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White Cross Offshore Windfarm Environmental Statement

Chapter 9: Marine Water and Sediment Quality

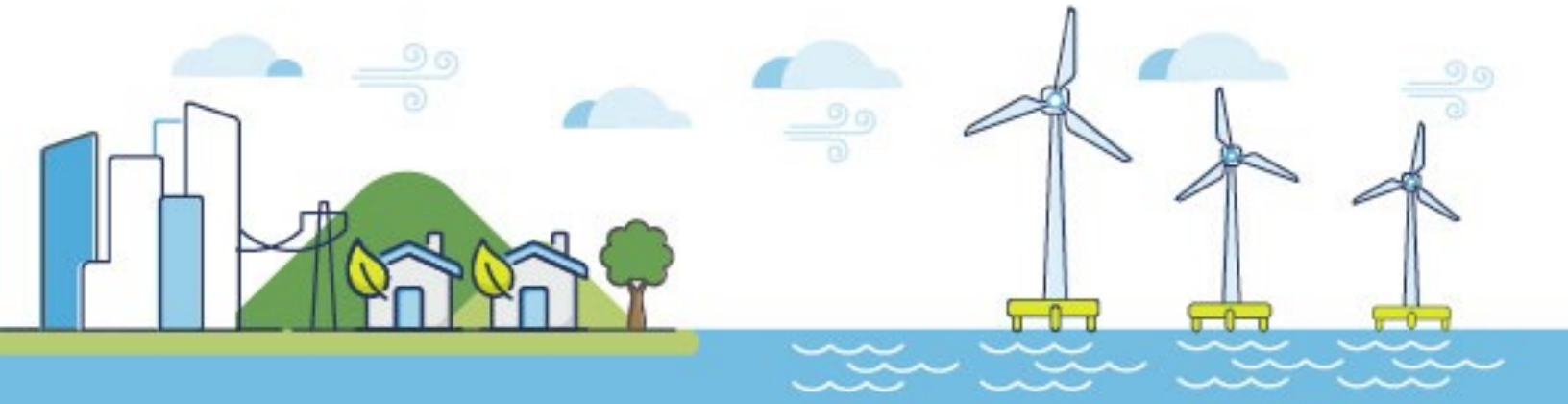

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Table of Contents

Table of Figures

Table of Tables

Appendices

Glossary of Acronyms

Acronym	Definition
AfL	Agreement for Lease
AL	Action Level
BAC	Background Assessment Concentration
BEIS	Department for Business, Energy and Industrial Strategy
BSH	Broadscale Habitat
CEA	Cumulative Effect Assessment
Cefas	Centre for the Environment and Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
DBT	Dibutyltin
DECC	Department for Energy and Climate Change
EEA	European Economic Area
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EQS	Environmental Quality Standards
ERL	Effects Range-Low
ES	Environmental Statement
EU	European Union
EUNIS	European Nature Information System
HDD	Horizontal Directional Drilling
IPC	Infrastructure Planning Commission
km	Kilometre
Km^2	Square kilometre
LPA	Local Planning Authority
m	Metre
MARPOL	International Convention for the Prevention of pollution from Ships
MMO	Marine Management Organisation
MW	Megawatts
NGC	National Grid Company
nm	Nautical Mile
NPPF	National Planning Policy Framework
NPS	National Policy Statement
OSPAR	The Convention for the Protection of the Marine Environment of the North-East Atlantic
OWL	Offshore Wind Ltd
PAH	Polycyclic Aromatic Hydrocarbon
PBDE	Polybrominated Diphenyl Ether
PCB	Polychlorinated Biphenyl

Acronym	Definition
PDE	Project Design Envelope
PPG	Pollution Prevention Guidelines
PSA	Particle Size Analysis
PSD	Particle Size Distribution
QSR	Quality Status Report
RBMP	River Basin Management Plan
S.36	Section 36 Consent
SSC	Suspended Sediment Concentration
TBT	Tributyltin
THC	Total Hydrocarbons
UK	United Kingdom
WFD	Water Framework Directive
WTG	Wind Turbine Generator

Glossary of Terminology

Defined Term	Description
Agreement for Lease	An Agreement for Lease (AfL) is a non-binding agreement between a landlord and prospective tenant to grant and/or to accept a lease in the future. The AfL only gives the option to investigate a site for potential development. There is no obligation on the developer to execute a lease if they do not wish to.
Applicant	Offshore Wind Limited
Cumulative effects	The effect of the Offshore Project taken together with similar effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with the Offshore Project.
Department for Business, Energy and Industrial Strategy (BEIS)	Government department that is responsible for business, industrial strategy, science and innovation and energy and climate change policy and consent under Section 36 of the Electricity Act.
Project Design Envelope	A description of the range of possible elements that make up the Offshore Project design options under consideration. The Offshore Project Design Envelope, or 'Rochdale Envelope' is used to define the Offshore Project for Environmental Impact Assessment (EIA) purposes when the exact parameters are not yet known but a bounded range of parameters are known for each key project aspect.
Development Area	The area comprising the Onshore Development Area and the Offshore Development Area
Environmental Impact Assessment (EIA)	Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation, maintenance, and decommissioning.
Export Cable Corridor	The area in which the export cables will be laid, either from the Offshore Substation or the inter-array cable junction box (if no offshore substation), to the NGC Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor.
Landfall	Where the offshore export cables come ashore (up to MHWS)
Mean high water springs	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean low water springs	The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
Mitigation	Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental impacts and discussed with the relevant authorities and

Defined Term	Description
	stakeholders in order to avoid, prevent or reduce impacts to acceptable levels. For the purposes of the EIA, two types of mitigation are defined: • Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA. Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant impacts. Additional mitigation is therefore subsequently adopted by OWL as the EIA process progresses.
Offshore Export Cable Corridor	The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall
Offshore Infrastructure	All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and ES and the parts of the Offshore Project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009
Offshore Substation Platform	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore
Project	The Project for the offshore Section 36 and Marine Licence application includes all elements offshore of MHWS. This includes the infrastructure within the windfarm site (e.g. wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and all infrastructure associated with the export cable route and landfall (up to MHWS) including the cables and associated cable protection (if required).
White Cross Offshore Windfarm	100MW capacity offshore windfarm including associated onshore and offshore infrastructure
Windfarm Site	The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present
Works completion date	Date at which construction works are deemed to be complete and the windfarm is handed to the operations team. In reality, this may take place over a period of time.

9. Marine Water and Sediment Quality

9.1 Introduction

1. This chapter of the Environmental Statement (ES) presents the potential effects of the White Cross Offshore Windfarm Project (the Offshore Project) on Marine Water and Sediment Quality. Specifically, this chapter considers the potential effect of the Offshore Project seaward of Mean High-Water Springs (MHWS) during its construction, operation and maintenance, and decommissioning phases.

2. The ES has been finalised with due consideration of pre-application consultation to date (see **Chapter 7: Consultation**) and the ES will accompany the application to the Marine Management Organisation (MMO) on behalf of the Secretary of State for Business for The Department for Business, Energy and Industrial Strategy (BEIS) for Section 36 Consent and relevant Marine Licences under the Marine and Coastal Access Act 2009 (MCAA 2009).

