Undertaking works in accordance with relevant consents / permits (W01). Surface water drainage managed using sustainable drainage systems (SuDS) in accordance with policy and guidance requirements of the Lead Local Flood Authorities (LLFA) (W11. Drainage system design to include ability to isolate and prevent discharges from outfalls. These controls (mandated under National Grid Technical Specifications) would be implemented to prevent discharges of firefighting runoff into the receiving water environment.	**Screened out** – given the implementation of the SuDS, and the ability to contain runoff on site in the event of a fire, operational drainage discharges would have negligible impacts on the screened-in waterbodies.
Permanent crossing of the River Fromus for access to the proposed Saxmundham Converter Station.	Undertaking works in accordance with relevant consents / permits (W01). Proposed bridge design: Option 1: 24 m clear span, 6 m wide, with set back of abutment and wing walls a minimum of 8 m from each river bank, soffit 6 m above Q95 water level. Option 2: 24 m clear span, 6 m wide, with set back of abutment	**Screened in –** this component of the Proposed Project carries a potential risk of effects to waterbody status as a result of increased shading, a barrier to dispersing flying invertebrates, and connectivity with the floodplain, and is taken forward to Stage 4 for further consideration.

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
	and wing walls a minimum of 8 m from each river bank, soffit 4 m above Q95 water level.	
Suffolk Onshore Scheme: Decommissioning Phase		
Temporary site compounds and other enabling works would be similar to those used during the construction phase. Temporary site compounds required for decommissioning of the substation and converter station sites would be located in the same location as during construction.	Compounds would be located to avoid encroaching into the floodplains and riparian corridors of screened-in waterbodies. Adoption of good practice for construction compound establishment and use (GG15, GG16). Suitable surface water and foul water drainage provision (GG15).	**Screened out -** it has been assumed that the effects of the decommissioning activities would be similar to, but less significant than, any of the screened in construction activity effects.
Offshore Scheme: Construction Phase		
Increased suspended sediment concentration (SSC) levels during cable installation.	At both landfall sites in Suffolk and Kent, trenchless techniques will be used to minimise the impact of sediment disturbance in the intertidal zone during cable installation.	**Screened in** - this activity carries some risk of causing deterioration (albeit temporary) of coastal waterbody status and is taken forward to Stage 4 for further consideration.
Disturbance of potentially contaminated sediment causing alteration of water quality.	Sensitive routeing and siting of infrastructure and temporary works to avoid areas of known contamination. Commitments made within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**.	**Screened in** - this activity carries some risk of causing deterioration (albeit temporary) of coastal waterbody status and is taken forward to Stage 4 for further consideration.
Discharge of drilling fluids during landfall installation.	Commitments made within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**.	**Screened in** - taken forward to Stage 4 for further consideration following consultation with the EA.
Changes to coastal morphology at landfalls due to installation of the cables,	At both landfall sites, trenchless techniques will be	**Screened in** – this development activity carries some risk of

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
including trenchless drilling operations, excavation of the entry/exit pits and changes to the nearshore wave regime and sediment transport patterns due to the presence of nearshore cable protection measures.	used to minimise the impact on seabed sediments. Commitments made within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**.	causing impacts to hydromorphology.
Direct loss of subtidal benthic habitats and species due to placement of hard substrates on the seabed.	Commitments made within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**.	**Screened in** – taken forward to Stage 4 for further consideration.
Introduction and spread of Invasive Non-Native Species (INNS).	Commitments made within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice** and **Application Document 7.5.12 Outline Invasive Non-Native Species Management Plan**.	**Screened in** – taken forward to Stage 4 for further consideration.
Underwater noise impacts due to Project activities e.g. UXO clearance, route preparation, cable installation and project related vessel movement.	Commitments made within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**.	**Screened in** - taken forward to Stage 4 for further consideration, informed by detailed underwater noise assessment.
Offshore Scheme: Operational Phase		
Thermal impacts to fish such as smelt from the operational cable (Osmeridae).	Minimum depth of lowing (DOL) to the top of the cable is 0.5 m (MPE02).	**Screened in** - taken forward to Stage 4 for further consideration following consultation with the EA.
Maintenance activities such as cable repair or part replacement.	Where cables need to be maintained the impact of the repair/replace process will be no greater than that for the construction phase and good practice measures would be adopted.	**Screened out** - it has been assumed that the effects of any maintenance activities would be minor and much less significant than, any of the screened in construction activity effects.

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
Offshore Scheme: Decommissioning Phase		
Increased SSC levels during cable removal. Impacts to water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns.	Where cables are decommissioned by removal, they may need to be pulled or excavated from the seabed and pulled back through the trenchless solution conduit. The impact of the excavation process will be no greater than that for the construction phase.	**Screened in** – this development activity carries some risk of causing deterioration (albeit temporary) of coastal waterbody status and is taken forward to Stage 4 for further consideration.
Kent Onshore Scheme: Construction Phase		
Pollution risk associated with general construction activities.	Adoption of good practice measures to prevent pollution (GG16, GG17), including in an emergency scenario (GG24). Measures to manage worksite runoff/drainage (GG15) and biosecurity (B04), as well as commitments regarding re-instatement (GG07).	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, general construction would have negligible impacts on the screened-in waterbodies.
Consumptive use of water resources	Adoption of water use use efficiency and leakage reduction measures (W15) to reduce consumptive water use.	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, consumptive water use during construction would be managed to have negligible impacts on the screened-in waterbodies.
Construction works in the floodplain of the Stour (for temporary access and for construction of new and works to remove/maintain existing pylons).	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. No construction materials should be stored within Flood Zone 3 (W06).	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, and the small footprint of the works, temporary works in the floodplain would have negligible impacts on the screened-in waterbodies.

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
Construction of foundations.	Design and construction of foundations in accordance with Foundation Works Risk Assessments (GH02) and informed by ground investigations (GH01).	**Screened out –** given the implementation of the good practice measures proposed, this activity would have negligible impacts on the screened in waterbodies.
Soil stripping, handling and storage resulting in silted runoff to waterbodies and changes to runoff rates/patterns.	Management, storage and reinstatement of soils in accordance with good practice (AS01).	**Screened out –** given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, this activity would have negligible impacts on the screened-in waterbodies.
Establishment and use of construction compounds, with associated pollution risks from receipt of site drainage and potential for physical disturbance of riparian corridors.	Compounds located to avoid encroaching into the floodplains and riparian corridors of screened-in waterbodies. Adoption of good practice for construction compound establishment and use (GG15, GG16). Suitable surface water and foul water drainage provision (GG15).	**Screened out** – given the implementation of the measures in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, construction compounds would have negligible impacts on the screened-in waterbodies.
Construction works in, over, under or adjacent to waterbodies to create temporary drainage outfalls and crossings for construction access (temporary bridge over River Stour), with effects on hydromorphology (physical change), flow regimes and water quality.	Undertaking works in accordance with relevant consents / permits (W01). Temporary crossing design in accordance with good practice (W02, W04). Retaining riparian vegetation and natural substrates through temporary crossing structures (W03).	**Screened in –** this activity carries some risk of causing deterioration (albeit temporary) of waterbody status and is taken forward to Stage 4 for further consideration.
Construction works in, over, under or adjacent to waterbodies for cable trenching with potential effects on water quality associated with soil strip	Undertaking works in accordance with relevant consents / permits (W01). Open cut crossings following good practice techniques (W02).	**Screened in –** this activity carries some risk of causing deterioration (albeit temporary) of waterbody status and is taken forward to Stage 4 for further consideration.

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
and drilling muds breakout risks.		
Kent Onshore Scheme: Operational and Maintenance Phase		
General maintenance activities.	Maintenance activities would include visual and physical inspections plus testing, repairing and replacing substation and converter station equipment as necessary. Overhead line sections would be inspected annually from the ground or by air to check for visible faults or signs of wear. Maintenance activity along the proposed cable routes would generally be limited to non-intrusive inspections and cable repairs. Any works involving breaking ground would be subject to similar environmental safeguards as described for construction.	**Screened out –** due to the nature of the maintenance activities there would be a negligible risk of causing deterioration of waterbody status.
Permanent outfalls and drainage discharges from Minster Converter Station and Substation, including potential for discharge of firefighting runoff.	Surface water drainage managed using SuDS in accordance with policy and guidance requirements of the LLFAs (W11). Drainage system design to include ability to isolate and prevent discharges from outfalls. These controls (mandated under National Grid Technical Specifications) would be implemented to prevent discharges of firefighting runoff into the receiving water environment.	**Screened out** – given the implementation of the SuDS, and the ability to contain runoff on site in the event of a fire, operational drainage discharges would have negligible impacts on the screened-in waterbodies.
Kent Onshore Scheme: Decommissioning Phase		
Temporary site compounds and other enabling works would be similar to those used during the construction phase. Temporary site compounds required for decommissioning of the	Compounds would be located to avoid encroaching	**Screened out -** it has been assumed that the effects of the decommissioning activities would be similar to, but less significant

Proposed Project Activities / Component	Proposed Measures to prevent Waterbody Deterioration	Screened In/Screened Out of Stage 4
substation and converter station sites would be located in the same location as during construction.	into the floodplains and riparian corridors of screened-in waterbodies. Adoption of good practice for construction compound establishment and use (GG15, GG16). Suitable surface water and foul water drainage provision (GG15).	than, any of the screened in construction activity effects.

3.3.8 Decommissioning activities have not been screened in to this assessment for the Suffolk and Kent Onshore Schemes. It has been assumed that the effects of the decommissioning activities would be similar to but less significant than any of the screened in construction activity effects. The decommissioning process is too far in the future to assess any activities further, as the regulations that may be in place at that time are currently unknown.

4. Stage 4 – WFD Assessment

4.1 Approach

4.1.1 For the Proposed Project activities and components screened in, an assessment has been undertaken to determine whether the Proposed Project is likely to result in failure to meet the WFD objectives comprising:

- failure to prevent any deterioration in the status of a waterbody;
- failure to achieve good ecological status or good ecological potential;
- prevention of implementing any of the mitigation measures specified in the Anglian and South East RBMPs or detailed on the Environment Agency's Catchment Data Explorer website; and
- non-compliance or compromised implementation of other legislations.

4.1.2 The assessments have been informed by the results of desk studies, field surveys and underwater noise modelling.

4.1.3 For the Suffolk and Kent Onshore Schemes, the assessment applies a traffic light system (red, amber, green) for screening the potential for risk at a local scale and/or for cumulative effects on the WFD objectives noted in paragraph 4.1.1 above (Environment Agency, 2016b). The traffic lights have been assigned under the Environment Agency's system of WFD risk screening for physical works in rivers, defined as any activities that alter the physical form of a river and/or its flow regime. The system considers if the proposed activities meet with specified risk screening thresholds. Activities with an amber or red rating require further review as part of a Stage 4 assessment.

4.1.4 For the Offshore Scheme in accordance with EA guidance for completing WFD assessments for coastal and transitional waters (Environment Agency, 2017) and the Planning Inspectorate's Advice Note Eighteen a three-stage approach has been adopted:

- Stage 1: Screening;
- Stage 2: Scoping; and
- Stage 3: Impact Assessment which is a detailed assessment of the water bodies and activities carried forward from the WFD screening and scoping stages.

4.2 Assessment

Suffolk and Kent Onshore Schemes

Traffic Light Classification

4.2.1 Green or low risk activities are described as "*posing a very low risk to the delivery of WFD objectives*". The guidance notes that no further (additional) WFD risk assessment is required for these activities. Amber activities are described as:

"*In general, posing a low risk to the delivery of WFD objectives. However, in certain sensitive or critical locations, they could pose a potential risk*". Red activities "*could pose a risk to the delivery of WFD objectives*".

4.2.2 The Proposed Project construction phase activities screened in for the Suffolk and Kent Onshore Schemes at Stage 3 have the following classifications:

- Temporary River Stour bridge for temporary construction access - Amber (set-back embankments >20 m but <200 m in length and bridge crossing which is not covered by the Environment Agency's flood defence consenting low risk checklist for service crossings).
- Temporary drainage outfalls – Green (where Environment Agency flood defence consenting low risk checklist criteria for small outfalls are met), otherwise Amber. At this stage of design development, it is not conclusive as to whether all outfalls would satisfy the 'green', low risk criteria, therefore this activity is assigned 'Amber' as a precautionary approach.
- Trenchless crossings of watercourses for cable installations - Green (where Environment Agency flood defence consenting low risk checklist criteria for service crossings below the bed of a main river not involving an open cut technique are met), otherwise Amber. The cable would be installed using a trenchless method under three ordinary watercourses in the Hundred River catchment and five ordinary watercourses in the Monkton and Minster Marshes waterbody catchment. However, this construction method is considered impractical in all areas due to the large compounds required either side of any waterbody to send and receive the drill, and the fact that such crossing methods would take significantly longer (given the number of waterbodies to be traversed, particularly in Kent) than a quicker open cut method and therefore extend the overall duration of disruption.
- Trenched crossings of watercourses for cable installations – Green where works (including coffer dams and/or flow diversions via flumes or over-pumping) are not in place for more than six months and there is no residual impact once the works are complete. Control of fine sediment releases is key to ensuring no residual impacts. The duration of trenched crossings of watercourses for the Proposed Project cable installation would vary, depending on factors such as the length of crossing and local geology but would be expected to meet these criteria. A suite of measures for sediment control would be put in place, as documented in measure W02 of the CoCP and as secured by measure B08 of the CoCP, where over pumping is required, pumps would be fitted with suitable screens to prevent injury to fish or eels, with a watching brief and fish rescue where required.
- Temporary culverting of watercourses for access – Red is assigned to all culverts, whatever the length or extent, under the Traffic Light Classification. Installation of culverts is classified as a high risk activity due to the impact on the WFD classification elements.

4.2.3 The Proposed Project operational phase activities screened in for the Suffolk and Kent Onshore Schemes at Stage 3 have the following classifications:

- Permanent River Fromus bridge for access into proposed Saxmundham Converter Station site in Suffolk, both design options – Amber (set-back embankments >20 m but <200 m in length and bridge crossing which is not covered by the Environment Agency's flood defence consenting low risk checklist for service crossings).
- Permanent culverting of watercourses for access – Red is assigned to all culverts, whatever the length or extent, under the Traffic Light Classification. Installation of culverts is classified as a high risk activity due to the impact on the WFD classification elements.

4.2.4 As detailed in Appendix A, National Grid has included a suite of embedded and good practice measures into the Proposed Project. These measures ensure that the activities classified as amber and red in the traffic light system are carried out in accordance with best practice, reducing the risk of detriment to WFD waterbodies.

Failure to prevent waterbody deterioration and preventing achieving Good Status

4.2.5 To satisfy the WFD objectives of avoiding deterioration and achieving improved waterbody status, to 'Good', it is necessary to implement specific embedded and good practice measures to reduce the detrimental impacts of the red and amber works activities, such that when considered at the waterbody scale, the residual risk of deterioration is negligible.

Bridge rossings

4.2.6 The clear span bridges proposed for the access crossings of the River Fromus in Suffolk (permanent) and River Stour (temporary) in Kent would be designed to avoid and reduce impacts on these waterbodies. The abutments of the bridges would be set back a minimum of 8 m from the river channels at both banks to avoid any physical change to channel form, flow and sediment transport regimes and to reduce effects on their riparian corridors and maintain floodplain connectivity. The set-backs would also reduce any risk of disturbance of fish by noise and vibration during the piling of the bridge abutments, with this risk further mitigated by the commitment to avoid the use of percussive piling techniques, described and secured by measure B10 in the CoCP.

4.2.7 The location proposed for the bridge over the Fromus waterbody is in a section of existing plantation woodland which provides shading that covers approximately 80% of the channel at the crossing site.

4.2.8 The bridge soffits are significantly raised above in channel water levels under both low, typical and flood flow conditions. For the River Fromus bridge, the two design options provide for a soffit height of 4.0 m and 6.0 m above Q95 flow level respectively. The other dimensions of the bridge are the same in both options. The considerable bridge soffit height, combined with a relatively narrow deck width of 6m will help reduce additional shading of the channels and loss of polarised light reflecting off the river (which could impact macrophyte cover and species) as light can enter under the bridge which in turn will help aid the passage of flying aquatic invertebrates and macrophyte growth.

4.2.9 The bridge across the River Stour in Kent will be very similar in design to the existing bridge used for the Richborough to Canterbury overhead line. Observations local to this crossing (51°18'39.9"N 1°20'32.1"E) indicate no significant reduction in vegetation due to shading from the bridge.

4.2.10 It is noted that although the crossing is not classified as 'temporary' in accordance with Environment Agency criteria, the River Stour bridge would only be in place for approximately 2 years, following which the structure would be removed, and any necessary reinstatement works would be undertaken (GG07).

4.2.11 A detailed assessment of the permanent River Fromus crossing, informed by a suite of surveys and a literature review, is presented in Appendix B.

Drainage outfalls/Discharges

4.2.12 Drainage outfalls would be constructed to convey construction drainage to receiving watercourses from permanent operational infrastructure, as well as from temporary elements e.g. construction compounds. Effects on the water quality attributes of receiving watercourses would be prevented by ensuring that prior to discharge, flows are treated, using suitable forms of SuDS, for example, to settle suspended solids. Discharge rates would also be controlled in line with commitment (W11). These measures would combine to prevent scour around discharge outfalls and safeguard receiving water quality and flow regimes/hydromorphology. Outfalls would be designed to exclude eels from accessing SuDS, for example by having outfall pipes situated above the receiving water level in line with commitment B18.