3. This ES chapter:

   - Presents the existing environmental baseline established from desk studies, consultation and site-specific survey work
   - Presents the potential environmental effects on Marine Water and Sediment Quality arising from the Offshore Project, based on the information gathered and the analysis and assessments undertaken
   - Identifies any assumptions and limitations encountered in compiling the environmental information
   - Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

9.2 Policy, Legislation and Guidance

4. **Chapter 3: Policy and Legislative Content** describes the wider policy and legislative context for the Offshore Project. The principal policy and legislation used to inform the assessment of potential impacts on Marine Water and Sediment Quality for the Offshore Project are outlined in this section.

9.2.1 National Policy Statement

5. The specific assessment requirements for Marine Water and Sediment Quality are set out within the overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy and Climate Change (DECC), 2011) and the draft EN-1

(BEIS, 2021) and NPS for Renewable Energy Infrastructure (EN-3) (DECC, 2011a) and summarised in **Table 9.1**. NPSs are statutory documents which set out the government's policy on specific types of Nationally Significant Infrastructure Projects (NSIPs) and are published in accordance with the Planning Act 2008. Although the Offshore Project is not an NSIP, it is recognised that due to its size of 100MW and its location in English waters, certain NPS are considered relevant to the Offshore Project and decision-making and are referred to in this ES.

Table 9.1 Summary of NPS EN-1 and EN-3 provisions relevant to Marine Water and Sediment Quality

Summary	How and where this is considered in the ES
"Infrastructure development can have adverse effects on the water environment, including transitional waters and coastal waters. During the construction, operation, maintenance and decommissioning phases, discharges could occur. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse impacts on health or on protected species and habitats and could, in particular, result in surface waters, ground waters of protected areas failing to meet environmental objectives established under the Water Framework Directive" - **EN-1, paragraph 5.15.1**	Potential impacts on water quality during construction, operation and maintenance and decommissioning are assessed in **Sections 9.5, 9.6** and **9.7**, respectively, and in the Water Environment Regulations Compliance Assessment found in **Appendix 9.A**. Impacts to habitats and species are assessed in **Chapter 10: Benthic and Intertidal Ecology** and **Chapter 11: Fish and Shellfish Ecology**.
"Where the project is likely to have adverse effects on the water environment, the application should undertake an assessment of the existing status of, and impacts of the proposed project, on water quality, water resources and physical characteristics of the water environment as part of the ES or equivalent." **- EN-1, paragraph 5.15.2**	The existing baseline and the baseline for the marine water environment within the study area is presented in **Section 9.4**.
"The ES should in particular describe the existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges" **- Draft EN-1, paragraph 5.16.5**	Potential impacts on water quality during construction, operation and maintenance and decommissioning are assessed in **Sections 9.5, 9.6** and **9.7**, respectively, and in the Water Environment Regulations Compliance Assessment found in **Appendix 9.A**.
"The risk of impacts on the water environment can be reduced through careful design to facilitate adherence to good pollution control practice." - **Draft EN-1, paragraph 5.16.12**	A Construction Environment Management Plan (CEMP) will be produced which will set out the best practice measures required throughout construction.

Summary	How and where this is considered in the ES
The construction, operation, maintenance and decommissioning of offshore energy infrastructure can affect marine water quality through the disturbance of seabed sediments or the release of contaminants with subsequent indirect effects on habitats, biodiversity and fish stocks. - **EN-3, paragraph 2.6.189**	Potential impacts on water quality during construction, operation and maintenance and decommissioning are assessed in **Sections 9.5, 9.6** and **9.7**, respectively. Contaminant analysis of samples collected from the seabed indicate very low levels of contaminants. Potential impacts on commercial fisheries receptors are assessed in **Chapter 14: Commercial Fisheries**.
"The Environment Agency regulates emissions to land, air and water out to 3 nautical miles (nm). Where any element of the wind farm or any associated development included in the application to the Infrastructure Planning Commission (IPC) (now the Planning Inspectorate) is located within 3nm of the coast, the Environment Agency should be consulted at the pre-application stage on the assessment methodology for impacts on the physical environment." - **EN-3, paragraph 2.6.191**	Consultation with the Environment Agency has been undertaken through the Expert Topic Group (ETG) process.
"Beyond 3nm, the Marine Management Organisation (MMO) is the regulator. The applicant should consult the MMO and Centre for Environment, Fisheries and Aquaculture Science (Cefas) on the assessment methodology for impacts on the physical environment at the pre-application stage." - **EN-3, paragraph 2.6.192**	Consultation with the MMO has been undertaken through the ETG process.

9.2.2 National Planning Policy Framework

6. The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, updated July 2021) is the primary source of national planning guidance in England. Sections relevant to this aspect of the ES are summarised below in **Table 9.2**.

Table 9.2 Summary of NPPF Policy relevant to Marine Water and Sediment Quality

Summary	How and where this is considered in the ES
"Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to,	Potential impacts on water quality during construction, operation and maintenance and decommissioning are assessed in **Sections 9.5, 9.6** and **9.7**, respectively and in the Water Environment Regulations Compliance

Summary	How and where this is considered in the ES
being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans" - **NPPF, paragraph 174 (e)**	Assessment (**Appendix 9.A**) with respect to the river basin management plans.

9.2.3 Guidance

7. There is no specific guidance available for the impact assessment of marine sediment and water quality. However, where the data available supports it, sediment quality guidelines used by OSPAR (OSPAR Commission, 2014), the US Environmental Protection Agency (EPA) and the MMO have been used in relation to the assessment of contaminant concentrations within sediments and the potential for biological effects.

8. With respect to OSPAR and the EPA, assessments are undertaken using OSPAR's Background Assessment Concentration (BAC) and the US EPA's Effects Range-Low (ERL). BACs are statistical tools defined in relation to the background concentrations which enable statistical testing of whether observed concentrations can be considered to be near background concentrations. The ERL value is defined as the lower tenth percentile of the data set of concentrations in sediments which were associated with biological effects. Adverse effects on organisms are rarely observed when concentrations fall below the ERL value. Relevant BACs and ERLs are provided in **Table 9.3**.

9. In the UK, licensing authorities for dredge material disposal to sea, regulate the activity using guidelines, part of which require characterisation of the sediments for disposal to enable the consideration of potential adverse environmental effects. To undertake this assessment, regulating authorities apply action levels (sediment quality criteria) for contaminants on a primary list. These action levels are then used as part of a 'weight of evidence' approach to decision making on the disposal of dredged material. There are two levels – Action Level 1 (AL1) and Action Level 2 (AL2). Contaminant levels below AL1 are generally assumed to be of no concern and are unlikely to influence the licensing decision. Contaminant levels between Level 1 and 2 generally trigger further investigation of the material, and contaminants in dredged material above AL2 are generally considered unsuitable for sea disposal (MMO, 2015).

10. Although the majority of the material assessed against these standards arises from a specific activity i.e. dredging and disposal activities, they are also considered a good way of undertaking an initial risk assessment with respect to determining risks to marine waters from other marine activities as part of the EIA and associated Water Framework Directive (WFD) compliance assessments. If, overall, levels do not generally exceed AL1 then contamination levels are considered to be low risk in terms of the potential for impacts on water quality. This approach is recommended by the Environment Agency in their Water Environment Regulations Compliance Assessment guidance 'Clearing the Waters for All' for example (Environment Agency, 2017). Relevant values are presented in **Table 9.3**.