Culverts

4.2.13 Culverts of any length or extent are classified as a red activity given the potential for culverts to result in creation of barriers to the passage of fish and other aquatic organisms, change channel bed/bank form, alter flow dynamics and sediment transport processes, and reduce lateral connectivity between watercourses and their floodplains.

Suffolk Onshore Scheme

4.2.14 Culverts are proposed on 12 ordinary watercourses as part of the Suffolk Onshore Scheme. Nine of these culverts would be temporary, facilitating watercourse crossings by the construction haul road. These culverts would be removed on completion of the Project construction and the watercourses fully reinstated. The remaining three culverts are permanent, facilitating the permanent accesses to the Converter and Substations, as well as for monitoring access off the B1110 (with two options for this access being included for within the DCO application). The watercourses that are proposed to be crossed using culverts are small land drains/ditches, several of which have been observed as dry during site surveys. Their geomorphological diversity and quality is low and their suitability for maintaining populations of fish is very limited. On this basis, well designed culverts (design commitments described further below) are considered to be justified as crossing options for these watercourses, with an associated low risk of adverse ecological, flood risk and geomorphological impacts. The alternative of clear span crossings would require piling activity, a larger temporary works footprint and so increased impact on other aspects of the environment.

Kent Onshore Scheme

4.2.15 Culverts are proposed on 31 ordinary watercourses as part of the Kent Onshore Scheme. Twenty seven of these culverts would be temporary, facilitating watercourse crossings by the construction haul road. These culverts would be removed on completion of the Project construction and the watercourses fully reinstated. The remaining four culverts are permanent, three of which would facilitate permanent accesses and one that is a replacement access to third party land.

4.2.16 The watercourses that are proposed to be crossed using culverts are land drains/ditches that are actively managed by the Stour (Kent) Internal Drainage Board, who are the consenting authority for works to the watercourses. The drains are uniform in their geometry, have a low geomorphological diversity, support flows of low velocity and bed materials are dominated by fine sediments/silt. With regard to their physical dimensions, they are typically 2 to 3 m in width and 1 m in depth.

4.2.17 On this basis, well designed culverts (design commitments described further below) are considered to be justified as crossing options for these watercourses, with an associated low risk of adverse ecological, flood risk and geomorphological impacts. Design parameters for the crossing have been discussed and agreed with the IDB. The alternative of clear span crossings would require piling activity, a larger temporary works footprint and so increased impact on other aspects of the environment.

Culvert Design Commitments

4.2.18 The effects of culverting would be reduced through design. With the exception of dry ditches (observed in the Suffolk Onshore Scheme area) culverts in waterbodies will either preserve the natural bed or be box culverts with inverts sunk a minimum of 300mm below the hard bed of the watercourse with natural/existing bed material placed across the inside of the culvert to lift the level up to meet that of the existing (W03).

4.2.19 New culverts would be sized to maintain the current land drainage regime (W04) and to avoid narrowing of natural channel width. Bankside vegetation would be reinstated at culvert entries and exits following the completion of construction works as soon as conditions are suitable for planting and were identified as necessary, provision for mammal passage would also be included (W13).

4.2.20 During culvert installation there would be a watching brief and fish rescue where required (B08). Where over pumping is required, pumps would be fitted with suitable screens to prevent injury to fish or eels (B08).

4.2.21 Collectively, the measures described above would allow existing hydraulic and sediment transport regimes to be maintained, as well as providing culverts that are passable for fish, and other aquatic species.

4.2.22 The residual effects of the screened in development activities classified as Amber and Red on WFD surface waterbodies within the ZOI are therefore concluded to have a negligible risk of causing waterbody deterioration.

Implementation of mitigation measures specified in the Anglian and South East RBMPs

4.2.23 As detailed in Section 3.2, there are no specific measures set out in the RBMPs to improve the future status of the screened in waterbodies. The Proposed Project activities would not compromise any of the general measures described, which are centered on improving, expanding, and connecting habitats including water and water-dependent environments, and as detailed below, the Proposed Project would deliver overall a long-term net increase in woody and wetland habitats as part of the Kent and Suffolk Onshore Schemes.

Compromised implementation of other legislation

4.2.24 The project's compliance with other legislation and planning policy is described in ES **Application Document 6.2.1.2 Part 1 Introduction Chapter 2 Regulatory and Planning Policy Context**. This and the Planning Statement (**Application Document 7.1**) conclude that the Project does not compromise implementation of other legislation, including the Salmon and Freshwaters Fisheries Act 1975, nor cause non-compliance with relevant legislation.

Contributing towards improvement in waterbody status

4.2.25 It is proposed as part of the Kent Onshore Scheme to deliver a series of small shallow riverside scrapes with riparian planting, and some alder and willow planting, along the River Stour within the OL, before the end of the Proposed Project's construction, increasing the ecological value of what is currently (north of the River Stour) a predominantly arable landscape.

4.2.26 In addition, invasive water fern (Azolla filiculoides) has been recorded in several ditches within the Monkton and Minster Marshes waterbody catchment. This fern can be managed by introducing the Azolla weevil[2], which consumes the fern but then dies and is consumed by fish. Therefore, as part of the Kent Onshore Scheme the Azolla weevil will be released into the watercourses to control the invasive fern; this will be targeted to locations where the infestation is greatest and control therefore most beneficial.

4.2.27 Details of the above measures are set out in **Application Document 7.5.7.2 Outline Landscape and Ecological Management Plan – Kent** and will be secured via DCO Schedule 3 Requirement 6.

4.2.28 The Proposed Project will deliver enhancement of an approximately 500m stretch of the riparian corridor along the River Fromus from approximate grid reference TM 38806 62412 to TM 38825 61847. Within this stretch (although not for its entire length) there will be reprofiling selected areas of the banks of the River Fromus at specific locations (where it would not for example require displacement of water voles) to create an approximately 50cm wide berm just above the typical summer water level. This berm will be planted with riparian vegetation. This will enhance the value of the River Fromus since this stretch of the river has little riparian emergent vegetation. The replanting will be focused on the new bridge partly in order to improve connectivity beneath the bridge structure. However, other stretches will also be diversified. Details are set out in **Figure 1 Application Document 7.5.7.1.1 Saxmundham Converter Station Outline Landscape Mitigation** and the commitment will be secured via DCO Schedule 3 Requirement 6.

Offshore Scheme

4.2.29 The Offshore Scheme passes through coastal and transitional waters at both nearshore locations at the landfalls, in Suffolk and in Kent. As per guidance provided by the Environment Agency (2023), the following receptors are considered for impacts to coastal and transitional waters and assessed in subsequent sections:

- Hydromorphology;
- Biology: seabed habitats and fish;
- Water quality: resulting from accidental spills and discharges and mobilisation of contaminated sediments;
- WFD protected areas; and
- Invasive non-native species (INNS).

4.2.30 As described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**, in the event that, at some future date, the authorised development, or part of it, is to be decommissioned, a written scheme of decommissioning would be submitted for approval to the relevant planning authority at least six months prior to any decommissioning works, as set out in Requirement 13 in

[2] https://www.cabi.org/what-we-do/cabi-centres/azolla-control/

Schedule 3 of **Application Document 3.1 Draft Development Consent Order**. The decommissioning works would follow National Grid's processes at that point in time, for assessing and mitigating any environmental impacts

Hydromorphology

4.2.31 Hydromorphology is defined as the physical characteristics of the coast and includes the size, shape and structure of the waterbody, and also the flow and quality of water and sediment. Potential impacts on hydromorphology include changes to morphological conditions (e.g., depth variations, seabed and intertidal zone structure etc.) and tidal patterns (e.g., dominant currents, wave exposure etc.).

Suffolk Landfall

4.2.32 In Suffolk, trench excavation and cable trenching will be limited to the subtidal area, temporarily affecting the structure of the seabed with trenchless techniques such as HDD, used to bring the HVDC cable onshore. Any resultant changes to the Suffolk Coastal Waterbody will be spatially limited and will not result in significant change to the hydromorphological qualities of the waterbody as a whole.

4.2.1 Coastal erosion and recession processes over the lifetime of the Project have been assessed using modelling, detailed in **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**, and the final engineered HDD solution will address coastal erosion and ensure the cable depth is such it, nor the landfall infrastructure becomes exposed, accounting for the predicted effects of climate change.

4.2.2 There are no in-service crossings currently requiring a crossing structure within the Suffolk ZOI or planned prior to the Sea Link cable installation. Any out of service crossings would be cut and removed, normally by reference to the ICPC guidelines, therefore no protection structures would be required for these.

4.2.3 In the event that a new cable (data or power) was installed prior to the installation of Sea Link, the most appropriate protection would be determined in conjunction with the 3rd party asset owner. The protection could be rock berm, or mattresses and would depend on the location of the crossing and the crossing agreement requirements.

4.2.4 Impacts to the structure of the intertidal zone are avoided in Suffolk, with entry/exit points being located in the subtidal area. Impacts to the seabed at entry/exit points will be temporary and highly localised. The Coralline Crag shoal/outcrop is in close proximity to the west of the Suffolk Landfall and occurs as subcrop to the soft sediments. The Proposed Project is therefore avoiding any pre-cut trenches in the Coralline Crag feature due to the sensitivity of the sediment circulation system. The activities at this location will instead use burial *in-situ* post lay. This involves laying the cable on the sea bed with burial within the underlying soft sediments undertaken at a later date. As stated above, the Coralline Crag will not be damaged during this process. During installation any suspended sediments are expected to naturally disperse. The breakouts will be protected using rock bags or concrete mattresses (**Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**).

4.2.5 The temporary use of rock bags or concrete mattresses at the HDD entry/exit points prior to cable pull in will likely interact with and modify the local nearshore wave regimes and associated sediment transport patterns. This may result in localised scour and

increase the rate and extent of erosion. Post cable pull in, any rock protection required to stabilise the ducts will be buried approximately 0.5 m below the seabed surface.

4.2.6 The coastline at the Suffolk Landfall is considered to be of high sensitivity reflecting the designated status of the environment and the fact that erosion and beach lowering is already taking place at the landfall site. Any rock protection will be installed with as low a profile as possible, meeting with the navigation guidance of not reducing the navigable depth by >5% of the water depth, without the agreement of the appropriate statutory body. This approach will minimise the obstruction to wave and tidal processes to minimise the impact on the coastline. The Suffolk coastline is naturally dynamic and is considered to have sufficient capacity to recover from any indirect effects related to HDD cable installation in the subtidal zone leading to localised (intertidal) morphological changes (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

4.2.7 Publicly available subtidal substrate mapping data, confirmed by project specific subtidal surveys (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic Characterisation Report (Original Report)**) demonstrates that substrates within the Offshore Scheme which intersect the Suffolk Coastal Waterbody are fine sediment with patches of soft circalittoral rock such clay covered by a thin veneer of sand and/or gravel. Between KP1.0 and KP3.2, the presence of soft circalittoral rock was also noted during the most recent Geophysical Survey (**Application Document 6.3.4.2.B Appendix 4.2.B Geophysical Survey Interpretation (Additional Surveys)**), with areas defined as 'encrusted' biogenic habitats, that have the potential to be Annex I *S. spinulosa* reefs that were not noted within the Subtidal Characterisation Survey 2021 (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic Characterisation Report (Original Report)**). Recovery of the structure of the coastal bed after installation is predicted to be rapid (within months) particularly for those substrates which characterise much of the waterbodies. Small bedforms are likely to recover quickly as sediment transport processes continue following the completion of the cable installation. Works at the entry/exit points at the landfall will be temporary, relatively localised and any changes to the intertidal zone seafloor morphology will naturally recover via sediment transport processes driven by wave and current action in shallow waters (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

4.2.8 No significant effects as a result of potential impacts on these aspects of the physical environment, with bearing upon hydromorphology, are identified within the Environmental Statement.

Kent Landfall

4.2.9 The Offshore Scheme crosses the existing Nemo Link subsea cable at KP 113.1 within the Kent North Coastal Waterbody. This crossing has the potential to affect water depth and structure of the coastal bed. The impacts of rock placement from this crossing will be highly localised and will cover an area of up to 5,000 m^2 (<0.001% of the waterbody surface area) and will not affect the status of the Kent North Coastal Waterbody.

4.2.10 Coastal erosion and recession processes over the lifetime of the Project have been assessed using modelling, detailed in **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment** and the final engineered HDD solution will address coastal erosion and ensure the cable depth is such that it, nor the landfall infrastructure becomes exposed, accounting for the predicted effects of climate change.

4.2.11 Publicly available subtidal substrate mapping data, confirmed by project specific subtidal surveys (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic Characterisation Report (Original Report)**) show substrates within the Offshore Scheme which intersect the Kent North Coastal Waterbody as mud and sand.

4.2.12 Due to the extent of the intertidal in Kent, trench excavation and cable trenching will be present within the intertidal mudflats in Pegwell Bay and the subtidal, with trenchless techniques, such as HDD, used to bring the HVDC cable onshore and avoid the sensitive saltmarsh habitat. The cable will be buried to a sufficient depth, to be established during the Front End Engineering Design stage, to avoid future exposure and possible interference with natural processes, such as the migration of low water channels. The sensitivity of the seabed in Kent is assessed to be low due to its ability to recover naturally over the short-medium term (weeks, to months, to <5 years). Any resultant changes to the Kent North Coastal Waterbody or Stour (Kent) Transitional Waterbody will be spatially limited and will not result in significant change to the hydromorphological qualities of the waterbodies as whole.

4.2.13 Impacts to the intertidal area at the Kent Landfall will be temporary and highly localised. The activities at this location will use burial *in-situ* post lay. During installation any suspended sediments are expected to naturally disperse. The breakouts will be protected using rock bags or concrete mattresses (**Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**).

4.2.14 The temporary use of rock bags or concrete mattresses at the HDD entry/exit points prior to cable pull in will likely interact with and modify the local nearshore wave regimes and associated sediment transport patterns. This may result in localised scour and increase the rate and extent of erosion. Post cable pull in, any rock protection required to stabilise the ducts will be buried approximately 0.5 m below the seabed surface.

4.2.15 The Kent landfall site is assessed to have low sensitivity to erosion due to its sheltered setting within Pegwell Bay and historically stable beach levels. Equally, recovery from any damage during the construction phase would be a long-term process highlighting the importance of the CEMP which will ensure such areas are restored, as close as possible, to their original, pre-construction condition. Any rock protection will be installed with as low a profile as possible, meeting the navigation guidance of not reducing the navigable depth by >5% of the water depth, without agreement from the appropriate statutory body. This will minimise the obstruction to wave and tidal processes to minimise the impact on the coastline (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

4.2.16 The potential for impacts on bathymetry, seabed morphology, suspended sediments, and water quality are all appraised in detail in **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**. No significant effects as a result of potential impacts on these aspects of the physical environment, with bearing upon hydromorphology, are identified within the Environmental Statement.

Biology

Habitats

4.2.17 Several impacts associated with installation of the Offshore Scheme have the potential to affect both higher and lower sensitivity habitats. Physical disturbance to substrates will result in some associated disturbance and potential loss of benthic habitats within the footprint of the Offshore Scheme Boundary. In addition, the physical disturbance to

sediments may result in the generation of a sediment plume and subsequent sediment deposition. Based on calculations undertaken in **Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Processes**, although coarse sediments will be deposited rapidly, within the immediate vicinity (within 20 m) of the Offshore Scheme, finer sediments will settle within a maximum distance of 17 km. However, this deposition will be limited to a thickness of less than 0.5 mm on the seabed, which is considered very small and equivalent to natural variability.

4.2.18 Within the Suffolk Coastal Waterbody, no species listed under Annex II of the Habitats Directive (2017a) or species of national conservation importance under Section 41 of the NERC Act (2006) have been identified within the intertidal area during site specific surveys. The survey found that the upper and mid shore was covered in barren shingle, with the lower shore dominated by coarse sand mixed with pebbles. The shallow areas, in the northernmost sections of the Suffolk Landfall route (at a depth of approximately < 5 m), were characterised by areas of fine sediment with patches of soft circalittoral rock such clay covered by a thin veneer of sand and/or gravel. Between KP1.0 and KP3.2, the presence of soft circalittoral rock was also noted during the most recent Geophysical Survey (**Application Document 6.3.4.2.B Appendix 4.2.B Geophysical Survey Interpretation (Additional Surveys)**), with areas defined as 'encrusted' biogenic habitats, that have the potential to be Annex I *S. spinulosa* reefs that were not noted within the Subtidal Characterisation Survey 2021 (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic Characterisation Report (Original Report)**).

4.2.19 The Kent North Coastal Waterbody and Stour (Kent) Transitional Waterbody are located within the Sandwich Bay to Hacklinge Marshes SSSI. This site is designated for the protection of a range of habitats, such as dunes and coastal grasslands above the marine environment, and saltmarsh and mudflats in the intertidal marine environment. The Thanet Coast SSSI, located to the north of the landfall site, is designated for the protection of foreshore habitats, such as sand and mudflats and areas of saltmarsh and coastal lagoons. Saltmarsh identified in the intertidal zone at Pegwell Bay, by the Kent Habitat Survey Partnership (2003), is representative of 'coastal saltmarsh', a habitat of 'principal importance' (HOPI) under Section 41 of the NERC Act (2006).

4.2.20 However, the use of a trenchless technique for the installation of the cable in the transition between the onshore and offshore schemes will avoid the saltmarsh habitat entirely, with the entry/exit points located 105 m to 140 m seaward from the edge of the saltmarsh. There will also be no vessels or vehicles interacting with the saltmarsh and no storage of construction materials would take place on the saltmarsh. The habitats below the saltmarsh are mudflats which is also a habitat of 'principal importance' under Section 41 of the NERC Act (2006).

4.2.21 The area of direct temporary physical disturbance is limited to a maximum width of 25 m if displacement ploughs were to be used during cable trenching activities for the Offshore Scheme, with the area of disturbance being spatially limited and the seabed expected to return to pre-installation conditions under natural processes. For the Suffolk Landfall, there will be a total area of 0.0002 km^2 of disturbance. For the Kent Landfall, there will be a total area of 0.020892 km^2 of disturbance (**Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**).

4.2.22 The primary method of installation across the Suffolk and Kent waterbodies is burial to a minimum depth of 0.5 m. Permanent habitat loss of up to 5,000 m^2 would be present within the Kent North Coastal Waterbody where the Offshore Scheme crosses the Nemo Link subsea cable, a small percentage compared to the remaining habitat within the waterbodies and wider North Sea.

4.2.23 Activities associated with the Proposed Project may disturb sediments, potentially leading to a temporary increase in SSC, turbidity and subsequent sediment deposition. The ZOI for the suspended sediment plume (and therefore potential smothering effects from redeposition) is up to 17 km for fine sediments, such as sand. Areas of lower sensitivity habitat dominate the encompassing waterbodies in Suffolk and Kent, with areas potentially impacted by direct physical disturbance and associated ZOI, small in comparison to the habitats available in the wider waterbody and North Sea (**Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**).

4.2.24 The potential for impacts on intertidal and subtidal habitats is appraised in detail in **Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology**. No significant effects as a result of potential impacts on these aspects of benthic ecology, are identified within the Environmental Statement.

Fish

4.2.25 Diadromous fish carry out seasonal migrations between bodies of freshwater and seawater. Those species known to migrate through the Outer Thames Estuary and adjacent estuaries. These species are:

- The European eel (*Anguilla anguilla*) is a catadromous migratory species, undertaking an extensive migration to spawn in the Sargasso Sea. Eels migrate upstream into freshwater predominately during spring but may continue to do so until early autumn. Once within freshwater habitats, eels remain for five to 15 years before they begin their downstream migration through rivers and estuaries towards spawning grounds, predominately between August and December (Behrmann-Godel & Eckmann, 2003; Chadwick, et al., 2007). European eels are known to migrate into several rivers along the southeast coast of England, within the southern North Sea including the River Thames, River Stour (Essex), River Stour (Kent), and Blackwater River. The closest river to the Proposed Project is the River Stour (Kent) which flows into Pegwell Bay, adjacent to the Offshore Scheme. However, Transitional and Coastal Waters (TraC) data show that European eels have not been recorded in the River Stour (Kent) in the past ten years. However, European eels are known to be present in marshland drainage ditches in the River Stour (Kent) catchment.
- Atlantic Salmon is an anadromous migratory species, which, during its lifecycle, uses both marine and freshwater habitats. Spawning of salmon typically occurs in November or December, in the upper reaches of rivers (Heessen, et al., 2015; NASCO, 2012). After one to five years, the species migrate to the marine environment during spring/summer. Once salmon have spent another one to five years at sea, the adults then return to their spawning rivers, which in the UK usually peaks between June to August and between October to December (Cowx & Fraser, 2003). Salmon typically spend the majority of their time (72% to 86%) in surface waters (0 m to 5 m), but often dive, sometimes to depths of > 20 m (6% to 9% of the time (Godfrey, et al., 2015). Anecdotal evidence suggests that salmon is known to be present in the Kent River Stour (Kent Wildlife Trust, 2021). However, TraC data did not record salmon in any other rivers within the vicinity of the Offshore Scheme between 1992 and 2023 and in general, the East Anglian Region is not considered to have salmon producing rivers (Cefas, 2022) with the nearest designated Principal Salmon River, the River Itchen, is located more than 200 km from the Offshore Scheme (Cefas, 2022).
- Brown trout (sea trout) exhibit a similar life cycle to Atlantic salmon, though the adult marine stage of sea trout is shortened both spatially and temporally, with some

migration back to freshwater environments after only a very short period of time feeding at sea. Adult sea trout returning to freshwater to spawn are more likely to stray from natal rivers compared to salmon. There is limited information on swimming depths for adult sea trout, though available data suggests that while at sea, they spend most of their time at a depth of 20 m or deeper (SAMARCH, 2019). However, when migrating into river systems, they reside generally in shallow waters 0-3 m, with occasional deep dives (Kristensen, et al., 2018). Upstream migration occurs between April and June and downstream migration through spring to early summer. Sea trout are widely distributed across the UK. However, TraC data from 1998 to 2022 recorded very low numbers of brown trout in the Adur, Medway, Stour (Essex) and Thames rivers. There were no individuals recorded in the River Stour (Kent) during the same time period. Few brown trout were recorded in the upper Thames River, with other studies recording this species migrating the tidal Thames (Zoological Society of London, 2016). Overall, the sea trout is reported to attempt to enter most of the south coasts river (Environment Agency, 2011) although numbers are lower in recent years (Environment Agency, 2011).

- Sea lamprey and river lamprey are both anadromous migratory species. After spending several years in the marine environment, adults return to freshwater to spawn in spring and early summer. Sea lampreys are widely dispersed in the open sea as they are solitary feeders, being rarely found in coastal and estuarine waters (Moore, et al., 2003). The distribution of sea lamprey is chiefly defined by their host river (Waldman, et al., 2008) and in offshore waters they are often found at considerable depths (Moore, et al., 2003). In contrast, river lampreys are usually found in coastal waters, estuaries and accessible rivers and juveniles are often found in large congregations (Maitland, 2003). Distribution in the UK appears to be mainly in Wales, Northern Ireland and southern Scotland. Both species have been previously reported in low numbers within the Thames estuary (Zoological Society of London, 2016). Although the EA NFPD freshwater fish data recorded a total of 98 lamprey sp. within the River Stour (Kent) between 2010 and 2023, however, TraC data did not record lamprey species in any of the rivers within vicinity of the Offshore Scheme between 1992 and 2023.
- The European smelt (*Osmerus eperlanus*) is an anadromous species that is occasionally recorded in inshore waters but is most commonly found in lower river reaches and upper estuarine habitats (Heessen, et al., 2015). Smelt migrate into estuaries where they congregate in large shoals in lower reaches of an estuary to feed before moving to freshwaters to spawn in spring (Maitland, 2003); post-larval juveniles then use estuarine nursery habitats. Smelt are thought to return to their natal river to spawn, although the degree of fidelity may not be as strong as other species such as Atlantic salmon (Torrissen, et al., 2013). It is believed that adult smelt aggregate in the lower Thames estuary, in February and March, before commencing their upstream migration to spawn in March and April. TraC data from 2013 to 2023 recorded high numbers of smelt across the ZOI However, only five smelt were recorded in the River Stour (Essex) between 2013 and 2023, with no individuals recorded in the River Stour (Kent). A breeding population of smelt is also known to be present in the Ore & Alde estuary (Maitland, 2003).
- Allis shad (*Alosa alosa*) and twaite shad (*Alosa fallax*) are very similar species, both members of the Clupeidae family. They occur in shallow coastal waters and estuaries but migrate further upstream to spawn in freshwater during late spring (April to June) (Maitland, 2003). Spawning sites were historically recorded for allis shad in many rivers, including the Thames, although they are not thought to spawn there now (Zoological Society of London, 2020). Twaite shad is recorded as

migrating through the Tidal Thames (Zoological Society of London, 2020). However, this species has been found in low abundance within the Outer Thames Estuary (Galloper Wind Farm Ltd, 2011). TraC data between 1992 and 2023 showed a single Allis shad recorded in the River Stour in 2011 and a single Twite shad recorded in the River Alde in 2011. These data suggest that both shad species are present in low abundance within the vicinity of the Proposed Project. The presence of shad at sea is very poorly understood, but the species appears to be mainly coastal and pelagic in habit (Maitland, 2003).

4.2.26 Migratory fish are not considered to have functional associations with seabed habitats due to their life history strategies and transient presence within the Offshore Scheme therefore potential effects of habitat disturbance and/or loss are not considered for this receptor group. All other potential for impacts on diadromous are outlined in the sections below and are also appraised in detail in **Application Document 6.2.4.3 Part 4 Marine Chapter 3 Fish and Shellfish Ecology** with no significant effects identified.

Temporary increase in SSC and subsequent sediment deposition leading to increased turbidity

4.2.27 The increase in SSC, turbidity and deposition has the potential to be a barrier to migration between marine and freshwater environments. Salmonids can be sensitive to increased SSC through the reduce vision of prey (Abbotsford, 2021) whilst some species may avoid areas of high SSC and prevent fish from migrating into rivers (Kjelland, et al., 2015).

4.2.28 Based on sediment modelling, the ZOI for the suspended sediment plume (and therefore potential smothering effects from redeposition) is up to 17 km for fine sediments. However, SSC levels generally remained below 300 mg/l, with high concentration only occurring in the first 24 hours of disturbance. SSC concentration of 100 mg/l were recorded as far as 11 km for fine sand, but these distances were associated with the resuspension of sediment at multiple locations, due to tidal currents, rather than a single large plume (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

4.2.29 The Offshore Scheme located in the vicinity of several estuaries and rivers including the River Thames, Thames Estuary, River Stour (Essex and Kent), River Blackwater, River Alde and River Orewall, which are used by migratory fish such as salmon, brown trout, sea and river lamprey, European eels and allis and twaite shad and smelt. The closest river to the Proposed Project is the River Stour (Kent) which flows into Pegwell Bay, adjacent to the Offshore Scheme. This river is known to be ultised by low numbers of Atlantic Salmon and lamprey. Therefore, the increase in SSC, turbidity and deposition associated with the construction activities of the Offshore Scheme has the potential to be a barrier to migration between marine and freshwater environments.

4.2.30 Migratory fish, have been shown to spend the majority of their time in the upper reaches of the water column, so are unlikely to encounter mobilised sediment which are expected to occur closer to the seabed. Furthermore, the increase in SSC from installation will be very temporary, with most SSC returning to background conditions within 24 hours (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**). The SSC will also be comparable to natural variations in sediment concentration in estuaries, which can be very high during periods of high turbidity.

4.2.31 Therefore, due to the low numbers of diadromous fish considered to be present, the short-term nature of any increase in SSC occurring during installation of the cable and

the relatively low predicted concentrations of SSC compared to natural variability, the effects of increased SSC on diadromous fish is predicted to be negligible.

Underwater sound

4.2.32 Vessel activity and cable installation activities could generate underwater noise which has the potential to directly affect fish. Sensitivity to underwater noise varies according to the frequency. For most fish, noise above 1 kHz is not audible (Popper, et al., 2014). This suggests that of the activities associated with the Proposed Project, only sub-bottom profiling survey activities that may be required during pre-installation geophysical surveys, and the use of some vessels, are thought to generate noise that may impact fish species.

4.2.33 Fish have been grouped into three hearing groups by Popper *et al.,* (2014), based on their physiology:

- **High hearing sensitivity fish** – this group use a swim bladder or other gas volume to detect sound, perceiving both sound pressure and particle motion. These fish are vulnerable to barotrauma and sensitive to a broad frequency range (several kHz). Migratory species in this category include Allis shad and twaite shad;
- **Medium hearing sensitivity fish** – includes fish with swim bladders that do not aid in hearing. These species can detect particle motion but not sound pressure, and while still susceptible to barotrauma, they are sensitive to a narrower frequency range. Migratory species in this category include Atlantic salmon, sea trout, European smelt (*Osmerus eperlanus*) and European eel; and
- **Low hearing sensitivity fish** – this group lack a swim bladder or other gas chamber. They detect only particle motion and are less prone to barotrauma. Migratory species in this category include lamprey.

4.2.34 The impact of underwater sound varies depending on several factors, including the intensity and nature of the sound produced, the distance of the receptor from the source, and environmental variable including water depth and seabed features. Potential effects are:

- Physical injury, such as barotrauma (e.g., swim bladder rupture), which can be fatal, is generally limited to extreme cases where fish are exposed to very high sound pressure levels. There are however, no sound sources in the Proposed Project expected to result in such effects;
- Auditory damage – high-intensity or very long duration underwater sound can physically damage auditory structures (Parvin, et al., 2006). This can be permanent damage or injury, or it can result in a temporary threshold shift; and
- Behavioural responses – these include changes in movement patterns, migration, feeding, breeding, and potential displacement from critical habitats.

4.2.35 The noise generated by SBP activities will be in a frequency range of 0.5 to 12 kHZ. A standard geometric spreading calculation, using a wave mode coefficient of 15 was used to determine the propagation of underwater sound from the SBP. The distance at which the injury and behavioural disturbance threshold is met is 46 m and 54 m respectively. From these calculations, injury and disturbance ranges are extremely limited where fish more likely to be disturbed by the presence of oncoming vessels. The noise generated by SBP activities will be temporary, only associated with installation works and vessels associated with activities are expected to be continuously moving.

4.2.36 Therefore, sources of underwater sound are not anticipated to act as a barrier to migration as the underwater noise generated will be transient and short term and highly localised to the vessel itself. Moreover, diadromous fish are expected to have moved away from any sources of underwater noise before entering the potential injury zone, returning to normal activities once the sound source has stopped/moved away.

Potential effects due to subsea cable thermal emissions

4.2.37 Diadromous species, such Atlantic salmon, European eel, and smelt, are sensitive to temperature changes, which can influence migration timing and routes (Jonsson & Jonsson, 2009; Righton, et al., 2016). Based on heat dissipation modelling was undertaken for a similar cable installation project (AECOM, 2022), it is considered that any temperature increase associated with the Offshore Scheme will be limited to approximately 3°C. However, seawater at the seabed surface will have a cooling effect and will dissipate any temperature increases further. Studies show that localised temperature increases near the seabed have minimal effects on diadromous species such as European eel compared to seasonal changes in water temperature and currents (Westerberg & Lagenfelt, 2008). Therefore, while the upstream migration for some diadromous species such as smelt in known to be controlled by temperature (Jörg, et al., 2007), the increase in sediment temperature from the Offshore Scheme will be minimal and extremely localised and is not expected to effect the overall surrounding water column in which diadromous species would occur.

4.2.38 The closest migration route is via the River Stour (Kent) located near the landfall at Pegwell Bay. The Kent landfall and approaches are the areas where migration routes may be crossed in shallow water. Smelt migrate through estuaries using selective tidal stream transport, and will seek refuge on the seabed in the coastal area when tidal movements inhibit their migration and to conserve energy, and will be vulnerable to thermal elevation at the seabed. However, given the that no smelt were recorded in the River Stour (Kent) by TraC data from 2013 to 2023, and that thermal emissions are likely to be limited to the cable itself, potential to effects to smelt are considered to be negligible.

4.2.39 Moreover, as temperature increases will be extremely limited, no barrier effects are expected to occur, and since other diadromous species primarily inhabit the upper water layers during migration, and can move freely in the water column, their exposure to such localised thermal emissions is negligible.

4.2.40 Additionally, as any thermal effects have been concluded to be extremely limited to the cable itself and of a negligible magnitude, any integration with thermal plume discharges during the operation of Sizewell B and Sizewell C are not considered to be significant as these developments are located over 5 km from the Offshore Scheme.

Disturbance due to subsea cable EMF emissions

4.2.41 Artificial EMF exposure has been linked to various impacts on marine ecological receptors. While the effects on migratory fish are not fully understood, literature suggests that significant responses are likely to be limited and confined to the immediate vicinity of the cable. Diadromous fish, such as European eels, have shown directional and behavioral changes, like reduced swimming speed, in response to magnetic fields (Westerberg & Lagenfelt, 2008; Westerberg & Begout-Anras, 2000). However, studies of juvenile salmon crossing cables emitting EMF found no significant behavioral changes or impacts on migration success (Wyman, et al., 2018). Similarly,

biotelemetry studies of migrating European eels indicated that subsea cables did not pose a major barrier to movement, with only minor directional shifts observed in a small number of fish (Westerberg & Begout-Anras, 2000). Based on these studies, diadromous fish are considered to have low sensitivity to EMF exposure.

4.2.42 The increase in background EMF resulting from the Proposed Project is expected to be confined to a very limited area around the cables. The closest migration route is via the Kent River Stour located near the landfall in Pegwell Bay. The Kent landfall and approaches are the areas where migration routes may be crossed in shallow water. However, the EMF levels at 5 m water depth, based on a burial depth of 1 m, were calculated to be 1.44 µT. Moreover, the actual EMF levels are expected to be even lower, as the Proposed Project has committed to a burial depth of 1 m to 2.5 m throughout most of the Offshore Scheme. Consequently, the area where EMF emissions from the cables have the potential to affect diadromous fish is extremely limited and is not expected to cause any barriers to migration.

4.2.43 In addition, laboratory studies have investigated the effects of EMF exposure on eggs, larvae, and juveniles across various fish species. Bochert and Zettler (2004) found no impact on juvenile flounder survival after exposure to 3,700 µT for four weeks. Similarly, Woodruff et al. (2012) reported no significant effects on Atlantic halibut larvae survival at 3,000 µT over 27 days, and Fey et al. (2019) observed no significant effects on rainbow trout eggs and larvae exposed to 10,000 µT for 36 days. However, the magnetic field strengths in these studies are significantly higher than would be encountered near the cable route. A recent review (Copping, et al., 2020) supports this, suggesting that the maximum levels produced from bundled cables of the Offshore Scheme (i.e. 51.5 µT at a burial depth of 1.0 m when the receptor is at seabed level) are unlikely to deter animals from their habitats or affect migration, with no significant effects reported on eggs, larvae, or juvenile fish. Therefore, the overall magnitude of impact from EMF emission to fish and shellfish is considered to be negligible.