Table 9.3 Sediment quality guidelines used in this assessment

Contaminant	Units	OSPAR BAC	OSPAR ERL	Cefas AL1	Cefas AL2
Arsenic	mg/kg	25	8.2	20	100
Cadmium		0.31	1.2	0.4	5
Chromium		81	81	40	400
Copper		27	34	40	400
Mercury		0.07	0.15	0.3	3
Nickel		36	21	20	200
Lead		38	47	50	500
Zinc		122	150	130	800
Acenaphthene	µg/kg	-	-	100	-
Acenaphthylene		-	-	100	-
Anthracene		5	85	100	-
Benz(a)anthracene		16	261	100	-
Benzo(a)pyrene		30	430	100	-
Chrysene		20	-	100	-
Dibenzo(a,h)anthracene		-	-	10	-
Fluoranthene		39	600	100	-
Fluorene		-	-	100	-
Naphthalene		8	160	100	-
Phenanthrene		32	240	100	-
Pyrene		24	665	100	-
Benzo(ghi)perylene		80	-	100	-
Indeno[1,2,3-cd]pyrene		103	-	100	-

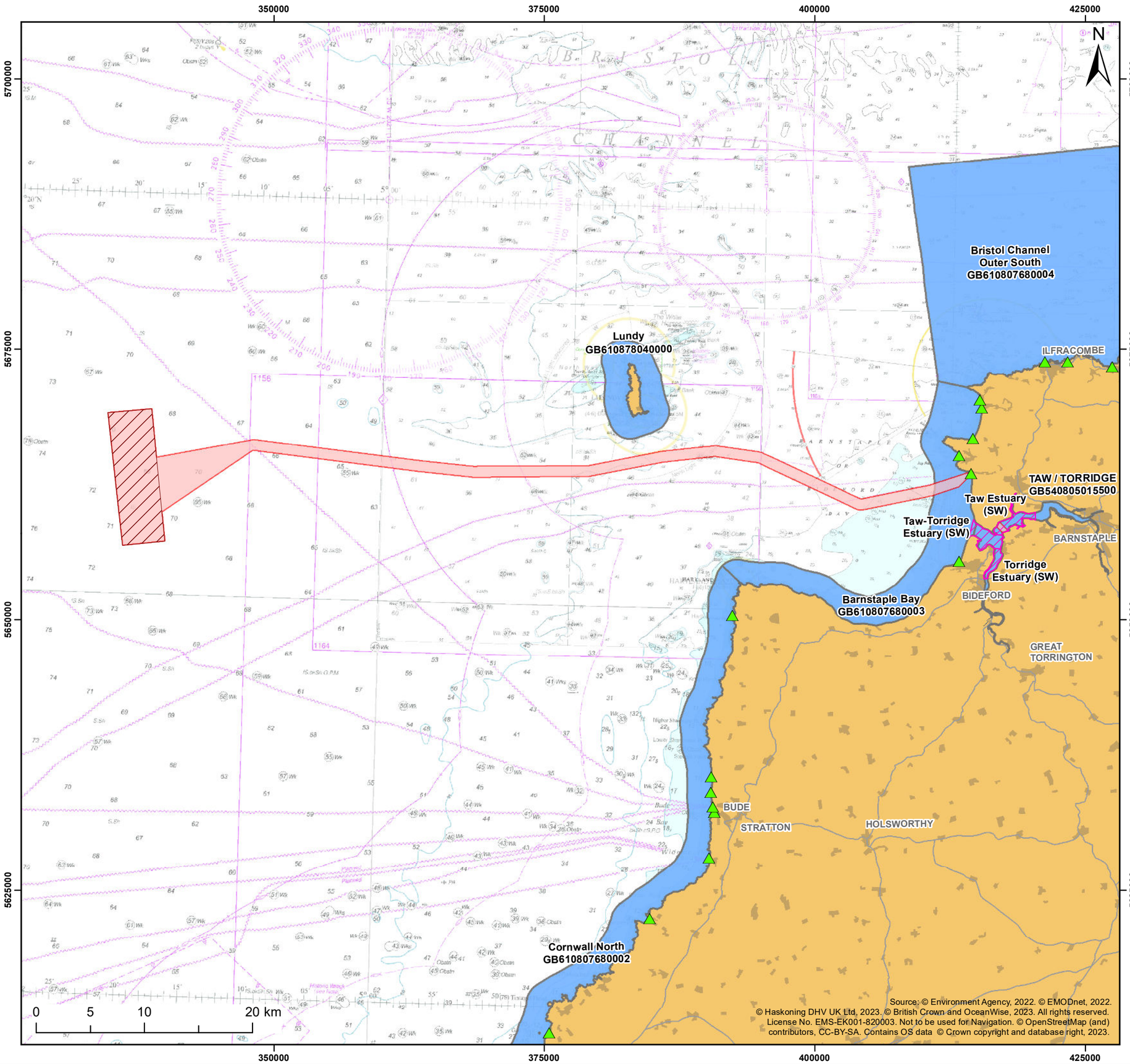
9.3 Assessment methodology

9.3.1 Study area

11. Details of the location of the Offshore Project and the offshore infrastructure are set out within **Chapter 5: Project Description.**

12. The Marine Water and Sediment Quality study area is defined by the distance over which impacts on water quality from all the offshore infrastructure (i.e., the Wind Farm Site, Offshore Export Cable Corridor, Offshore Substation and Landfall) may occur and by the location of any receptors that may be affected by those potential impacts.

13. The study area therefore includes the direct footprint of the offshore infrastructure, and the wider area which may be impacted by sediment plumes. This area has been informed by **Chapter 8: Marine Geology, Oceanography and Physical Processes** which considers the spatial extent of any potential sediment plumes. The study area is shown in **Figure 9.1**.



Legend:
- Windfarm Site
- Offshore Development Area
- WFD Coastal Water body
- Shellfish Waters
- Bathing Waters

Client: Offshore Wind Ltd.	Project: White Cross Offshore Windfarm

Title: Marine Water and Sediment Quality Study Area

Figure: 9.1 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0468

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P02	03/03/2023	AB	SM	A3	1:350,000
P01	19/12/2022	AB	SM	A3	1:350,000

Co-ordinate system: WGS 1984 UTM Zone 30N

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9.3.2 Approach to assessment

14. The assessment methodology for Marine Water and Sediment Quality differs to that presented in **Chapter 6: EIA Methodology**. The methodology to be followed is set out in the following sub-sections.

9.3.2.1 Impact assessment criteria

15. The terms used to define sensitivity and magnitude are outlined in **Table 9.4** and **Table 9.5**.

Table 9.4 Definition of terms relating to receptor sensitivity

Sensitivity	Definition
High	The water quality of the receptor supports or contributes towards the designation of an internationally or nationally important feature and/or has a very low capacity to accommodate any change to current water quality status, compared to baseline conditions.
Medium	The water quality of the receptor supports high biodiversity and/or has low capacity to accommodate change to water quality status.
Low	The water quality of the receptor has a high capacity to accommodate change to water quality status due, for example, to large relative size of the receiving water and capacity for dilution. Background concentrations of certain parameters of natural or anthropogenic origin are known to exist within the surrounding environment.
Negligible	Specific water quality conditions of the receptor are likely to be able to tolerate proposed change with very little or no impact upon the baseline conditions detectable.

16. Water quality in the offshore area is considered to be of low sensitivity because it is not within a confined area and therefore has a high capacity to accommodate change due to its size and ability to dilute any alterations to water quality parameters.