Water quality

4.2.44 Changes to water quality could impact all four waterbodies in Suffolk (Table 3.4) and Kent (Table 3.5) due to the release of drilling fluid. Embedded mitigation is detailed within each technical chapter within Volume 6 and outlined in **Application Document 7.5.3.1 CEMP Appendix B Register of Environmental Actions and Commitments (REAC)**.

Accidental spills and discharges

4.2.45 Drilling fluid discharges from the Proposed Project trenchless techniques, such as HDD operations, will be single events over a short period of time. All drilling fluids used, such as bentonite, will be selected from the OSPAR List of Substances/Preparations Used and Discharged Offshore (2021) which are considered to ‘Pose Little or No Risk to the Environment’ (PLONOR).

4.2.46 During drilling activities at both landfalls, if surface frac out or break outs occur the drilling would immediately stop to prevent any further fluid being pumped. A sump would be dug, or sandbags positioned, to contain the fluid. It would then be pumped back to the HDD site or transported by tractor and bowser. Any bentonite frac out in freshwater environments would be removed from the floor of the pond, stream or drain by suction hoses. Following clean-up of the frac out, the drill would be restarted to test if the bentonite drilling fluid has sealed the zone. If the zone has not sealed lost circulation material (LCM) can be pumped, allowed to set, then tested. This process may need to

be repeated a number of times. In extreme cases cementitious grout may need to be pumped into the zone and allowed to set to affect a seal.

4.2.47 At the Suffolk Landfallit has been estimated that up to 7,240 m^3 of drilling fluid will be discharged wit the entry/exit points are located in approximately 7 m below lowest astronomical tide (LAT). Some particulates from the drilling muds may settle, but the presence of fine sediment habitats at the HDD entry/exit points coupled with the generally dynamic nature of shallow coastal waters, there is likely to be natural resuspension distribution of sediments occurring due to tides and wave action.

4.2.48 At the Kent Landfall, it has been estimated that up to 40 m^3 of drilling fluid will be discharged. The presence of intertidal mudflat at the HDD entry/exit points indicate that the landfall location is comparatively more sheltered from wave action. However, the volume of HDD drilling fluid will be very limited and the regular tidal movement in the intertidal zone acting to disperse and dilute any drilling fluid released. Where entry/exit points are in the intertidal area (i.e. at the Kent Landfall) drilling fluid will be captured where possible (control measure LVS05 in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**).

4.2.49 Therefore, the impact of changes to marine water quality during from the use of drilling fluids is considered to be limited and due to the temporary nature of HDD activities effect are assessed as not significant.

Contaminated sediment

4.2.50 Marine sediment quality can be affected by the deposition and subsequent accumulation of substances on the seabed. Historically, English nearshore and offshore waters have been heavily impacted by anthropogenic activities, such as dredging, which can result in sediment resuspension and the associated release of chemical pollution.

4.2.51 Metals occur naturally in the marine environment and are widely distributed in both dissolved and sedimentary forms. Rivers, coastal discharges and the atmosphere are the principal modes of entry for metals into the marine environment, with anthropogenic inputs occurring as a result of industrial and municipal wastes. The metals most characteristic in marine sediments include barium (Ba), chromium (Cr), lead (Pb) and zinc (Zn). Trace metal contaminants are most prone to various environmental interactions and transformations (physical, chemical and biological), potentially increasing their biological availability.

4.2.52 Increased levels of Polycyclic Aromatic Hydrocarbons (PAH) concentration and chromium (Cr) were recorded during the Project specific subtidal 2021 survey in the region of the Suffolk Coastal Waterbody which exceeded Cefas Action Level 1 (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic Characterisation Report (Original Report)**). Route preparation and cable installation activities in this area, including any maintenance, have the potential to increase SSC as the seabed is disturbed, leading to increases in turbidity and potential mobilisation of contaminants.

4.2.53 The Project specific subtidal survey 2021 also identified elevated levels above the CEFAS AL1 of Arsenic (As) in the Kent North Coastal Waterbody (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic Characterisation Report (Original Report)**).

4.2.54 Particle-Size Analysis (PSA) at taken from the grab station closest to the Suffolk Coastal Waterbody during the 2021 subtidal survey recorded 56% Sand, 25% silt and 19 % clay (**Application Document 6.3.4.2.A Appendix 4.2.A Benthic**

Characterisation Report (Original Report)). PSA at taken from the grab station in the Kent North Coastal Waterbody recorded 24% gravel and 76% sand. Based on calculations of fall velocity, the maximum distance travelled by larger fractions of sands and gravels is expected to be approximately 20 m and will subsequently be re-deposited either directly back into the trench or within a few meters of the area of disturbance within timescales in the order of seconds to tens of seconds having a very localised effect (**Application Document 6.2.4.1 Part 4 Marine Chapter 1 Physical Environment**).

4.2.55 Disturbance of seabed sediments associated with the screened in construction phase activities may result in the mobilisation of sediment-bound contaminants into the water column, with potential to cause indirect effects on water quality. Exceedances of Cefas Action Level 1 were recorded for sampling stations within the region of both the Suffolk Coastal Waterbody and Kent North Coastal Waterbody. However, there will be a limited spatial extent of construction activities within the Offshore Scheme which will limit the potential area in which to disturb sediments. The dominant sediment types along the route are sands, which are generally mobile and porous and consequently have much lower adsorption of contaminants compared to muds and clays. The limited spatial extent of project activities, combined with the limited spatial extent of sediments with contaminants exceeding Cefas Action Level 1, along with the dominance of sand at these locations and the potential for suspended sediments to be dispersed and diluted rapidly through natural hydrodynamic processes, it is not expected that the potential disturbance of sediment bound contaminants will significantly affect the water quality in the two waterbodies and the potential for impacts on water quality from mobilisation of contaminated sediment during construction are considered not significant.

WFD protected areas

4.2.56 The following WFD protected areas have been identified within the ZOI of the Suffolk Onshore and Offshore Schemes:

- Alde-Ore & Butley Estuaries, Orfordness-Shingles Street, Staverton Park & The Thicks Wantisden Special Areas of Conservations (SAC);
- Alde-Ore Estuary, Sandlings Special Protection Area (SPA);
- Butley River Shellfish Waters; and
- Alde Shellfish Waters.

4.2.57 The following WFD protected areas have been identified within the ZOI of the Kent Onshore and Offshore Schemes:

- Multiple areas of Bathing Water (Table 4.1);
- Margate Shellfish Waters;
- Sandwich Bay, Thanet Coast SAC; and
- Thanet Coast and Sandwich Bay SPA.

4.2.58 A detailed assessment of potential effects to the SACs and SPAs listed above can be found in **Application Document 6.2.2.2 Part 2 Suffolk Chapter 2 Ecology & Biodiversity**, **Application Document 6.2.3.2 Part 3 Kent Chapter 2 Ecology & Biodiversity**, **Application Document 6.2.4.2 Part 4 Marine Chapter 2 Benthic Ecology** and **Application Document 6.2.4.5 Part 4 Marine Chapter 5 Ornithology** corresponding to qualifying features of the sites in the Environmental Statement. A

Habitat Regulations Assessment (HRA) Report has also been prepared for the Proposed Project (**Application Document 6.6 Habitats Regulations Assessment Report**). This report concluded that there would be no likely significant effects on the integrity of European Designated Sites, including those listed above from the Offshore Scheme, and therefore is considered compliant with the EU Habitats Directive (92/43/EEC).

4.2.59 Bathing/shellfish waters are protected to limit *Escherichia coli* and Intestinal Enterococci (IE) levels from impacting human health. There are storm overflows located in Pegwell Bay and the River Stour estuary. These storm overflows can discharge when periods of heavy rainfall overwhelm the sewerage system. However, these outfalls are designed not to affect bathing water compliance. Additionally, the consistent classification of the Bathing Waters in the Kent coastal waterbodies over the last few years (Table 4.1) indicates that the sediment bacterium levels, in close proximity to these Bathing Waters, do not result in a reduction in water quality. On this basis, and due to the temporary nature of any sediment disturbance associated with the Proposed Project activities, it is not anticipated that the Proposed Project will lead to an impact on bacterial counts within the bathing/shellfish waters within the waterbodies.

4.2.60 This assessment concludes in the previous impact assessment sections that activities associated with the Offshore Scheme, and their related impact pathways, will not result in significant effects to any identified receptors (i.e., hydromorphology, habitats and water quality). As a result, it is considered that the Offshore Scheme does not present a risk to any of the qualifying features for which the identified SPAs and SACs are designated or bathing/shellfish waters.

Table 4.1 Water quality classification for bathing waters within the Kent coastal waterbodies

Bathing water	Water quality classification		
	2021	2022	2023
Botany Bay	Excellent	Excellent	Excellent
Broadstairs, Stone Bay	Excellent	Excellent	Good
Broadstairs, Viking Bay	Sufficient	Good	Sufficient
Herne Bay	Excellent	Excellent	Excellent
Herne Bay Central	Good	Good	Good
Joss Bay, Broadstairs	Excellent	Excellent	Excellent
Margate Fulsam Rock	Excellent	Excellent	Excellent
Margate The Bay	Excellent	Excellent	Good
Minnis Bay, Birchington	Excellent	Excellent	Excellent

Bathing water	Water quality classification		
	2021	2022	2023
Ramsgate Sands	Good	Good	Good
Ramsgate Western Undercliff	Good	Good	Good
Sandwich Bay	Excellent	Excellent	Good
St Mildred's Bay, Westgate	Excellent	Excellent	Excellent
Walpole Bay, Margate	Excellent	Good	Good
West Bay, Westagte	Excellent	Good	Sufficient
Westbrook Bay, Margate	Excellent	Excellent	Excellent

Invasive non-native species

4.2.61 The installed cable is expected to require protection at some locations, which will introduce hard substrates in the form of rock protection or mattresses, in habitats dominated by sediments ranging from mud to sand and gravel. This could provide additional habitat for any existing epifaunal INNS populations allowing for localised spreading.

4.2.62 The potential impact of the introduction of INNS via vessel hull or ballast water was considered unlikely and scoped out due to the implementation of control and management measures, including BE01, BE02 and BE03, detailed in **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**, **Application Document 7.5.12 Outline Invasive Non-Native Species Management Plan** and **Application Document 7.7 Marine Biosecurity Plan**.

4.2.63 The presence of additional hard substrate, including the cable itself and cable protection could create habitat for many endemic species, increasing local biodiversity. However, the introduction of hard substrate into an area could also act as artificial reef, providing suitable habitat and therefore an 'ecological stepping stone', facilitating the colonisation of existing or new INNS. Such colonisation could also reduce the amount of available habitat for local, endemic species and have the potential to extend the ranges of species. The introduction of new anthropogenic features in locations near to likely sources of INNS such as harbours, shipyards, and ballast water operations, provide additional surface area for colonisation of INNS, aiding the spread of such species. However, infrastructure associated with cable routes, including cable protection, are limited and restricted to a narrow strip along parts of the cable route. Therefore, although, there are concerns around introduced substrata providing habitat for INNS, acting as a 'stepping stone' and facilitating range extension, particularly given the substantial growth of marine infrastructure in the North Sea, the available field studies of cables indicate a colonisation of the provided new habitat by endemic, rather than invasive fauna (OSPAR Commission, 2023). Moreover, to prevent the potential of any spread of INNS, an INNS Management Plan and Marine Biosecurity Plan will be produced to provide a framework for managing the introduction and spread of INNS associated with the Proposed Project (**Application Document 7.5.12 Outline Invasive**

Non-Native Species Management Plan; Application Document 7.7 Marine Biosecurity Plan).

4.2.64 In addition, although there are several studies indicate that the risk of the establishment of non-native species on hard substrates in subtidal areas, there are fewer when compared to those on structures in the upper part of the water column and in the intertidal zone (Kuhnz, et al., 2015; Sherwood, et al., 2016). Therefore, as subsea cables, and associated protection structures, are almost exclusively laid in the subtidal, it has been suggested that they are less prone to colonisation by non-native species (OSPAR Commission, 2023), and to date, no spread of INNS caused by submarine cabling has been documented (Taormina, et al., 2018) it is considered unlikely that INNS will be introduced to the subtidal environment during the placement of cable protection associated with the offshore scheme.

4.2.65 The only activities occurring within the intertidal area are located at the Kent Landfall. At this landfall, concrete mattresses will be used at HDD entry/exit points over an area of 0.00036 km^2. However, post-construction there will be limited hard structures present within the intertidal, limiting areas of possible colonisation by INNS.

4.2.66 To ensure that the potential impact of INNS introduction is reduced, all rock and concrete mattresses used for cable protection will be clean and from a suitable source (control measure BE03 in **Application Document 7.5.3.1 Appendix A Outline Code of Construction Practice**).

4.2.67 Therefore, it can be concluded that it is not likely that the Proposed Project will influence the introduction or spread of INNS as

4.2.68 The residual effects of the screened in development activities on transitional and coastal waterbodies within the ZOI are therefore concluded to have a negligible risk of causing waterbody deterioration.

4.3 Cumulative Assessment

4.3.1 Several ‘other watercourses’ (i.e. not designated as WFD waterbodies) within the ZOI would be crossed by the underground cable trenches using opencut techniques and a number of these minor watercourses would also be temporarily culverted during construction due to the temporary access routes crossings. On a very small number of these, permanent culverts would be introduced.

4.3.2 Cable installation via trenched methods would qualify as a low risk activity, as described in Section 4.2 and the cumulative effects would be reduced by the installation being undertaken along a rolling programme along the cable route, followed by re-instatement, rather than undertaking all of the activity simultaneously.

4.3.1 In the Fromus WFD waterbody catchment 11 temporary crossings for access are proposed, represent a total culverted reach of approximately 132 m. The two proposed permanent culverts represent a total culverted reach of approximately 24 m.

4.3.2 In the Monkton and Minster Marshes WFD waterbody catchment temporary crossings for access represent a total culverted reach of approximately 312 m. The three proposed permanent culverts represent a total culverted reach of approximately 36 m. Although this is a relatively sizeable amount, given the numerous ditches in this environment and the fact that the loss is generally in stretches of 20 m or less, losses from each individual ditch will be small and the vast majority of ditch habitat in the landscape will be preserved intact.

4.3.3 As described, good practice culvert design would be adopted to reduce barrier effects and the cumulative effects of temporary culverting and associated habitat loss would ultimately be reinstated. Gaps in ditch marginal vegetation would either be planted with mature emergent vegetation purchased from nurseries or left to recolonize naturally from the adjacent ditch vegetation. Moreover, the losses documented above are not net losses because there will be habitat creation as part of the Proposed Project and overall the Kent and Suffolk Onshore Schemes will deliver a long-term net increase in wetland habitats.

4.4 Sensitivity Testing

4.4.1 As noted in Section 2.2 the assessment presented within this report is based on the indicative alignment as shown on the General Arrangement Plans (**Application Document 2.14.1 Indicative General Arrangement Plans - Suffolk and Application Document 2.14.2 Indicative General Arrangement Plans - Kent**). However, it should be noted that the permanent aspects of the Proposed Project are not fixed and could be located anywhere within the LoD, as defined on the Work Plans (**Application Document 2.5.1 Work Plans – Suffolk, Application Document 2.5.2 Work Plans – Kent and Application Document 2.5.3 Work Plans - Offshore**).

4.4.2 Sensitivity checks have been undertaken to consider the flexibility provided by the LoD and whether this would change the assessment presented above. This has concluded that when taking account of the embedded and good practice measures described in Appendix A, that changes to the positions of the permanent crossings of the screened in waterbodies would not result in any new impacts, nor increase the risk of waterbody deterioration. Therefore, the objectives of the WFD would not be compromised when considering flexibility provided within the LoD.

5. Conclusion

5.1.1 A screening assessment has been undertaken in relation to the Proposed Project. The WFD waterbodies that were screened in were limited to:

- Hundred River (GB105035046260).
- Fromus (GB105035045980).
- Suffolk Waterbody (GB650503520002).
- Alde & Ore Waterbody (GB520503503800).
- Monkton and Minster Marshes (GB107040019621).
- Kent North Waterbody (GB650704510000).
- Stour (Kent) Waterbody (GB520704004700).

5.1.2 Several watercourses, that are not designated WFD waterbodies, drain to these WFD waterbodies and the potential effects on these watercourses have been considered cumulatively within the assessment of the WFD waterbodies.

5.1.3 Two coastal waterbodies within one nautical mile of the two landfall sites, and a number of project activities have been screened into the WFD assessment for the Offshore Scheme and were considered in Stage 4 of the assessment. Due to the nature of the Proposed Project and the Offshore Scheme, both during construction and operation there is limited potential for project activities to cause future deterioration of coastal waterbodies. Temporary effects during construction would be avoided or extensively reduced by implementing the good practice measures, contained within Appendix A.

5.1.4 The underlying WFD groundwater bodies were scoped out of any further assessment owing to the very limited interactions between the Proposed Project and the waterbodies.

5.1.5 The review of the Suffolk and Kent Onshore Schemes components concluded that the majority of the proposed construction activities qualify as ‘Green’ low risk activities. However a small number of activities classify as potentially posing a risk to WFD objectives (Amber/Red) and several activities associated with the Offshore Scheme were taken forward to Stage 4 of the assessment.

5.1.6 Stage 4 concluded that the residual effects of the activities on the screened in waterbodies would be negligible, following the implementation of the good practice and embedded measures outlined in Appendix A.

5.1.7 This assessment concludes that the project is compliant with the objectives of the WFD, including preventing any deterioration in the status of a waterbody, and when considering the potential for cumulative effects. On this basis, no further assessment is proposed.

5.1.8 Sensitivity checks have also been undertaken to consider the flexibility afforded by the set LoD for the permanent elements of the Project and the Order Limits in relation to land required for construction of the Proposed Project. These concluded that, taking account of the embedded and good practice measures, that the changes to the positions of the temporary crossings of waterbodies would not compromise the objectives of the WFD, nor the conclusions presented herein.

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Appendix A Summary of Embedded and Good Practice Measures

Table A.1 Embedded and good practice measures relevant to the WFD assessment

Ref	Measure	Relevance to the WFD Assessment
Good Practice Measures within CEMP Appendix 1.4.A: Outline of CoCP		
GG03	The CEMP shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Management Plans. The title and contact number of person(s) accountable for issues relating to dust, waste, water, noise, vibration and soil will be displayed at site boundary.	This would manage runoff to prevent pollution of a watercourse in the event of spills or contamination, safeguarding water quality during construction (physico-chemical and biological quality elements).
GG04	A suitably experienced Environmental Manager will be appointed for the duration of the construction phase. In addition, a qualified and experienced Environmental Clerk of Works (ECoW) will be available during the construction phase to advise, supervise and report on the delivery of the mitigation methods and controls outlined in the CEMP. The ECoW will monitor that the works proceed in accordance with relevant environmental DCO requirements and adhere to the required good practice and mitigation measures. The ECoW will be supported as necessary	This would protect waterbodies during construction, safeguarding water quality (physico-chemical and biological quality elements).

Ref	Measure	Relevance to the WFD Assessment
	by appropriate specialists, including ecologists, soils scientist and arboriculturists.	
GG05	Construction workers and maintenance staff will undergo training to increase their awareness of environmental issues as applicable to their role on the project. Topics will include but not be limited to: • pollution prevention and pollution incident response; • dust management and control measures; • location and protection of sensitive environmental sites and features; • adherence to protected environmental areas around sensitive features; • working hours and noise and vibration reduction measures; • working with potentially contaminated materials; • waste management and storage; • flood risk response actions; and • agreed traffic routes, access points, etc.	This would protect waterbodies during construction and maintenance, safeguarding water quality (physico-chemical and biological quality elements).
GG07	Land used temporarily will be reinstated where practicable (bearing in mind restrictions on planting and land use) to its pre-construction condition and use, unless agreed otherwise, save where the DCO provides otherwise, in which case such	This would reduce the long-term impact of the project and help reduce change in pre and post development conditions.

Ref	Measure	Relevance to the WFD Assessment
	reinstatement will be in accordance with the DCO. This is subject to the provisions of Article 27 of the draft DCO. Hedgerows, fences, and walls (including associated earthworks and boundary features) will be reinstated to a similar style and quality to those that were removed where possible, with landowner consultation.	
GG14	Fuels, oils and chemicals will be clearly marked as to their contents and stored responsibly, in a secure, bunded area with an impervious base, away from sensitive water receptors. Where practicable, they will be stored >15 m from watercourses, ponds and groundwater dependent terrestrial ecosystems. Where it is not practicable to maintain a >15 m distance, additional measures will be identified. Any spillages or leaks are to be dealt with promptly, and all waste disposed of in an appropriate manner. Before any tank is removed or perforated, all contents and residues will be emptied by a competent operator for safe disposal at a licensed facility. All refuelling, oiling and greasing of construction plant and equipment will take place in an appropriate bunded area that includes an impervious base and where possible interceptor drains above drip trays and also away from drains as far as is reasonably practicable. All pumps, generators and similarly fuelled equipment are to be placed on drip trays or in a bunded area and all valves, hoses and associated re-fuelling equipment will be regularly inspected and turned off and securely locked when not in use. Vehicles and plant will not be left unattended during refuelling. Appropriate spill kits will be made easily accessible for these activities. Potentially hazardous materials used during construction will be safely and securely stored including use of secondary containment where	This would reduce the risk of pollution, safeguarding water quality during construction (physico-chemical and biological quality elements).

Ref	Measure	Relevance to the WFD Assessment
	appropriate. Stored flammable liquids such as diesel will be protected either by double walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits will be located nearby.	
GG15	Runoff across the site will be controlled through a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding. There will be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of an emergency).	This would reduce the risk of pollution, safeguarding water quality during construction (physico-chemical and biological quality elements).
GG16	Where required, wash down of vehicles and equipment will take place in designated areas within construction compounds. Wash water will be prevented from passing untreated into watercourses and groundwater. Appropriate measures will include use of sediment traps. Ensure there is an adequate area of hard surfaced road between the wash facility and the site exit, wherever site size and layout permits.	This would reduce the risk of pollution during construction, safeguarding water quality (physico-chemical and biological quality elements).
GG17	Where required, wheel washing will be provided at each main construction works compound access point on to the highway. An adequate supply of water will be made available at these locations at all times. Road sweepers will be deployed on public roads where necessary to prevent excessive dust or mud deposits.	This would reduce the risk of pollution from silted runoff during construction and avoid changes to runoff rates/patterns safeguarding water quality (physico-chemical and biological quality elements).

Ref	Measure	Relevance to the WFD Assessment
GG22	A Material and Waste Management Plan will be submitted to and approved by the local planning authority prior to construction as secured by Requirement 6 in the draft DCO. The contractor(s) will maintain and monitor this plan throughout the construction phase and oversee that any sub-contractor(s) adhere to it. The Materials and Waste Management Plan will set out, in an auditable manner, how waste will be reduced, reused, managed and disposed of in accordance with the waste hierarchy. Dedicated areas will be identified on the construction plans to allow materials and wastes to be segregated at source, reducing the risk of damage or contamination.	This would reduce the risk of pollution during construction, safeguarding water quality (physico-chemical and biological quality elements).
GG24	An Incident Response Plan will be developed by the contractor for the construction phase. This will be prepared prior to construction works commencing and thereafter complied with. It will outline procedures that will be implemented in case of unplanned events, including but not limited to site flooding and pollution incidents. Local authorities will be informed of any large scale incidents under the Incident Resource Plan. Smaller scale issues will be recorded in a register that will be made available to local authorities for review on request.	This would reduce the impact of unplanned events on the water environment, safeguarding the water quality, flow regime and hydromorphology of the waterbodies.
GG28	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	This would reduce the risk of pollution during construction and maintenance, safeguarding water quality (physico-chemical and biological quality elements).
B04	To control the spread of invasive weeds in accordance with the Wildlife and Countryside Act 1981, any plant or machinery that	This would reduce the pollution risk associated with

Ref	Measure	Relevance to the WFD Assessment
	has been used in areas infested with invasive species (both terrestrial and aquatic), such as Japanese knotweed and Himalayan balsam, will be thoroughly cleaned. Water used to clean vehicles will be controlled to prevent the spread of the plant (through seeds, rhizomes, fragments, etc.). The area will be cordoned off to prevent any inadvertent spreading.	general construction activities with reference to biosecurity and safeguard biological quality elements.
B08	During culvert installation there would be a watching brief and fish rescue where required. Where over pumping is required, pumps would be fitted with 2mm screens to prevent injury to fish or eels.	This would avoid harm to fish associated with culvert installation and where overpumping is required to install cables.
B10	The foundations of bridges across the River Fromus and the River Stour would use soft-start non-percussive piling techniques to limit disturbance, which would assist in allowing sounds to increase gradually allowing fish in the immediate vicinity to swim away.	This would avoid harm to fish associated with the noise and vibration generated by percussive piling.
B18	Drainage outfalls would be designed to exclude eels from accessing SuDS, for example by having outfall pipes situated above the receiving water level.	This would prevent access to SuDS systems and avoid harm to eels.
W01	All works within main rivers, ordinary watercourses and board drains, will be in accordance with a method approved under environmental permits issued under the Environmental Permitting Regulations by the Environment Agency and /or the relevant secondary consents or permits from the Lead Local Flood Authorities and Internal Drainage Boards.	The project crosses a number of WFD surface waterbodies and other watercourses and this measure would safeguard the water quality, flow regime and hydromorphology of the waterbodies.

Ref	Measure	Relevance to the WFD Assessment
W02	For open cut watercourse crossings and installation of vehicle crossing points, good practice measures will include but not be limited to: • where practicable, reducing the working width for open cut crossings of a main or ordinary watercourse whilst still providing safe working; • installation of a pollution boom downstream of open cut works; • the use and maintenance of temporary lagoons, tanks, bunds, silt fences or silt screens as required; • have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident; • the use of all static plant such as pumps in appropriately sized spill trays; • prevent refuelling of any plant or vehicle within 15m of a watercourse; • prevent storing of soil stockpiles within 15m of a main river (16m where river is tidal); • inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and • 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,	The project crosses a number of watercourses designated as WFD surface waterbodies and several other watercourses that are not designated as WFD waterbodies. No WFD waterbodies would be crossed using opencut techniques for cable installation. These measures would reduce impacts on the floodplain connectivity, safeguard water quality and reduce impacts on hydromorphology during construction for other watercourses, that drain to WFD surface waterbodies.

Ref	Measure	Relevance to the WFD Assessment
	appropriately sized material of similar composition will be used.	
W03	Riverbank and in-channel vegetation will be retained where not directly affected by installation works. Where ditches retaining seasonal flows are crossed, culverts in waterbodies will either preserve the natural bed or be box culverts with inverts sunk a minimum of 300mm below the hard bed of the watercourse and natural / existing bed material placed across the inside of the culvert, to maintain existing channel gradients and habitat for aquatic invertebrates, as well as to ensure continued passage for in channel species.	These measures would reduce impacts on the hydromorphology and biological quality elements of watercourses and ponds effected by construction works.
W04	Where watercourses are to be crossed by construction traffic, measures will include the use of culverts or temporary spanned bridges. Once the culvert is installed, the area above the culvert will be backfilled and construction mats placed over the backfilled area to permit the passage of plant, equipment, materials and people. Culverts will be sized to reflect the span width and the estimated flow characteristics of the watercourse under peak flow conditions and kept free from debris. The installation works would be timed to avoid flood flow conditions where practicable or if periods of work were necessary when higher flow conditions could be expected, suitable pumping provision would be put in place, with standby pumps also made available. Where used, temporary bridges will be designed specifically to consider the span length and the weight and size of plant and equipment that will cross the bridge. The bridge across the River Stour would have a soffit height sufficient to meet with navigational	These measures would reduce adverse impacts on hydromorphology during construction.

Ref	Measure	Relevance to the WFD Assessment
	requirements and in excess of the 0.5% flood level plus 600 m freeboard.	
W06	Where new or additional impermeable surfacing is required on any access tracks, bellmouths and in compound areas e.g. for parking provision, site offices, Sustainable Drainage Systems (SuDS) will be incorporated, appropriate to the existing ground conditions, with infiltration to ground preferred where conditions are suitable. These would be put in place as early activities in the construction schedule so as to avoid or reduce working on land that is prone to waterlogging and flooding. The Proposed Project will incorporate appropriate surface water drainage measures into its final design for the haul roads and access tracks so that they do not lead to a significant increase in flood risk. 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, except in instances where the ground level has been adjusted as part of the Proposed Project subject to the provisions of the draft DCO in Article 27. No construction materials should be stored within Flood Zone 3 and areas of high and medium risk of flooding from surface water, where this cannot be avoided, for example in the River Stour floodplain adequate mitigation measures will be applied. For example, model outputs would inform the placement of soil during construction and soil stockpiles would be aligned in the direction of flow to avoid impeding flood flow routes.	This means that fluvial floodplain flow routes, connectivity and storage within the OL would not be impacted or lost, reducing effects on hydromorphology quality elements.

Ref	Measure	Relevance to the WFD Assessment
W09	In the event of a significant spill during construction or maintenance, all landowners/tenants with a private water supply within 250 m of the spill, will be contacted within 24 hours. An assessment of the likelihood of groundwater contamination reaching identified private water supplies will be undertaken, and where a private water supply is judged likely to be affected, an alternative water supply will be provided, as appropriate and in agreement with the affected landowner/tenant.	This would reduce the impacts on private water supplies due to a pollution event.
W11	Surface water drainage from permanent above ground infrastructure would be managed and treated using SuDS in accordance with policy and guidance requirements of the relevant Lead Local Flood Authorities and would include allowances for climate change in accordance with current (May 2022) Environment Agency guidelines. These SuDS would be maintained over the lifetime of the Proposed Project and the drainage infrastructure would provide the storage necessary to achieve discharges at greenfield rates and would not significantly alter groundwater recharge patterns by transferring recharge quantities from one catchment to another.	This would reduce the risk of groundwater and surface water flows being impacted by above ground features.
W13	Bankside vegetation would be reinstated at culvert entries and exits following the completion of construction works as soon as conditions are suitable for planting and where identified as necessary, provision for mammal passage would also be included.	This would reduce the barrier effects of culverts and ensure habitat restoration as soon as practicable.

Ref	Measure	Relevance to the WFD Assessment
W14	The contractor shall develop a Drainage Management Plan and this must be submitted to the Local Planning Authority for approval prior to construction works for the Proposed Project commencing and thereafter the approved plan shall be complied with, subject to any amendments that are subsequently approved pursuant to Requirement 6 of Schedule 3 of the draft DCO. The plan shall demonstrate how the contractor would manage surface water runoff across the worksite, including details of how offsite impacts would be managed and mitigated.	This would reduce the impact of surface water runoff on receptors from construction activities and during the operational phase.
W16	Water use efficiency and leakage reduction measures would be adopted during the construction phase, such as use of water-efficient fittings (taps, toilets) in site offices and welfare facilities, use of misting/atomising systems for dust suppression, drive-on recirculating systems for wheel washing, and sub-metering to help in detecting leaks where reasonably practicable.	This would reduce consumptive water use and limit impacts on surface and groundwater resources.
GH01	Intrusive ground investigations and assessment will be undertaken prior to construction which will inform appropriate geotechnical design in relation to the site/structure specific ground conditions including ground instability/adverse ground conditions.	This would reduce the risk of groundwater flows being impacted by the development, and ground conditions.
GH02	A Foundation Works Risk Assessment (FWRA) will be undertaken by the contractor where the use of piled foundations are anticipated and at trenchless crossings. The contractor will utilise construction methods such as appropriate piling techniques to minimise and avoid the risk of introducing new contamination (if required), creating new contamination	This would reduce the risk of aquifer bodies being impacted by the above ground development and associated foundations.

Ref	Measure	Relevance to the WFD Assessment
	pathways, and mixing of aquifer bodies. The FWRA would be undertaken once the proposed foundation solutions are known in accordance with Environment Agency guidance 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination'.	
GH05	All materials that could be hazardous to water quality will be stored in suitable areas, more than 8m away from a watercourse, away from site traffic and in containers which are fit for purpose, meeting the requirements of the Control of Pollution (Oil Storage) Regulations. The use and storage of chemicals and fuels will also be controlled and monitored under the Onshore CEMP which will include, for example, protected from vandalism, procedures for good general construction site practices, environmental and waste management procedures, regular vehicle checks, use of spill kits, correct waste storage and disposal, use of oil-water separators as necessary (for example, for drainage from refuelling areas). Any washing of vehicles or equipment will only take place in controlled areas, and wash waters will not be discharged into the water environment. The wash water will be treated and discharged to an approved location.	This would reduce the risk of pollution, safeguarding water quality during construction and maintenance (physico-chemical and biological quality elements).
GH08	A protocol will be developed for dealing with any unexpected contamination.	This would reduce the impact on receptors due to unexpected contamination.
AS01	The Outline Soil Management Plans set out specific guidance in relation to soil handling, including, soil stripping, soil stockpiling and soil reinstatement. These will be updated to Soil Management Plans prior to construction, to include information	This would reduce the risk of topology and soil conditions being disrupted during the development.