17. The descriptions of magnitude are specific to the assessment of marine water quality impacts and are considered in addition to the generic descriptors of impact magnitude that are presented in **Chapter 6: EIA Methodology**. Potential impacts have been considered in terms of whether they are permanent or temporary and have resulting adverse or beneficial effects. The magnitude of an effect is dependent upon its:

- Scale (i.e., size, extent or intensity)
- Duration
- Frequency of occurrence

- Reversibility (i.e., the capability of the environment to return to a condition equivalent to the baseline after the effect ceases).

18. The magnitude of effect is described using a standard scale and definitions for each term are provided in **Table 9.5**.

Table 9.5 Definition of terms relating to magnitude of an impact

Magnitude	Definition
High	Large scale change to key characteristics of the water quality status of the receiving water feature. Water quality status degraded to the extent that a permanent or long-term change occurs. Inability to meet (for example) Environmental Quality Standard (EQS) is likely.
Medium	Medium scale changes to key characteristics of the water quality status taking account of the receptor volume, mixing capacity, flow rate, etc. Water quality status likely to take considerable time to recover to baseline conditions.
Low	Noticeable but not considered to be substantial changes to the water quality status taking account of the receiving water features. Activity not likely to alter local status to the extent that water quality characteristics change considerably or EQSs are compromised.
Negligible	Although there may be some impact upon water quality status, activities predicted to occur over a short period. Any change to water quality status would be quickly reversed once activity ceases.

19. The significance of the effect upon Marine Water and Sediment Quality is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is presented in **Table 9.6**.

Table 9.6 Significance of an impact - resulting from each combination of receptor sensitivity and the magnitude of the effect upon it

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

9.3.3 Worst-case scenario

20. In accordance with the assessment approach to the Project Design Envelope (PDE), or 'Rochdale Envelope', set out in **Chapter 6: EIA Methodology**, the impact assessment for marine water and sediment quality has been undertaken based on

a realistic worst-case scenario of predicted impacts. The PDE for the Offshore Project is detailed in **Chapter 5: Project Description**.

21. The realistic worst-case scenarios with regard to marine water and sediment quality within the study area are presented by impact in **Table 9.7**. These relate to activities which will cause the disturbance of large volumes of sediment into the water column.

Table 9.7 Definition of realistic worst-case scenario details relevant to the assessment of impacts in relation to marine water and sediment quality

Impact	Realistic worst-case scenario	Rationale
Construction		
Impact 1: Localised temporary increases in suspended sediments due to cable burial	Export cable burial (up to two cables) would disturb the subtidal seabed 25m wide (incl. pre-lay activities), up to 93.6km long = 4,680,000m^2 (plan area for two cables). Volume of sediment disturbance for two cables = 1,684,800m^3 (burial depth 3m x trench width 3m x cable length 93.6km per cable). Sand wave removal for a single export cable would disturb about 2.8km of the seabed (assumed to be 3% of the total cable length) up to 50m wide = 280,800m^2 (plan area for two cables). Assuming an average sand wave height of 3m = 842,400m^3 (volume for two cables). Inter-array cable burial would disturb the subtidal seabed 20m wide, up to about 29.76km long = plan area of 480,000m2. Cable burial for two cables would displace a volume of 216,000m3 assuming 3m wide, 3m deep excavation for each. Jetting/ploughing considered the worst case. The cable landfall (up to MHWS) will require burial across the intertidal at the northern end of Saunton Sands which, as a worst case, would be undertaken using a trenching technique. The two cables would be	The worst-case scenario for water quality would occur through the release of significant volumes of, potentially contaminated, sediment into the water column. Jetting/ploughing within the subtidal and open cut trenching in the intertidal would disturb the largest volume of sediment and therefore potentially cause the largest suspended sediment concentrations.
Impact 2: Remobilisation of existing contaminated sediments		

Impact	Realistic worst-case scenario	Rationale
	buried in a trench across the intertidal and into the subtidal. The trench dimensions across the beach would be 0.5m wide and 270m long per cable, = 135m^2 for two cables and 162m^3 (volume for two cables).	
Operation		
Impact 1: Localised temporary increases in suspended sediments due to the physical presence of the infrastructure	Catenary drag footprint at each turbine would be the seabed footprint of six 10m by 10m anchors multiplied by the mooring line radius (8m) and the chain width (0.5m) = 2,424m^2. For eight turbines = 19,392m^2. Maintenance activities may also cause the resuspension of sediment; however this will be localised and smaller in scale than during construction.	Effects on water quality may arise by the re-suspension of sediment within the catenary drag footprint of each WTG.
Impact 2: Remobilisation of existing contaminated sediments		
Decommissioning		
Impact 1: Localised temporary increases in suspended sediments due to cable decommissioning	As for Construction Impact 1 and 2	
Impact 2: Remobilisation of existing contaminated sediments	As for Construction Impact 1 and 2	

9.3.4 Summary of mitigation

9.3.4.1 Embedded mitigation

22. This section outlines the embedded mitigation relevant to the Marine Water and Sediment Quality assessment, which has been incorporated into the design of the Offshore Project (**Table 9.8**). Where other mitigation measures are proposed, these are detailed in the impact assessment.

Table 9.8 Embedded mitigation measures relevant to the Marine Water and Sediment Quality assessment

Component/Activity	Mitigation embedded into the design of the Offshore Project
Cables	Route selection and micro-siting of the cables will be used to avoid areas of seabed that pose a significant challenge to their installation, including for example, areas of sand waves and megaripples. This will minimise the requirement for seabed preparation (levelling) and the associated seabed disturbance and resuspension of sediment.
All construction activities	All vessels involved with construction and operation of The Offshore Project will be required to comply with the International Convention for the Prevention of pollution from Ships (MARPOL)73/78. A CEMP will also be put in place for the Offshore Project to ensure all works are undertaken in line with best practice for working in the marine environment.

23. No additional mitigation measures are required for Marine Water and Sediment Quality.

9.3.5 Baseline data sources

9.3.5.1 Desktop study

24. Data were acquired within the study area through a detailed desktop review of existing studies and datasets. Agreement was reached with all consultees that the data collected, and the sources used to define the baseline characterisation for Marine Water and Sediment Quality are fit for purpose (Marine Ecology ETG Meeting 1, 5 May 2022). The agreed sources of information are summarised in **Table 9.9**.