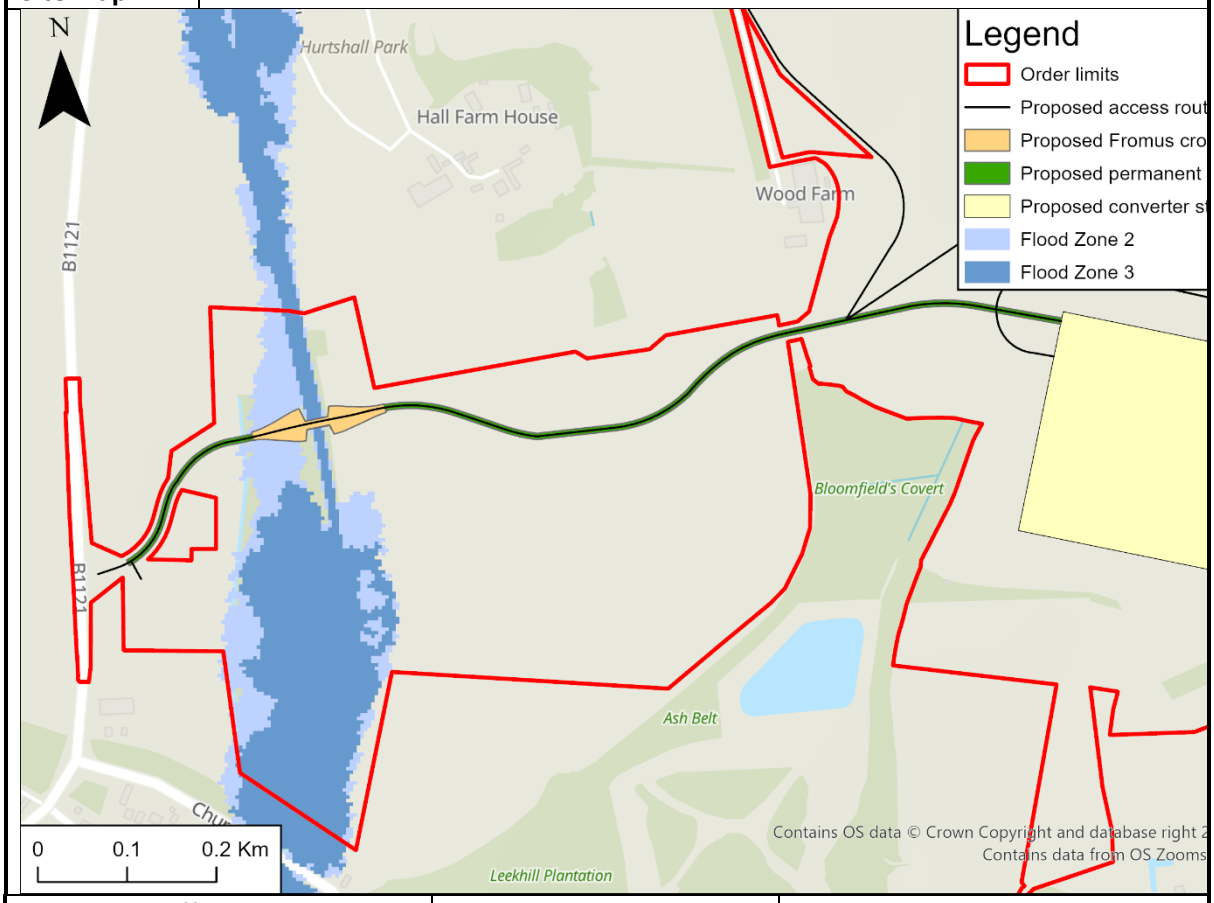
Ref	Measure	Relevance to the WFD Assessment
	from soil and agricultural land classification (ALC) surveys. Measures will include but not be limited to the following: • pre-construction surveys in accordance with published guidance to confirm ALC grade and soil type; • how topsoil and subsoil will be stripped and stockpiled; • suitable conditions for when handling soil will be undertaken, for example avoiding handling of waterlogged soil; • indicative soil storage locations; • how soil stockpiles will be designed taking into consideration site conditions and the nature/composition of the soil; • specific measures for managing sensitive soils; • suitable protective surfacing where soil stripping can be avoided, and weed suppression encouraged, based on sensitivity of the environment and proposed works; • approach to reinstating soil that has been compacted, where required; and • details of measures required for soil restoration.	
MPE02	The minimum depth of lowering (DOL) to the top of the cable is 0.5 m (in areas of bedrock), with a target DOL for the Proposed Project approximately 1 m to 2.5 m, to be achieved where possible dependant on the seabed geology.	This would reduce the physical disruption to the seabed associated with post development.

Ref	Measure	Relevance to the WFD Assessment
BE01	A biosecurity plan will be produced for the project, following the latest guidance on invasive non-native species (INNS) from the Great Britain (GB) non-native species secretariat.	This would ensure that the biodiversity at potential risk due to the development, is protected.
BE02	All project vessels shall adhere to the International Maritime Organisation (IMO) Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines 2011).	This would ensure that vessels are compliant with guidelines, and the impact of vessels on aquatic species is managed.
BE03	Any material introduced into the marine environment, such as rock protection material, will be from a suitable source or cleaned to ensure no INNS can be introduced.	This would ensure that the biodiversity of the marine environment is not impacted by the introduction of INNS.
LVS05	Drilling fluids required for trenchless operations will be carefully managed to minimise the risk of breakouts into the marine environment. Specific avoidance measures would include: • the use of biodegradable drilling fluids (pose little or no risk (PLONOR) substances) where practicable; • drilling fluids will be tested for contamination to determine possible reuse or disposal; and • If disposal is required drilling fluids would be transported by a licensed courier to a licensed waste disposal site.	This will control the release of drilling fluid into the marine environment.

Appendix B Fromus Appraisal

Project details	
Project title	Sea Link
Project description	The Proposed Project involves the reinforcement of the electricity transmission network between Suffolk and Kent, predominantly via offshore High Voltage Direct Current (HVDC) link, but with onshore elements to connect into the transmission network. The Proposed Project is split into three elements: • Suffolk Onshore Scheme • Kent Onshore Scheme • Offshore Scheme This assessment is specific to the crossing of the River Fromus as part of the Suffolk Onshore Scheme. The location of the proposed bridge is as shown in **Application Document 2.14.1 Indicative General Arrangement Plans – Suffolk**. The following options with regards to the proposed bridge over the River Fromus have been considered as part of this assessment (see **Application Document 2.13.1 Design and Layout Drawings – Suffolk – Indicative River Fromus Crossing**): • Option 1 - A bridge height of up to 6 m from the ground level at the abutment to the top of the parapet (which also equates to approximately 6m from the Q95 flow level of the river to the bridge sofit) with 62 m long approach ramps; • Option 2 - A bridge height of up to 4 m from the ground level at the abutment to the top of the parapet (which also equates to approximately 4m from the Q95 flow level of the river to the bridge sofit) with 42 m long approach ramps
Activity type/s	The activity types are summarised below: • From the main access road (B1121) a bellmouth will be created, followed by compound and haul road with access to the proposed River Fromus bridge location. • Bridge foundations and abutments will be constructed, this is likely to be piled foundations (to be confirmed following completion of a Foundation Works Risk Assessment (FWRA), as secured by commitment GH02 within **Application document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice.** • Bridge beams will be installed from the primary access side, formwork will be installed. • The deck will be poured, and parapets installed followed by an approach ramp being constructed and surfaced. • Drainage will be routed either site of the bridge where permanent attenuation and outfall to the River Fromus and ditch west of the river will occur. • The trackway to the proposed Saxmundham Converter Station will be removed. • Once the bridge is in place, a haul road will be constructed to the converter station site to the east of the River Fromus.

Location of the works	National Grid Reference (NGR): TM 38837 62286
Site map	



Waterbody affected	Waterbody name	Waterbody ID
	Fromus	GB105035045980
Length of waterbody affected	A reach of 715 m of the waterbody is included within the Order Limits (shown in red in figure above), however as illustrated in the figure Project works are proposed along a much shorter reach.	
Proposed timing of the works	October 2026 to February 2027	
Proposed duration of the works	The proposed duration of the B1121 to River Fromus Crossing is approximately 4 months.	

Are the works on the exemption list? Yes ☐ No ☒

Are the works temporary? Yes ☐ No ☐ Both ☒

Are the works likely to cause deterioration in waterbody status or prevent the achievement of good ecological potential/status in the future, and therefore is further assessment required?

Yes ☒ No ☐

If the scheme requires further assessment please proceed to Further assessment. Otherwise, please justify your conclusion that the works are not likely to cause deterioration in waterbody status, nor prevent the achievement of good ecological potential/status in the future.

Justification for conclusion of no risk to WFD objectives	
N/A – See Further Assessment	

Further Assessment

Waterbody data	

Fromus Waterbody: Cycle 3 data

- Waterbody type: River
- Hydromorphological designation: not designated artificial or heavily modified.
- Catchment area: 34.568 km^2
- Length: 13.276 km

Ecological status data is from 2022 and chemical status data is from 2019 ('does not require assessment' in 2022).

Ecological overall status: Poor

- Biological quality elements: Poor
- Physio-chemical quality elements: Moderate
- Hydromorphological Supporting Elements: Supports Good
- Supporting elements (Surface Water): N/A
- Specific pollutants: High

Chemical overall status: Fail

- Priority hazardous substances: Fail
  - Benzo(g-h-i)perylene: Good
  - Polybrominated diphenyl ethers (PBDE): Fail
- Priority substances: Good

Objectives:

- Ecological: Good, 2027 – low confidence (disproportionately expensive: disproportionate burdens; Technically infeasible: Practical technical constraints prevent implementation of the measure by an earlier deadline)
- Chemical: Good, 2063 (natural conditions: chemical status recovery time; technically infeasible: no known technical solution is available)

Water Quality Archive:

There are three water quality sampling points along the River Fromus between Gromford and Stenfield:

- R.FROMUS Gromford (AN-FRO040)[3]
- R.FROMUS The Watering Snape (AN-FRO030)[4]
- R.FROMUS Benhall Green Bridge (AN-FRO020)[5]

These sampling points are all freshwater (river) points, with samples taken between 2000 and 2024 over all three.

[3] R.FROMUS Gromford, EA Water Quality Archive, Available at: https://environment.data.gov.uk/water-quality/view/sampling-point/AN-FRO040 [Accessed 10.07.24]

[4] R.FROMUS The Watering Snape, EA Water Quality Archive, Available at: https://environment.data.gov.uk/water-quality/view/sampling-point/AN-FRO030 [Accessed 10.07.24]

[5] R.FROMUS Benhall Green Bridge, EA Water Quality Archive, Available at: https://environment.data.gov.uk/water-quality/view/sampling-point/AN-FRO020 [Accessed 10.07.24]

Benhall Sewage Treatment Works[6] (STW) lies along this stretch of the River Fromus and water quality samples have been taken of the treated effluent from 2000 to 2024. The data is largely incomplete due to the monitoring location being a STW, however both available values – biological oxygen demands and ammoniacal nitrogen – are above the published quality standards.

Fromus Waterbody: Aquatic Macroinvertebrates Surveys

Invertebrate surveys at the proposed crossing location of the River Fromus were completed on 20 November 2023, 28 May 2024 and 28 November 2024. Further macroinvertebrate surveys were completed at additional locations upstream and downstream of the proposed bridge location on 28 November 2024 within the autumn sampling season.

Macroinvertebrate sampling locations

Survey site	National Grid Reference	Relation to proposed bridge crossing	Autumn survey date	Spring survey date
WBN2 River Fromus	TM 38861 62093	190 m downstream	20/11/2023 28/11/2024	28/05/2024
WBNx2 R. Fromus	TM 38702 61084	1210 m downstream	28/11/2024	-
WBNx1 R. Fromus	TM 38771 63161	880 m upstream	28/11/2024	-

The combined taxa list of all survey samples included a total of five riverfly taxa; specifically, the mayflies *Cloeon dipterum* (WBN2 only) and *Baetis rhodani/atlanticus* (US R. Fromus only), and the caddisflies *Lype* sp. (WBN2 and Mid only), *Limnephilus lunatus* (WBN2 only) / Limnephilidae (Mid and DS only), and *Glyphotaelius pellucidus* (Mid only). All taxa are common and widespread throughout the UK where appropriate habitat is available to support their presence.

A relatively diverse aquatic beetle fauna comprising 10 species was also recorded, including the beetle *Anacaena bipustulata* (current CCI species conservation score 5 – Local, current scores provided by the EA via the EA Ecology and Fish Data Explorer) which attained the highest CCI species conservation score within the AECOM River Fromus dataset. At the US (Upstream) R. Fromus site in autumn 2024, the riffle beetle *Elmis aenea* was recorded, the only riffle beetle recorded at any site.

With the exception of the flatworm *Polycelis felina* and the Limnephilidae caddisfly larva *Glyphotaelius pellucidus* (current CCI species conservation score 3 - Frequent), all other recorded species had CCI Species conservation scores of 1 or 2, equating to Common or Very Common species.

All macroinvertebrate samples from the River Fromus resulted in an assessment of Low Conservation Value on the CCI index.

Summary metrics for the samples are presented in the table below. The metrics demonstrate the community sampled is of low to moderate conservation value (based on CCI metrics) and resides in a heavily sedimented and low flow velocity habitat (from LIFE and PSI data).

Index	Autumn 2023 (WBN2)	Spring 2024 (WBN2)	Autumn 2024 (3 sites)
NTAXA (WHPT)	10	17	WBNx2: N B WBN2 N B 0

[6] Benhall StW F/E, EA Water Quality Archive, Available at: https://environment.data.gov.uk/water-quality/view/sampling-point/AN-BENHALL [Accessed 10.07.24]

			WBNx1: B: 3
ASPT (WHPT)	4.23	4.16	WBNx2: B: .9 WBN2: N: B: .8 WBNx1:b:4.2
PSI Score (species)	20.00 – Sedimented	24.14 – Sedimented	WBNx2:0 – Heavily Sedimented WBN2: N: B: .7 – Heavily Sedimented WBNx1:x:N:B:36.4 – Sedimented
LIFE Score (species)	6.29 – Low sensitivity	6.06 – Low sensitivity	WBNx2 B .0 – Low sensitivity WBN2: BN: 5 – Moderate sensitivity WBNx1: 7.1 – Moderate Sensitivity
CCI Score	1.1 – Low conservation value	7.1 – Moderate conservation value	WBNx2: x: N: B: .0 – Low conservation value WBN2: N: B: .7 – Low conservation value WBNx1: 1.0 – Low conservation value

RICT analysis using environmental variables derived by the RICT Location Checker for Model 44 Input Variables[7] and in accordance with best practice WFD classification methodology (WFD UKTAG, 2023[8]), available on the DEFRA portal, resulted in an overall WFD invertebrate classification of **Moderate** (based on the combination of the modelled distributions for each of WHPT-ASPT and WHPT-NTAXA across all classes in both spring and autumn). In this case, macroinvertebrate surveys from the exact bridge crossing location are used to give an 'equivalent WFD classification', to support the WFD assessment alongside the EA WFD classification data, which has also been used as described elsewhere.

RICT analysis of the autumn 2024 survey data provided WFD status equivalent of **Moderate** for the WBNx1 survey location, and **Bad** for the WBN2 and WBNx2 survey locations. While this is indicative only and should be treated with caution as single-season sampling, autumn data is most reliable in providing accurate single-season results (Hill et al, 2016[9]).

In this case the Moderate equivalent WFD status at the crossing point, and as low as Bad status elsewhere, indicates that habitat at these locations is less optimal for macroinvertebrates than elsewhere in the WFD waterbody, i.e., at the EA monitoring site downstream used for WFD classification.

The conclusion here is not that the WFD status of the WFD waterbody as a whole is Moderate or otherwise, but that variations in macroinvertebrate communities present indicate a range of WFD status-equivalents that demonstrate habitat variability, i.e., macroinvertebrate communities are not uniform throughout.

[7] RICT - Location Checker for Model 44 Input Variables, Environment Agency, Available at: https://environment.data.gov.uk/explore/8d1422b3-c960-4ed9-a324-40eefb0c016e?download=true

[8] WFD UKTAG (2023). UKTAG River Assessment Method: Benthic Invertebrate Fauna: Invertebrates (General Degradation): Walley, Hawkes, Paisley & Trigg (WHPT) metric in River Invertebrate Classification Tool (RICT).

[9] Hill, M.J., Sayer, C.D. and Wood, P.J. (2016) When is the best time to sample aquatic macroinvertebrates in ponds for biodiversity assessment? Environ Monit Assess (2016) 188: 194.

Fromus Waterbody: Macrophyte Survey

Macrophyte surveys at the proposed crossing location on the River Fromus were completed on 22 July 2024, within the optimal survey season for aquatic macrophytes. The surveyed reach extended 100 m, from NGR TM 38847 61988 to TM 38859 62097, which encompassed the proposed crossing point.

The channel was heavily shaded for the majority of its length, including the proposed crossing point, which limited macrophyte growth considerably. The upstream approximate 20 m was unshaded, where the majority of macrophyte growth was present within the surveyed reach.

The macrophyte taxa present at the time of survey included eight species, presented in the table below. Of the species present, only two taxa score for LEAFPACS; broad-leaved pondweed *Potamogeton natans* and water starwort *Callitriche sp*. None of the taxa present are notable, rare or protected; all taxa recorded are very common and likely to be present in the wider landscape where suitable conditions are present. However, the Wildlife and Countryside Act 1981 (as amended) Schedule 9 invasive non-native species Himalayan balsam *Impatiens glandulifera* was found to be growing sporadically throughout the site.

Scientific name	Common name	TCV	LEAFPACS scoring
Sparganium erectum	Branched bur-reed	C6	N
Phalaris arundinacea	Reed canary grass	C4	N
Solanum dulcamara	Bittersweet	C3	N
Carex pseudocyperus	Cyperus sedge	C1	N
Conocephalum conicum	Great scented liverwort	C2	N
Potamogeton natans	Broad-leaved pondweed	C1	Y
Impatiens glandulifera	Himalayan balsam	C5	N
Callitriche sp.	Water starwort	C1	Y

The table below presents a summary of the results of LEAFPACS analysis. These results demonstrate that there are fewer scoring taxa (NTAXA) and functional groups (NFG) than would be expected compared to estimated reference conditions, while slightly less algae cover (ALG) and the macrophyte community reflected lower nutrient content (RMNI) than might be expected compared to estimated reference conditions. The River Fromus has achieved an equivalent WFD classification of **High**.

RMNI EQR	NTAXA EQR	NFG EQR	ALG EQR	Final EQR	Classification
1.332	0.212	0.335	1.001	0.987	High

It should be noted, however, that only two scoring taxa were present. The minimum requirement for LEAFPACS2 classification is three scoring macrophyte taxa[10]. Consequently, these results should be treated with caution, and this does not therefore constitute an accurate estimate of WFD status.

[10] WFD-UKTAG (2014b). *UKTAG River Assessment Method Macrophytes and Phytobenthos: Macrophytes (River LEAFPACS2)*. Water Framework Directive - United Kingdom Advisory Group, Stirling, UK.

Fromus Waterbody: Fish Survey and Baseline

A fish survey was undertaken on 22 July 2024 near the proposed crossing point on the River Fromus, at NGR TM 38838 61982 (refer to fish survey locations below). A semi-quantitative electric fishing survey was completed by a team of four aquatic ecologists at the River Fromus where safely accessible. Sampling procedure followed standard Environment Agency guidelines (Beaumont, et al., 2002). The survey was completed over a single run in an upstream direction using a bankside electrofishing kit consisting of an Electracatch WFC4 control box with Pramac 4000 generator and single anode. This equipment was chosen after careful consideration of water depth and stream width (i.e., depth < 0.8 m and stream width being an average of 4 m). The river reach surveyed was approximately 60 m in length between natural barriers (fallen tree and debris build up). Fish that were caught were placed in well aerated holding buckets on the river margins and identified to species level. Their fork length was measured to the nearest mm before being released safely and unharmed back into the watercourse.

Only one species was captured, three-spined stickleback (Gasterosteus aculeatus; n = 45). Three-spined stickleback are a ubiquitous species and deemed a High tolerance species as per the Fisheries Classification Scheme (FCS)[11].

Fish survey locations

Survey reach	National Grid Reference Start (downstream)	National Grid Reference Centre	National Grid Reference End (upstream)	Survey date	Method
River Fromus	TM3880861988	TM3886262110	TM3883762041	22 July 2024	Semi-quantitative electric fishing

It is important to note that this survey is representative of fish assemblage and habitat conditions at the crossing point - the intention is not to provide a WFD classification equivalent for the entire WFD waterbody.

EA WFD classification fish data has been used to inform the WFD assessment, together with desk study of fish records at the catchment scale (see below).

The EA has previously completed WFD surveys at four monitoring sites on the Fromus Waterbody between the years of 2006 and 2012. This survey site is situated approximately 950 m downstream of the Saxmundham EA monitoring site. Here, both fish assemblages are similar, with Saxmundham being dominated by three-spined stickled with the addition of a single European eel (*Anguilla anguilla*), only caught in 2012.

Site name	Saxmundham	Snape Watering	Abbey Farm B	Abbey Farm A
Site ID	**618**	**619**	**27840**	**27839**
Years surveyed	**2006 & 2012**	**2006 & 2011**	**2007**	**2007**
Brook lamprey (*Lampetra planeri*)		5		
Brown / sea trout (*Salmo trutta*)			1	
Dace (*Leuciscus leuciscus*)			2	

[11] UKTAG Rivers Assessment Methods Fish Fauna (Fisheries Classification Scheme 2 (FCS2)), WFD-UKTAG, Available at: https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Biological%20Method%20Statements/river%20fish.pdf

European eels	1	3	4	4
Lamprey sp. (*Petromyzontidae*)		2		12
Roach (*Rutilus rutilus*)				1
Rudd (*Scardinius erythrophthalmus*)			1	6
Stone loach (*Barbatula barbatula*)		17	6	3
Three-spined stickleback	30	8	8	8
Ten-spined stickleback (*Pungitius pungitius*)		1		
Species richness	**2**	**6**	**6**	**6**

Species richness is shown to increase downstream of both the Saxmundham (n = 2) and the AECOM survey site at the proposed crossing point (n = 1), to n = 6 across all further monitoring sites. This increase may be the result of increased habitat heterogeneity (i.e. diverse flow and depth patterns and in-stream macrophytes) which can support a more diverse fish assemblage. It was noted that the habitat quality at the proposed crossing was generally poor with deep silt deposits and near-stagnant water.

Given the location of the proposed crossing point and the similarity of the fish assemblage between the survey site and the EA monitoring site Saxmundham, it is believed that the results presented herein are representative of the River Fromus at the proposed crossing point. This is supported by the Site Classifications for the EA monitoring locations, whereby Saxmundham has been classified as Poor for the Fish biological quality element across all assessment years between 2009 – 2016, apart from 2010 where fish were classified as Bad.

	Environment Agency WFD monitoring sites			
Year	**Saxmundham**	**Snape Watering**	**Abbey Farm B**	**Abbey Farm A**
2009	Poor	Moderate	Good	Good
2010	Bad	Moderate	Good	Moderate
2011	Poor	Moderate	Good	Moderate
2013	Poor	Moderate	Good	Moderate
2013	Poor	Moderate	Good	Moderate
2014	Poor	Moderate	--	--
2014	Poor	Moderate	--	--
2015	Poor	Moderate	--	--
2016	Poor	Moderate	--	--

Unfortunately, the FCS2 model used to assess the WFD status of the fish fauna in rivers, is not available outside of the EA, and as such only a qualitative assessment of the impact on the WFD status of the Fromus Waterbody can be made. Based on the fish assemblage present, it is considered that the site would be classified as either **Poor** or **Bad**. Given that three-spined stickleback are, as previously mentioned, ubiquitous and a High tolerant species, these species are considered to be unaffected by the potential crossing and any residual impacts would not be significant.

Smelt:

No smelt were found in the aquatic ecology survey, nor in any of the previous EA surveys (WFD or routine monitoring sites) completed on the Fromus Waterbody. The closest record for smelt is approximately 7.9 km downstream of the proposed crossing point within the main River Alde, which was recorded at the EA monitoring site U/S Langham Bridge (Site ID: 35) in 2013.

Mitigation measures	

Project Specific Measures

Measures to mitigate potential effects on this waterbody focus on the risk of pollution and bridge design. These will be covered by standard good practice measures, as well as project specific measures outlined within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice**.

Measures secured within **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice** which are relevant include: GG03, GG04, GG05, GG15, GG16, GG28, W02, W09 and W14. These measures include best practice for construction of vehicle watercourse crossings, fuel storage in the vicinity of a watercourse, managing runoff and actions to undertake in the event of spills and contamination to prevent pollution of a watercourse.

Bridge design measures include:

- Crossing the River Fromus at the point where the floodplain (defined by Flood Zone 3) is narrow
- No development in-channel or within 8 m of either bank of the River Fromus
- Width of the bridge structure 6 m
- Clear span bridge over the channel (24 m),
- Two bridge design options are being considered:
    - Option 1 - 6 m clearance of the bridge soffit from the Q95 flow level of the river; and
    - Option 2 - 4 m clearance of the bridge soffit from the Q95 flow level of the river
- with soffit height above the 1 in 100 year flood event plus climate change (both design options).

Both of the bridge design options for the crossing of the River Fromus have been modelled using the existing EA Fromus hydraulic model, adding in the bridge and its approaches. The outputs of the modelling have informed the Proposed Project Flood Risk Assessment (FRA) (**Application Document 6.8**) and Environmental Impact Assessment (EIA). Modelling results demonstrate that in the 1 in 30 year flood event there is no inundation of the floodplain at the proposed crossing location, suggesting that the functional floodplain of the watercourse would not be impacted by the proposed crossing in either of the two bridge design scenarios. Modelling of the 1 in 100 year and 1 in 100 year plus climate change events has been used to inform the need for any project specific mitigation measures, for example, provision of floodplain compensation storage. Results show that in these two events, all flow is also contained within the channel, and there would therefore be no loss of floodplain storage volume in the 1 in 100 year floodplain as a consequence of building either of the bridge designs.

River Basin Management Plan Measures

Measures for the River Fromus are included in the Anglian River Basin District River Basin Management Plan (RBMP)[12]. There are none specifically for the management of the Fromus Waterbody.

Assessment	

[12] Anglian River Basin District RBMP Part 1 (2016) Environment Agency, Available at: https://www.gov.uk/government/publications/anglian-river-basin-district-river-basin-management-plan [Accessed 04.07.24]

Methodology

The assessment has been undertaken with reference to Environment Agency (EA) guidance on the WFD compliance of physical works in rivers[13]. This guidance introduces a traffic light system whereby activities associated with physical works in rivers are risk rated.

Green or low risk activities are described as “posing a very low risk to the delivery of WFD objectives”. The guidance notes that no further (additional) WFD risk assessment is required for these activities.

The outfall to the River Fromus and ditch west of the river is classified as a green activity and meets the requirements for FRAP exemption No. 12[14]. The proposed outfall would comprise a 150 mm or 225 mm diameter plastic pipe installed in a narrow trench (with a granular surround and as-dug backfill), discharging at a mean annual maximum flow rate of 20 l/s. The headwall limitations and pipe alignment requirements within the guidance will be applied to the detailed design.

Amber activities are described as "*in general, posing a low risk to the delivery of WFD objectives. However, in certain sensitive or critical locations, they could pose a potential risk*". Red activities “*could pose a risk to the delivery of WFD objectives*”.

Proposed works classified as amber activities relate to the bridge and crossing (including works on the bridge beams, bridge deck, and access haul road):

- Two set-back embankments >20 m but ≤200 m in length.
- A bridge crossing which is not covered by a flood defence consenting low risk checklist for service crossings.

There are no red activities.
There are currently two bridge design options under consideration, one that maintains a clearance of 4 m between the Q95 water level and the bridge soffit and one that increases this clearance to 6 m. An appraisal of the potential for these ‘amber’ Proposed Project activities to result in waterbody deterioration or failure to meet WFD objectives is presented below, highlighting any differentiators between the two design options as applicable. The source-pathway-receptor principle has been applied to the assessment and the mitigation measures described above have also been accounted for in drawing conclusions.

Assessment

Aquatic Macroinvertebrates:

The EA Gromford invertebrate site is in excess of 4 km downstream of the proposed crossing location. The compensation flight for riverflies such as mayflies has been observed to be up to 4 km[15]. As such the taxa recorded at this location is considered unaffected by the potential crossing and should not

[13] Protecting and improving the water environment: Water Framework Directive compliance of physical works in rivers (2016) Environment Agency (Doc No. 488_10)

[14] Exempt flood risk activities: environmental permits, Environment Agency, Available at: https://www.gov.uk/government/publications/environmental-permitting-regulations-exempt-flood-risk-activities/exempt-flood-risk-activities-environmental-permits#outfall-pipes-less-than-300mm-diameter-through-a-headwall-fra12

[15] Russev, B. (1959) “Vol de compensation pour la ponte” de Palingenia longicauda (Oliv.) (Ephem.) contre le courant du Danube. Comptes rendus de l’Académie bulgara des Sciences, 12(2), 165-168.

be considered further (refer to the Flying Insects Literature Review which is Annex 2.F.11 of **Application Document 6.3.2.2.F Appendix 2.2.F Aquatic Ecology Report**).

Of the seven species of caddisfly identified at the Benhall Green Bridge site, five species are of the family Limnephilidae which are known for strong flying ability (e.g., Crichton et al 1978[16]; Finn & Poff, 2008[17]). All recorded riverfly taxa have persisted at the Benhall Green Bridge site despite the existence of two bridges located in close proximity to the proposed crossing location with soffit heights 2.5 m – 3 m.

Only two Limnephilidae taxa, the species *Limnephilus lunatus* and *Glyphotaelius pellucidus*, have been recorded at the Mid and DS sampling locations.

The referenced literature review considers the level of risk posed to the dispersal of flying insects, the airborne life stage of the aquatic macroinvertebrates shown to be present in the location of and around the proposed crossing point. This is assessed in the context of habitat assessment (presented below) including the presence of numerous existing bridges in this locality on the River Fromus. The key findings are summarised as follows:

- No details regarding the flight elevation of adult UK riverfly species during compensation flight (upstream migration of adult riverflies to compensate for the downstream drift experienced by the aquatic larvae) has been identified, and very limited information on general flying ability of adult UK riverfly species is available;
- *P. longicauda* (ref. Málnás *et al*., 2011[18]) is not an appropriate model species to act as a substitute of UK riverfly species to provide suitable and relevant data upon which to base decisions, due to substantial difference in size and consequent differences in flying ability and perceptual range; and
- Málnás *et al*. (2011) remains the single study contending that bridges may act as an optical barrier to riverfly species; no further literature has been found to support this view or exploring the cumulative effects of multiple bridges on riverfly species.

Whilst clearly interested in the avenue of research investigated by Málnás et al. (2011) and not discounting the relevance of their findings to conservation, Dr Loxdale (2013)[19] makes the valid point that there are issues facing macroinvertebrate populations which are likely to pose greater threats to species survival than the effects of light polarization reflected by large bridges. This communication was also written only two years after publication of Málnás et al. (2011), when it might have been expected that further instances of optically barring bridges affecting other species would be documented in the future. It has now been over a decade and there is yet to be a single other documented case of bridges acting as optical barriers to riverfly dispersal.

From an intuitive perspective it seems unlikely that a bridge soffit height greater than a couple of meters could seriously obstruct mayfly flight, as all published observations as detailed earlier document mayflies routinely flying at least 0.5 m from the water surface during swarming and compensation flights. From a scientific perspective, Málnás et al. (2011) remains the only study to

[16] Crichton, M.I., Fisher, D. & Woiwod, I.P. (1978) Life histories and distribution of British Trichoptera, excluding Limnephilidae and Hydroptilidae, based on the Rothamsted Insect Survey. Holarctic Ecology, 1, 31–45.

[17] Finn, D. S., & Poff, N. L. (2008). Emergence and Flight Activity of Alpine Stream Insects in Two Years with Contrasting Winter Snowpack. *Arctic, Antarctic, and Alpine Research*, 40(4), 638–646. https://doi.org/10.1657/1523-0430(07-072)[FINN]2.0.CO;2

[18] Málnás K, Polyák L, Prill E, Hegedüs R, Kriska G, Dévai G, Horváth G, Lengyel S (2011) Bridges as optical barriers and population disruptors for the mayfly Palingenia longicauda: an overlooked threat to freshwater biodiversity? Journal of Insect Conservation 15:823-832.

[19] Loxdale HD, von Mende-Loxdale N, Macadam C (2013) A bridge too far… at least for Caddisflies and Mayflies. Antenna 37(3):106-110.

suggest that a bridge, devoid of electrical lighting, with ample space for underway passage, could obstruct upstream riverfly dispersal. To accept that bridges pose a significant threat to riverfly populations by acting as optical barriers requires further study and corroborating evidence from a source external to the research group that introduced this concept to the scientific community. At present, it is not possible to conclude, given the current body of scientific data, that any given bridge, or multiple bridges, could impact riverfly species found in the UK in the manner described by Málnás et al. (2011).

Aquatic Macrophytes:
It is not considered that macrophytes will be an impediment to the construction and operation of the proposed crossing. All of the macrophytes recorded are common, with none being notable or rare. Moreover, the River Fromus is heavily shaded at the location of the proposed crossing and supports very little in the way of diversity or abundance of macrophytes.

Himalayan balsam was growing sporadically throughout the survey area, so measures to avoid the spread of this highly invasive Schedule 9 species would be implemented, as detailed in **Application document 7.5.12 Outline INNS Plan** and commitment B04 within the Outline Code of Construction Practice (**Application document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice).**

Noise and Vibration:
Pile driving can be a source of underwater noise and vibration if the pile being driven is in water, or on land near water[20]. The substrate can contribute either via direct propagation or via interface waves[21] [22]. The latter originate at the water-sediment interface and have large particle velocity components that decay rapidly with distance from the interface[23.] As design measures include no development in channel or 8 m either side of the channel, it is believed that the risk of the proposed crossing to the species identified is low as the sound propagation should dissipate sufficiently to reduce the risk to fish. Despite the fish species shown to be present and the distance of piling from the River Fromus (>8 m), non-percussive piling will be used to further reduce noise and vibrational impact on fish species (B10).

Smelt:
Smelt migrate into rivers to spawn amongst gravels in fast flowing rivers (normally above the saline influence). Given that the habitat present at the crossing point does not represent suitable spawning habitat for smelt, and there are no records of smelt in the Fromus WFD waterbody, it is considered that smelt are not present within the vicinity of the Proposed Project. Therefore, smelt should be scoped out of further consideration for mitigation.

Hydromorphology

[20] Popper A. N., Hawkins A. D., Fay R. R., Mann D. A., Bartol S., Carlson T. J., Coombs S. Ellison W. T., Gentry R. L., Halvorsen M. B., Løkkeborg S., Rogers P. H., Southall B., Zeddies D. G.& Tavolga W. N. (2014). Asa S3/Sc1.4 Tr-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report Prepared by ANSI-Accredited Standards Committee S3/Sc1 a (Springerbriefs in Oceanography).

[21] Hazelwood RA (2012) Ground roll waves as a potential influence on fish: measurement and analysis techniques. In: Popper AN, Hawkins AD (eds) The effects of noise on aquatic life. Springer Science + Business Media, New York, p 449–452

[22] Hazelwood RA, Macey PC (2015) The intrinsic directional information of ground roll waves. Popper AN, Hawkins AD (eds) The effects of noise on aquatic life, II, Springer Science+Business Media, New York.

[23] Brekhovskikh L, Lysanov Y (1982) Fundamentals of ocean acoustics. Springer-Verlag, New York.

The proposed crossing designs both avoid any direct disturbance to the existing channel (bed, banks) and the riparian corridor and modelling has demonstrated that the footprint of the approach ramps to the bridge (both designs) would not encroach into the functional floodplain of the Fromus in this location. There would be no impact on the in-channel flow regime and no reduction in connectivity between the river and its functional floodplain. Detriment to the hydromorphological status of the river would therefore be avoided.

Habitat Assessment – River Fromus

A walkover survey including bridge assessment was conducted of the River Fromus between Saxmundham (TM 38688 63323) and Gromford (TM 38597 58611), a total distance of 4.9 km, between 27 and 29 November 2024 by two experienced aquatic ecologists.

During the walkover bank vegetation and habitats were identified using the Environment Agency (EA) River Habitat Survey criteria (EA, 2003[24]) as guidance, with substrate and flow type also mapped where possible. Each bridge encountered was photographed and the height from water, construction materials, use and potential impact to flying insect species noted. Outfall, pylon, phone/electricity cable locations and surrounding land use were also identified.