Table 9.9 Data sources used to inform the Marine Water and Sediment Quality assessment

Source	Summary
OSPAR Assessments (OSPAR 2010 assessment (OSPAR 2010) OSPAR Intermediate Assessment 2017 (OSPAR 2017)	The Interim Assessment 2017 provides background information and assessments of human pressures on the marine environment and biological diversity of the OSPAR Maritime Area. The Quality Status Report 2010 evaluates the quality status of the marine environment and biological diversity of the OSPAR Maritime Area.
OSPAR Coordinated Environmental Monitoring Programme (CEMP) assessment reports (OSPAR Commission 2020)	The 2019-2020 report summarises the 2019-2020 annual CEMP assessment of levels and trends of contaminants and their biological effects.
Environment Agency Catchment Data Explorer (Environment Agency, 2022a)	Database for information related to river basin management plans (RBMP) in England. Contains

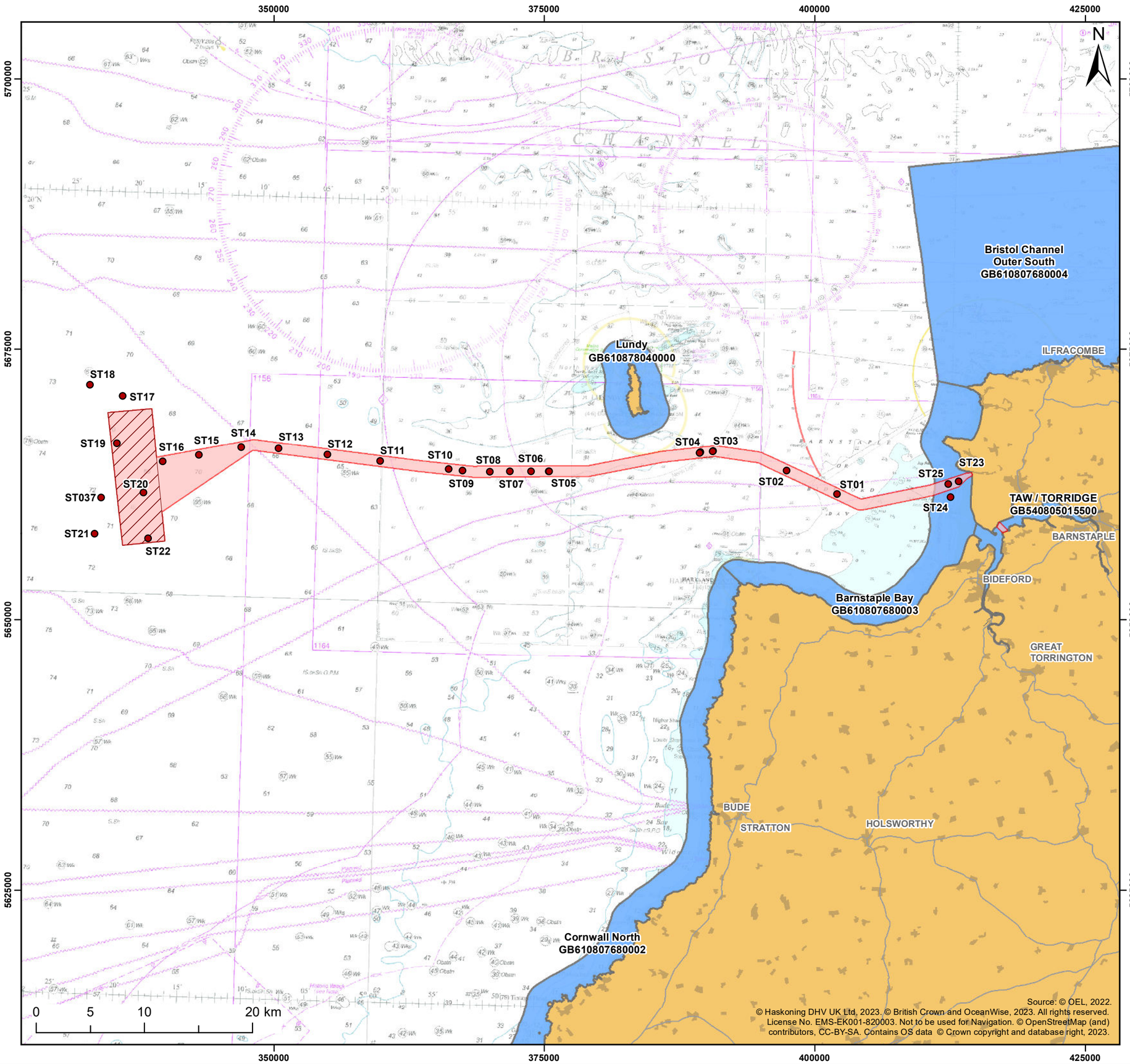
Source	Summary
	information on river basin districts and catchments and WFD compliance data
Environment Agency Bathing Waters Information and classification (Environment Agency, 2022b)	Data for designated bathing waters.

9.3.5.2 Site specific survey

25. To further inform the baseline, site-specific surveys were undertaken, as agreed with the statutory consultees during the Marine Ecology ETG Meeting 1 on the 5 May 2022. These surveys are outlined in **Table 9.10**. Chemical analysis sampling locations undertaken as part of the site-specific survey are shown in **Figure 9.2**.

Table 9.10 Summary of site-specific survey data

Survey name and year	Summary
Benthic Characterisation Survey, 2022	25 stations (22 offshore and 3 nearshore) sampled with a 0.1 m^2 grab sampler with prior investigation by drop-down camera. Single Particle Size Distribution (PSD) analysis and macrobenthic samples collected from each sampling station. Additional samples were collected at a subset of 14 of the 25 stations for subsequent chemical contaminant analysis. The samples were analysed for the following parameters: • Trace metals • Organotins, • Polyaromatic Hydrocarbons (PAHs) and Total Hydrocarbons (THC) • Polychlorinated biphenyls (PCBs). Chemical analysis was undertaken in line with the MMO accreditation scheme regarding sediment sampling for disposal to sea licensing at SOCOTEC. A 0.1m^2 Day grab sampler was used to collect the samples.



Legend:
- Windfarm Site
- Offshore Development Area
- WFD Coastal Water body
- Grab Samples (Chemical Contamination)

Client: Offshore Wind Ltd.	Project: White Cross Offshore Windfarm

Title: Grab Sample Locations Analysed for Chemical Contamination

Figure:	Drawing No:
9.2	PC2978-RHD-ZZ-XX-DR-Z-0469

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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P01	04/01/2023	AB	SM	A3	1:350,000

Co-ordinate system: WGS 1984 UTM Zone 30N

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9.3.6 Data limitations

26. Given the limited data available regarding site specific offshore water quality, information from more general monitoring programmes such as those undertaken by OSPAR are used to inform the baseline for offshore water quality. This limitation is not considered to significantly affect the certainty or reliability of the impact assessments presented in **Sections 9.5, 9.6 and 78**.

9.3.7 Scope

27. During scoping (Case reference: EIA/2022/00002), several potential impacts upon Marine Water and Sediment Quality were agreed to be "Scoped out". These impacts are outlined, together with a justification as to why they are not considered further, in **Table 9.11**.

Table 9.11 Summary of impacts relating to Marine Water and Sediment Quality that are scoped out of the assessment

Potential Impact	Justification
Pollution events resulting from the accidental release of pollutants	There is a risk that a pollution event could occur through the accidental release of pollutants into the water column which could have a detrimental effect on Marine Water and Sediment Quality. All vessels involved with construction and operation of The Offshore Project will be required to comply with the International Convention for the Prevention of pollution from Ships (MARPOL)73/78. A CEMP will also be put in place for the Offshore Project to ensure all works are undertaken in line with best practice for working in the marine environment. This mitigation will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event.
Transboundary impacts	The likely water quality impacts would be restricted to near-field effects only (within tens or hundreds of metres of the activity), transboundary impacts are unlikely to occur, or are unlikely to be significant.

9.3.8 Consultation

28. Consultation has been a key part of the development of the Offshore Project and has been conducted throughout the preparation of this ES. See **Chapter 7: Consultation** for further detail.

29. A summary of the key issues raised during consultation specific to Marine Water and Sediment Quality is outlined below in

30. **Table** 9.12, together with how these issues have been considered in the production of this ES.