Overall, within the surveyed reaches the watercourse had a wetted width of 2.0 m, widening to between 3.0 and 4.0 m in some areas. Across the survey extent, the flow rate was no greater than 25 cm/sec, with some deeper reaches such as that at the proposed River Fromus bridge crossing, having a flow rate less than 10 cm/sec. The banks along the reach primarily comprised of earth with artificial banks made of brick and concrete present in the upstream section of the walkover within Saxmundham where residential and industrial buildings abut the river. Where it was possible to assess the substrate, sand and gravels were the primary substrate types present with some areas, such as that in the area proposed for the River Fromus bridge crossing, dominated by silt. Run and glide habitat types dominated the entire surveyed area, with pools and riffles also present. The river predominantly flowed through broadleaf/mixed woodland, providing woody debris and submerged tree roots into the channel, with sections of open areas dominated by tall herb. South of Saxmundham town the wider land use was dominated by agriculture both for growing crops and rearing of animals.

Potential habitat for fish varied across the survey extent. The upstream survey reach within Saxmundham town was generally shallow with an average depth of 20 cm and a flow rate of 10-25 cm/s. Run, riffle and glide habitat types were present here with the substrate appearing to be dominated by gravel and sand, suggesting potential as salmonid spawning grounds.

The mid-section of the river walkover at the proposed bridge crossing was dominated by plantation woodland with little understory. Where there were gaps in the tree line, in-channel macrophytes were present. Depth had increased from upstream to approximately 1.0 m and flow rate was <10 cm/s. Many trees had fallen within the river creating natural weirs and pools. This mid-section reach and in woodland further downstream south of the A1094 at Snape Watering had extensive earth banks and submerged roots, providing refuge for fish and other fauna.

South of Benhall bridge the habitat consisted of both broadleaf/mixed woodland strips and large open areas which were dominated by tall herb or emergent reeds, sedges or rushes which were evident despite having either died or been cut back as part of land management. It should also be noted that there were large expanses of lakes and conservation waterbodies present in the area

[24] RHS Manual 2003 (2022 Reprint): Available at: https://www.gov.uk/government/publications/river-habitat-survey-guidance-manual

between Benhall bridge and the A1094 which also had emergent vegetation present. In-channel macrophytes increased in presence towards Gromford which could help support both coarse and salmonid juveniles.

Bridges

During the habitat assessment and desk study, 24 bridges were identified (see Table 1 below and **Application Document 6.4.2.2.F.3 River Fromus Bridge Locations**). One rail bridge, four road bridges, three farm track/haul road bridges, and the remaining footbridges either encompassing public footpaths or situated on private land.

The dimensions and construction of the bridges depended on the use of each bridge. Vehicle bridges (both farm tracks/haul roads and road bridges) were between 4.0 and 10.0 m wide. These were constructed entirely from either concrete or brick, with one bridge being constructed of concrete with a wooden deck. Footbridges had a width between 1 and 2.0 m. These were predominantly constructed with a steel/metal parapet with a concrete or wooden deck, with three comprised solely of wood. Where parapets were present, they were constructed of wood or metal, between 1.0 and 1.2 m. All bridges identified during the walkover had a height from the water between 0.5 m and 3.0 m (see Table 1 below).

A further four bridges were identified as part of the desk-based assessment of inaccessible land (see Table 2 below). Two bridges both private/farm tracks, appear to be constructed with a concrete deck approximately 5.0 m in width, one has open parapets on both sides, whilst the other has none rendering it passable. Two other bridges were identified as footbridges. One between two agricultural fields likely forming a permissive footpath, whilst another connecting two areas of a private garden likely formed of wood with parapets.

Habitats observed at the proposed bridge location differ compared to those both upstream and downstream. Both upstream and downstream of the proposed crossing location, semi-natural woodlands dominate the banktop habitat, whilst in the midsection, dense plantation woodland dominates with extensive fallen trees.

Due to the lack of understory vegetation, runoff from the surrounding agricultural landscape is considered to input high silt loads into the channel at the proposed crossing point, as shown by the 'heavily sedimented' PSI scores. In addition, outfalls upstream of this reach around Saxmundham and from local field drains appeared heavy with silt. Throughout this reach the watercourse becomes deeper, this combined with the number or fallen trees, slows the flow compared to the upstream section through Saxmundham causing the deposition of fine sediments into the channel as well as coarser sediments. Additionally, where large quantities of fallen trees are present, these act as a strainer capturing woody debris floating down the channel increasing impoundment of flow.

The land use in this area is dominated by arable/tilled land and improved grassland with a tall herb strip adjacent to the watercourse on both banks. This likely increases the sediment load in the channel as there is a minimal filter strip in comparison the rest of the surveyed area, explaining the dominance of the silt substrate, which provides sub-optimal habitat for macroinvertebrates, hence the limited macroinvertebrate assemblage observed and limitations to equivalent WFD status. The dominance of arable land here is also not representative of the wider catchment surveyed, where the dominant habitat on the riverbanks is broad-leaved woodland with a tall herb understory with a mix of broad-leaved woodland blocks and grazed pasture dominating the wider environment. Within the wider catchment the substrate, where visible, had lower proportions of silt and mainly comprised sand and gravels.

Water Quality

Measures secured within the **Application Document 7.5.3.1 CEMP Appendix A Outline Code of Construction Practice** (GG03, GG04, GG05, GG15, GG16, GG28, W02 and W09) would avoid or control pollution source receptor pathways and emergency incident response protocols would be in place to deal with spills. Pollution of the watercourse would therefore be prevented during construction of the crossing and during its operation, routine runoff from the bridge would be captured by a drainage system that provides for storage and attenuation, prior to discharge into the water environment. Shading from the proposed crossing is not considered to pose a risk to water quality due to the open nature of the bridge design (both options), including set backs and its soffit height above the 1 in 100 year plus climate change flood level.

Conclusion	

Current ecological status of the River Fromus WFD waterbody is **Poor**, driven by **Poor** status for fish (**Good** status for the Invertebrates and Macrophytes and Phytobenthos Combined supporting elements).

Macroinvertebrate surveys in autumn 2023, and spring and autumn 2024, completed according to WFD best-practice methods and industry standards, indicate that macroinvertebrate communities at and around the proposed bridge crossing point are of Bad to Moderate WFD status-equivalent, are of Low Conservation Value (CCI), indicative of Heavily Sedimented or Sedimented conditions (PSI), and are of Low Sensitivity to reduced flows (LIFE), demonstrating significant existing ecological impacts in the waterbody.

Macrophyte survey data cannot be used for classification of WFD status-equivalent using LEAFPACS methods because of the lack of scoring taxa present at the proposed crossing point. This is due in part to heavy shading from riparian plantation woodland, and the effects of siltation.

Semi-quantitative electric fishing survey at the proposed crossing point only caught one species, three-spined stickleback, and habitats for fish were generally limited due to heavy shading and siltation. Despite more fish species being identified downstream at the EA WFD monitoring sites, it is considered that the fish species recorded is indicative of the limited assemblage present at the proposed crossing point and is considered homologous with the current WFD status for fish of Poor.

In terms of the dispersal of flying insects, the aerial life stages of aquatic macroinvertebrates, it is considered unlikely that a bridge soffit height greater than a **couple of meters** could seriously obstruct mayfly flight, as all published observations document mayflies routinely flying at least **0.5 m from the water surface** during swarming and compensation flights. While there are some differences in species composition for macroinvertebrates between the different survey locations, the limited macroinvertebrate assemblage present includes few mayflies and caddisflies, with two Limnephilidae species occurring at both the Mid and DS sampling locations. It is therefore considered that **the presence of multiple existing bridges** (see below) **is not a constraint to the dispersal of flying insects**.

During the habitat assessment and desk study, **24 existing bridges were identified** (Table 1). One rail bridge, four road bridges, three farm track/haul road bridges, and the remaining footbridges either encompassing public footpaths or situated on private land.

Given that all existing bridges are of a height lower than or equal to 3 m from the water surface (ranging from 0.5 m to 3.0 m), and of variable width (1.0 m to 10.0 m), it is considered that the

proposed bridge of 4 m height and 6 m width will have no cumulative adverse effect upon the dispersal of the assemblage of flying insects shown to be present, certainly not at the WFD waterbody-scale.

Overall, it is concluded there will be **no deterioration in the existing WFD status of the River Fromus** as a consequence of the proposed new crossing designed to maintain **4 m clearance** between the Q95 water level and the bridge soffit. A design with a 6 m clearance between the Q95 water level and the bridge soffit would also not result in deterioration in the existing WFD status however would have a larger construction footprint and may have effects on other aspects of the environment, subject to the outcome of ongoing assessment.

The Suffolk Onshore Scheme would deliver riparian planting and enhancement of 500m along the Fromus waterbody corridor, contributing towards improvement in the status of this waterbody.

Table B.1 Bridges located on the walkover of the River Fromus between Saxmundham and Gromford

Bridge Number	National Grid Reference	Dimensions (m)	Bridge Construction Material	Bridge Parapet Type	Use
1	TM 38660 63385	Height off water: 3.0 Deck height height: N/A Parapet height: N/A Bridge Width: N/A	Concrete with earth – built into hillside	Solid	Rail
2	TM 38678 63319	Height off water: 3.0 Deck height: Not visible due to foliage Parapet height: 1.2 Bridge width: 10.0	Concrete bridge	Vertical metal bars 0.1m spacing (width)	Road bridge with pavement
3	TM 38742 63214	Height off water: 2.0 Deck height: 0.2	Steel bridge with lain concrete deck	Vertical metal bars 0.1m spacing (width)	Footbridge

Bridge Number	National Grid Reference	Dimensions (m)	Bridge Construction Material	Bridge Parapet Type	Use
		Parapet height: 1.2 Bridge width: 2.0			
4	TM 38777 63111	Height off water: 1.5 Deck height: 0.2 Parapet height: 1.2 Bridge width: 2.0	Steel bridge with lain concrete deck	Vertical metal bars 0.1m spacing (width)	Footbridge
5	TM 38803 62987	Height off water: 1.5 Deck height: 0.5 Parapet height: 1.2 Bridge width: 10.0	Concrete bridge with brick reinforcement on banks	Solid	Road bridge with pavement Runoff outfall
6	TM 38786 61804	Height off water: 3.0 Deck height: ~0.75 (Curved Arch) Parapet height: 2.0 Bridge width: 6.0	Brick	Solid	Road bridge Runoff outfall

Bridge Number	National Grid Reference	Dimensions (m)	Bridge Construction Material	Bridge Parapet Type	Use
7	TM 38693 61079	Height off water: 1.0 Deck height: 0.2 Parapet height: 1.2 Bridge width: 1.0	Concrete with wooden deck.	Horizontal metal bars 1m spacing (width)	Footbridge over ford
8	TM 38628 60974	Height off water: 1.2 Deck height: 0.1 Parapet height: 1.0 Bridge width: 1.0	Metal structure with wood deck	Only on one side. Vertical metal bars. 1m spacing (width & height)	Footbridge
9	TM 38607 60875	Height off water: 2.0 Deck height: 0.2 Parapet height: 1.5 Bridge width: 1.5	Metal structure with wood deck	Horizontal metal bars 1m spacing (width) 0.5m spacing (height)	Footbridge
10	TM 38605 60778	Height off water: 1.5 Deck height: 0.2	Metal structure with wood deck	Horizontal metal bars 1m spacing (width) 0.5m spacing (height)	Footbridge

Bridge Number	National Grid Reference	Dimensions (m)	Bridge Construction Material	Bridge Parapet Type	Use
		Parapet height: 1.5 Bridge width: 1.5			
11	TM 38571 60711	Height off water: 0.5 Deck height: 0.4 Parapet height: N/A Bridge width: 3.0	Concrete	None	Vehicle bridge on farmland
12	TM 38481 60675	Height off water: 1.0 Deck height: 0.2 Parapet height: N/A Bridge width: 1.0	Metal structure with wood deck	None	Footbridge
13	TM 38277 60487 (on tributary right next to R.Fromus)	Height off water: 1.0 (culvert pipe) Deck height: 0.7 Parapet height: 1.2 Bridge width: 6.0	Stone	Wooden panel 1m spacing (width). 0.3m spacing (height)	Private haul road

Bridge Number	National Grid Reference	Dimensions (m)	Bridge Construction Material	Bridge Parapet Type	Use
14	TM 38226 60368	Height off water: 0.5 Deck height: 0.2 Parapet height: 1.0 Bridge width: 1.0	Steel frame bridge with wooden deck	Horizontal metal bars. 1m spacing (width) 0.5m spacing (height)	Footbridge (PRoW)
15	TM 38272 59887	Height off water: 1.2 Deck height: 0.5 Parapet height: 1.0 Bridge width: 10.0	Concrete bridge with metal soffit Banks beneath the bridge reinforced with concrete.	Horizontal metal bars. 2m spacing (width) 0.5m spacing (height)	Road bridge with no pavement
16	TM 38169 58979	Height off water: 1 Deck height: 0.2 Parapet height: N/A Bridge width: 1.0	Wood	None	Footbridge
17	TM 38167 58940	Height off water: 1.0 Deck height: 0.2 Parapet height: 1.0	Steel bridge with laid concrete deck	Horizontal metal bars. 1m spacing (width) 0.5m spacing (height)	Footbridge (PRoW)

Bridge Number	National Grid Reference	Dimensions (m)	Bridge Construction Material	Bridge Parapet Type	Use
		Bridge width: 1.0			
18	TM 38244 58820	Height off water: 1.0 Deck height: 0.2 Parapet height: N/A Bridge width: 1.0	Wood	None	Footbridge
19	TM 38315 58807	Height off water: 1.0 Deck height: 0.2 Parapet height: 1.0 Bridge width: 5.0	Wooden bridge with concrete foundations	Wooden horizontal panels. 1m spacing (width) 0.5m spacing (height)	Farm track
20	TM 38372 58769	Height off water: 1.0 Deck height: 0.1 Parapet height: N/A Bridge width: 1.0	Wood	None	Footbridge

Table B.2 Bridges - Desk Based Assessment

Bridge Number	National Grid Reference	Dimensions	Construction Material	Use
A	TM 38760 62849	Width: 5.0 m Deck and parapets	Parapet appears to have horizontal metal bars.	Farm track
B	TM 38814 62390	Width: 1.2 m Deck and parapets	Unknown dimensions and material due to bridge under tree cover.	Footbridge
C	TM 38688 61069	Unknown	Wooden bridge with wooden cross hatch parapet	Footbridge
D	TM 38173 59190	Width: 4.0 m	Concrete deck	Farm track

Appendix C WFD Coastal Waterbody Details

Table C.1 Suffolk Coastal and Transitional Waterbody Elements

Waterbody	Description (Suffolk Waterbody)	Alde and Ore Waterbody
Waterbody ID	GB650503520002	GB520503503800
River Basin District Name	Anglian River Basin District	Anglian River Basin District
Waterbody type (estuarine or coastal)	Coastal	Transitional
Waterbody total area (ha)	14738.706	1144.66
Overall waterbody status (2022)	Moderate	Moderate
Ecological status (2022)	Moderate	Moderate
Chemical status (2019)	Fail	Fail
Target waterbody status and deadline	Ecological: Moderate 2015 Chemical: Good 2063	Ecological: Moderate 2015 Chemical: Good 2063
Hydromorphology status of waterbody	Heavily Modified	Heavily Modified
Heavily modified waterbody and for what use	Yes – Agriculture, rural land management, and water industry	Yes - Agriculture, rural land management, and water industry

Waterbody	Description (Suffolk Waterbody)	Alde and Ore Waterbody
Higher sensitivity habitats present	Yes - Saltmarsh	
Lower sensitivity habitats present	Yes – Cobbles, gravel and shingle, intertidal soft sediments like sand and mud, subtidal soft sediments like sand and mud.	
Phytoplankton status	Good	N/A (only applicable to coastal waterbodies)
History of harmful algae	No	High
WFD protected areas within 2km	Yes - Alde-Ore & Butley Estuaries (SAC), Orfordness-Shingles Street (SAC), Staverton Park & The Thicks Wantisden (SAC), Alde-Ore Estuary (SPA), Sandlings (SPA), Butley River Shellfish Waters	

Table C.2 Kent Coastal and Transitional Waterbody Elements

Waterbody	Description (Kent North Waterbody)	Description (Stour Kent Waterbody)
Waterbody ID	GB650704510000	GB520704004700
River Basin District Name	South East River Basin District	South East River Basin District
Waterbody type (estuarine or coastal)	Coastal	Transitional
Waterbody total area (ha)	45077.729	511.259
Overall waterbody status (2022)	Moderate	Moderate

Waterbody	Description (Kent North Waterbody)	Description (Stour Kent Waterbody)
Ecological status (2022)	Moderate	Moderate
Chemical status (2019)	Fail	Fail
Target waterbody status and deadline	Ecological: Good 2027 (low confidence) Chemical: Good 2063	Ecological: Moderate 2015 Chemical: Good 2063
Hydromorphology status of waterbody	Heavily Modified	Heavily Modified
Heavily modified waterbody and for what use	Yes – mitigation measures	Yes - Agriculture, rural land management, water industry, mitigation measures
Higher sensitivity habitats present	Yes – Chalk beds, mussel beds (including blue and horse mussels), saltmarsh, subtidal kelp beds.	
Lower sensitivity habitats present	Yes – Cobbles, gravel and shingle, intertidal soft sediments like sand and mud, rocky shore, subtidal rocky reef, subtidal soft sediments like sand and mud	
Phytoplankton status	High	Moderate
History of harmful algae	No	High
WFD protected areas within 2 km	Yes - Sandwich Bay (SAC & SPA), Thanet Coast (SAC & SPA), Margate Shellfish Waters, Multiple areas of Bathing Water	

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