Table 9.12 Consultation responses

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
Cefas	25th March 2022, Scoping response	The onshore cable ducts are to be installed using a trenching machine/open-cut trench techniques and using HDD or other trenchless methods, where necessary, to avoid surface disturbance at sensitive features. I acknowledge that the risk of suspended sediments and contamination is low using these methods.	Please see **Section 9.5.1** for an assessment of this potential impact
		Paragraph 129 describes that installation of the offshore export cable is typically undertaken by ploughing, jetting, trenching or post-lay burial depending on the soil conditions along the cable route. Please note that these methods have the potential for contaminant release and therefore, the Applicant may need to take samples to inform the impact assessment. I recommend the applicant engage with the MMO and provide a map of where these methods are to be carried out, to allow sampling advice to be provided.	Sampling has been undertaken to inform this assessment, in line with recommendations of the MMO and Cefas (see **Table 9.10**). The analysis results of this sediment survey are presented in **Section 9.4.1**)
		The effect of construction activities on suspended sediment concentrations will be assessed using expert-based assessment and using a source-pathway-receptor conceptual model. Further, the EIA will consider any likely changes in suspended sediment concentrations in response to scouring effects. I welcome these inclusions.	Noted. Construction effects on SSCs are assessed in **Section 9.5.1** and changes in SSCs during operation are assessed in **Section 9.6.1**.
		Potential cumulative effects are yet to be assessed and will consider cumulative effects with the existing windfarms and any other projects and marine users within the zone of influence. This is appropriate for the scoping stage.	Please see **Section 9.8** for an assessment of cumulative effects.
		Transboundary effects have been scoped out as the Offshore Project is ~130km from any international territory boundary. I agree with this scoping decision.	Noted. This is justified within **Section 9.3.7**.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
North Devon District Council	5th April 2022, Scoping response (pre-application enquiry)	The Scoping Out of pollution events resulting from the accidental release of pollutants does not appear to be fully justified. Pollution events at the offshore development site, along the cable route, landfall (up to MHWS) site or from construction vessels in transit could have potentially significant effects on wide range of environmental and socio-economic receptors. All primary effects on the receiving environment and secondary effects on tourism, the fishing industry, etc should be assessed in full.	A CEMP would be put in place for the Offshore Project to ensure all works are undertaken in line with best practice for working in the marine environment. This mitigation will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event.
Environment Agency	6th April 2022, Scoping response (ref DC/2022/122540/01-L01)	With regard to the objectives of the Water Framework Directive (WFD) new development must not cause deterioration from the present status. We would expect the Environment Statement to demonstrate that the proposal will not cause deterioration in WFD waterbody status. When the proposal's detailed locations are decided, we can provide further advice. At this stage we require the Environment Statement to scope in how the proposed development would affect the River Taw (& wider estuary), River Torridge (& wider estuary), Sir Arthurs Pill (main river) and other minor watercourse along with any relevant bathing waters and shellfish waters.	Please refer to **Appendix 9.A** for the Water Environment Regulations Compliance Assessment.
		The distance between the proposed turbines and nearest designated Bathing Waters and Shellfish Waters means that any sediment plume generated during construction or decommissioning is unlikely to have a significant adverse effect.	Noted. Please refer to **Section 9.5** and **Section 9.7** for construction and decommissioning assessments on sediment plumes.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		However, an assessment should be prepared into the potential impacts of sediment deposition in the Taw and Torridge estuary and associated designated bathing beaches during construction operations at the site of the cable landfall (up to MHWS) and any crossing of the River Taw / Torridge. The impact assessment should include the possible effects of the drilling works on dispersion of final effluent from any outfall for Sewage Treatment Works and also the Taw / Torridge Estuary Shellfish Waters. We would expect the development to submit a Water Quality Monitoring Strategy to set out the pre- and post- development water quality sampling scheme, and any monitoring during the works which may be required.	This Chapter focusses on the potential impacts arising from the installation of the offshore infrastructure. An assessment of potential impacts on marine water quality during construction is presented in **Section 9.5**. **8: Marine Geology, Oceanography and Physical Processes** finds that the Offshore Project will not have an effect on the Taw/Torridge estuary. Potential impacts on freshwater and transitional water bodies arising from the installation of the Onshore Project are assessed in **Appendix 9.A**.
		To help manage risks (i.e., any increased silt loads) to the water environment, we recommend that a Construction Environment Management Plan (CEMP) is developed. The CEMP should pull together and manage the pollution control and waste management requirements during the construction phase. It should ensure that adequate pollution prevention	A CEMP will be produced to ensure all works are undertaken in line with best practice for working in the marine environment. An Outline

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		measures are included to protect controlled waters during construction. We recommend that the CEMP is drafted using guidance in our Pollution Prevention Guidelines (PPGs), in particular PPG5 - Works and maintenance in or near water and PPG6 - Working at construction and demolition sites. These can be viewed via the following link: https://www.gov.uk/government/collections/pollution-prevention-guidance-ppg	CEMP is provided in **Appendix 5.A**.
		All fuel, hydraulic and lubricating oils associated with onshore and offshore works should be stored in suitable double skinned or integrally bunded storage systems with leakage control alarm mechanisms. A pollution contingency plan should be in place in the event of a leak or spill of oil from onshore or offshore operations. Our relevant Pollution Prevention Guidelines (PPGs) should be referred to. These are available on our website.	As above. The CEMP will contain guidance on the control of chemicals.
		All temporary working methods including: piling, dredging, de-watering, pumping, and construction within any water course must all be considered in the context of timing and minimising disturbance to migratory fish species' movement and activity. Sediment and its movement is a natural part of aquatic systems, essential for hydrological, geomorphological and ecological functioning. Sediment forms a variety of habitats, which directly and indirectly support a broad range of flora and fauna. Dredging / drilling can affect the water environment. It can alter flow regimes, release contaminants accrued within the sediment, and create smothering effects, thereby damaging benthic habitats and migratory fish populations. Dredging should only be undertaken in a manner that protects the environment. The applicant should consider the methodology to be used, the disposal of dredged material, and the timing of works. Decisions should be underpinned by	Jetting / ploughing is considered to be the worst-case scenario during offshore export cable installation and trenching is considered the worst case scenario for the cable landfall (up to MHWS) (**Table 9.7**). The potential impacts of these activities on marine water quality are considered in **Section 9.5**. Potential impacts for the onshore cable route installation on transitional

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		the fundamental scientific principles of hydraulics and geomorphology and take account of the multiple functions and services that a channel delivers. We recommend that any dredging is carried out in accordance with the Channel Management Handbook and our good practice guidance.	and freshwater bodies are considered in **Appendix 9.A**.
Natural England	17th March 2022, Scoping response (ref 384007)	The planning system plays a key role in determining the location of developments which may give rise to water pollution, and hence planning decisions can have a significant impact on water quality, and land. The assessment should take account of the risks of water pollution and how these can be managed or reduced.	A CEMP will be produced to ensure all works are undertaken in line with best practice for working in the marine environment. An Outline CEMP is provided in **Appendix 5.A**.

9.4 Existing environment

31. This section describes the existing environment in relation to Marine Water and Sediment Quality for the Offshore Project. It has been informed by a review of the sources listed in **Table 9.9**.

9.4.1 Current baseline

9.4.1.1 Water quality – contaminants

32. The Offshore Export Cable Corridor and the landfall (up to MHWS) routes pass through a WFD water body – the Barnstaple Bay coastal water body. The construction work required for the refurbishment of the onshore substation and cable trenching will take place directly adjacent to the Taw/Torridge transitional water body (see **Figure 9.1**). The assessment of potential effects on this water body arising from the onshore cable route installation is considered in the separate Onshore Town and County Planning Act Planning Application. However, the water quality information available for these water bodies is also relevant to this chapter and is therefore summarised here and the Water Environment Regulations Compliance Assessment is presented in **Appendix 9.A**.

33. Barnstaple Bay coastal water body is not designated as an artificial or heavily modified water body. It is currently classified as having an overall status of 'Moderate' (Environment Agency, 2022a). The status of ecological parameters within the water body, including macroalgae and phytoplankton, and the status of physico-chemical parameters (dissolved oxygen and inorganic nitrogen) is currently classified as 'good' however, the chemical status of the water body is classified as 'fail' due to high levels of polybrominated diphenyl ethers (PBDEs) and mercury.

34. The Taw/Torridge transitional water body is classified as a heavily modified water body due to physical modifications. It is also classified as having an overall status of 'moderate' (Environment Agency, 2022a). The status of its ecological parameters is classified as 'moderate' due to levels of dissolved inorganic nitrogen and it has a chemical status of 'fail' due to levels of benzo[ghi]perylene, mercury and PBDEs.

35. There are six Bathing Waters located along this coastline between Bideford and Mortehoe as shown in **Figure 9.1**. These include:

- Westward Ho!
- Saunton Sands
- Croyde Bay
- Putsborough

- Woolacombe Village
- Combesgate Beach, Woolacombe.

36. The offshore export cable route will make landfall (up to MHWS) within the Saunton Sands Bathing Water. Other Bathing Waters closest to the offshore export cable landfall (up to MHWS) are Westward Hoe! (c. 6.5km to the south) and Croyde Bay (c. 4km to the north). Saunton Sands and Westward Ho! are currently classified as 'Excellent' and Croyde Bay is currently classified as 'Good' based on water samples taken from 2017 through to 2021[1] (Environment Agency 2022b).

37. The Taw-Torridge estuary Shellfish Water is located within the estuary of the rivers Taw and Torridge, from where the two rivers meet to the mouth of the estuary and is designated to protect mussel (*Mytilus spp.*) beds (Cefas, 2013). Further Shellfish Waters are located upstream, the Taw estuary Shellfish Water and the Torridge estuary Shellfish Water. Mussels are farmed within these Shellfish Waters and a small area within the Torridge estuary Shellfish Water is farmed for Pacific oyster (*Crassostrea gigas*) (Cefas, 2013).

38. In terms of the offshore area, the Interim Quality Status Report (QSR) (OSPAR, 2017) states that since the QSR 2010 (OSPAR, 2010) in the OSPAR region, within which the Offshore Project sits, contaminant concentrations have continued to decrease, especially for polychlorinated biphenyls (PCBs). Although contaminant concentrations are generally below levels likely to harm marine species in the areas assessed, in most cases they have not yet reduced to within background levels (where these are specified). Concerns remain in some localised areas with respect to high levels of mercury, lead, and CB118 (one of the most toxic PCB congeners) and locally increasing concentrations of polycyclic aromatic hydrocarbons (PAHs) and cadmium in open waters (OSPAR, 2017).

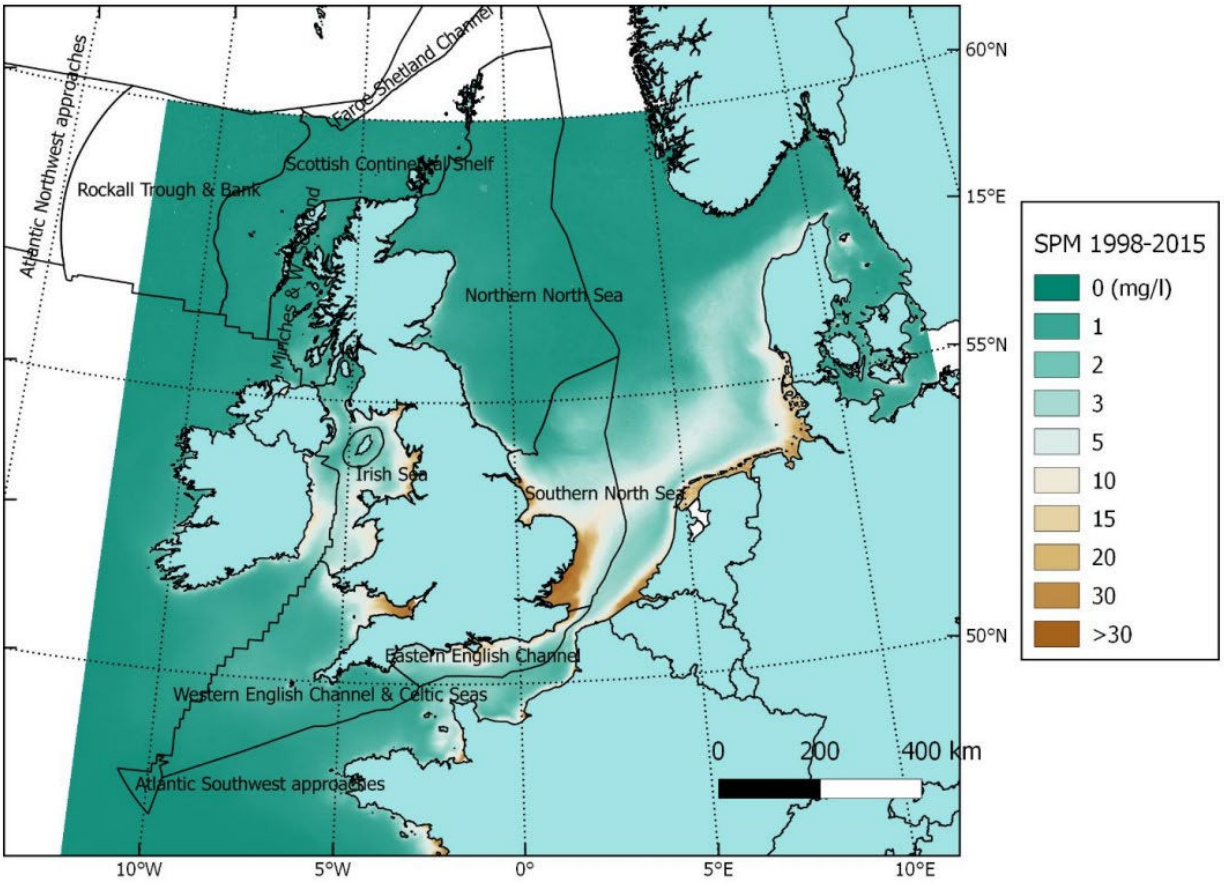
9.4.1.2 Water quality – suspended sediment

39. As set out in **Section 8.4.1** of **Chapter 8: Marine Geology, Oceanography and Physical Processes**, Cefas published average suspended sediment concentrations (SSCs) between 1998 and 2015 for the seas around the UK (Cefas, 2016) (**Plate 9.1**). The average annual suspended sediment concentrations at the Windfarm Site

[1] It should be noted that Bathing Water classifications were not made for the 2020 season due to the impact of the COVID-19 pandemic on the sampling programme.

is lower than 5mg/l. Towards the coast, along the Offshore Export Cable Corridor, concentrations increase to up to 15mg/l.

Plate 9.1 Average SSCs in the Celtic Sea for the period 1998-2015 (Cefas, 2016)



9.4.1.3 Sediment – physical characteristics

40. Sediment grain size is important to inform assessment of the risk of contamination because finer grained materials (silts and clays) function as a sink for contaminants and therefore have a greater potential to retain contaminants than larger grained materials (Cefas, 2001). Sediment grain size also assists in predicting the extent of any sediment plume should the material be disturbed.

41. The Windfarm Site is located approximately 52km offshore, to the north-west of the Devon and Cornwall coastline in water depths of between 60-80m. The seabed sediments in this area are characterised by sand (EMODnet, 2022). Along the route of the export cable are areas of coarse sediments and rock. From approximately 20km offshore to the landfall site (up to MHWS) the sediments become finer sands with some mud, associated with the sheltering effect of Bideford Bay (EMODnet, 2022).

42. This is supported by the particle size analysis (PSA) of sediments taken during the benthic surveys (OEL, 2022/**Chapter 8 Appendix 8.B: Ocean Ecology (2022) benthic survey report).** Despite some variation in sediment types between stations, the majority of stations were dominated by sand. Mud content was highest close to land (at ST01). Gravel content was overall low but variable along the cable route with a few stations along the route found to contain >50% gravel composition (ST03, ST07, ST09, and ST10).

43. The majority of samples were comprised of sand representing EUNIS (European Nature Information System) broadscale habitat (BSH) A5.2 (sand and muddy sand). Some stations were classified as sandy gravel or gravelly sand representing EUNIS BSH A5.1 (coarse sediment); only one station was classified as muddy sandy gravel and one station as gravelly muddy sand representing EUNIS BSH A5.4 (mixed sediment).

9.4.1.4 Sediment - contaminants

44. To inform the baseline for sediment quality, 14 grab samples were sub-sampled for chemical analysis during benthic surveys of the Windfarm Site and Offshore Export Cable Corridor route (**Chapter 10: Benthic and Intertidal Ecology Figure 10.2)**. Analysis was undertaken for the following contaminants:

- Heavy metals (arsenic, mercury, cadmium, chromium, copper, nickel, lead and zinc)
- Organotins (tributyltin (TBT) and dibutyltin (DBT))
- PCBs
- PAHs.

45. The full data set is provided in **Chapter 8: Marine Geology, Oceanography, and Physical Processes Appendix 8.B**.

46. The data is presented in **Table 9.13** for metals and **Table 9.14** and **Table 9.15** for PAHs. All other data were below the limits of detection and are available in **Chapter 8: Marine Geology, Oceanography, and Physical Processes Appendix 8.B**.

Table 9.13 Site specific data for metals (yellow indicates an exceedance of Cefas AL1 or BAC. There were no exceedances of ERL or AL2). All data in mg/kg

Site Reference	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Mercury (Hg)	Nickel (Ni)	Lead (Pb)	Zinc (Zn)
ST01	16.20	0.07	24.70	16.40	0.14	21.60	36.00	108.00
ST06	54.20	<0.04	12.80	7.10	0.03	12.30	17.00	38.30
ST08	40.70	0.06	12.60	8.30	0.05	11.60	17.60	50.80
ST09	22.70	0.06	22.80	13.40	0.09	18.90	29.30	89.30
ST10	49.80	<0.04	10.10	7.50	0.03	13.60	13.60	37.40
ST13	13.60	<0.04	9.40	4.50	0.03	6.80	10.70	33.40
ST15	13.60	<0.04	10.40	4.90	0.02	7.10	10.00	41.60
ST16	12.10	0.05	10.40	4.30	0.02	6.90	9.30	32.30
ST18	13.10	<0.04	10.80	5.20	0.02	7.10	10.40	35.80
ST19	12.10	<0.04	10.30	4.70	0.02	6.70	9.20	34.80
ST21	12.00	0.06	10.00	4.90	0.02	6.30	9.20	28.60
ST22	11.00	0.06	10.20	4.90	0.02	7.10	9.60	33.50
ST23	18.60	0.05	11.10	6.80	0.02	13.70	16.00	69.00
ST24	19.30	0.04	11.00	6.20	0.02	13.70	15.90	65.40
CEFAS AL1	20	0.4	40	40	0.3	20	50	130
CEFAS AL2	100	5	400	400	3	200	500	800
OSPAR BAC	25	0.31	81	27	0.07	36	38	122
OSPAR ERL	-	1.2	81	34	0.15	-	47	150

Table 9.14 Site specific data for PAHs (yellow indicates an exceedance of Cefas AL1 or BAC. There were no exceedances of ERL.) All data in µg/kg

Station	Acenaphthene	Acenaphthylene	Anthracene	Benzo[a]anthracene	Benzo[a]pyrene	Benzo[b]fluoranthene	Benzo[ghi]perylene	Benzo[e]pyrene	Benzo[k]fluoranthene
ST01	1.6	0	2.2	6.58	7.75	9.08	6.9	6.58	4.6
ST06	0	0	0	3	3.4	4.72	3.3	3.4	1.93
ST08	5.81	3.02	9.39	20.5	25.6	32.2	27	25.5	13.4
ST09	13	7.44	18.3	60.9	79.3	102	77.4	74	40.8
ST10	0	0	0	1.08	1.23	1.67	1.27	1.23	0
ST13	0	0	1.02	2.57	2.91	3.05	2.7	2.6	1.6
ST15	1.23	0	1.08	3.46	3.85	3.59	3.01	3.46	1.92
ST16	0	1.98	1.85	6.88	7.48	7.26	5.03	5.2	3.51
ST18	0	0	0	2.35	2.59	3.32	3.01	2.71	1.03
ST19	0	0	0	1.41	1.52	2.23	1.81	1.93	1.11
ST21	0	0	1.01	1.87	2.15	3.58	2.65	2.72	1.42
ST22	0	0	1.25	2.72	2.94	4.63	3.39	3.53	2.53
ST23	0	0	0	2.7	2.77	5.44	3.84	4.3	2.86
ST24	0	0	0	0	0	1.72	1.12	1.31	0
CEFAS AL1	100	100	100	100	100	100	100	100	100
CEFAS AL2	-	-	-	-	-	-	-	-	-
OSPAR BAC	-	-	5	16	30	-	80	-	-
OSPAR ERL	-	-	85	261	430	-	-	-	-

Table 9.15 Site specific data for PAHs (yellow indicates an exceedance of Cefas AL1 or BAC. There were no exceedances of ERL.) All data in µg/kg

Station	Chrysene	Dibenzo[ah]anthracene	Fluoranthene	Fluorene	Indeno[123cd]pyrene	Naphthalene	Perylene	Phenanthrene	Pyrene
ST01	8.93	1.49	13.2	2.45	7.29	5.25	2.26	9.23	10.1
ST06	5.02	0	5.65	1.37	3.23	3.23	0	6.13	4.48
ST08	33.8	5.93	45.8	9.79	27.1	26.1	7.42	40.1	35.8
ST09	95	17.3	122	25.6	79.7	60	21.8	98	95
ST10	1.78	0	2.15	0	1.31	1.96	0	2.4	1.8
ST13	3.37	0	5.19	0	2.8	1.83	0	3.38	3.95
ST15	4.93	0	7.57	1.29	3.03	4.79	1.05	7.6	6.82
ST16	7.89	1.19	10.4	1.13	5.37	2.93	1.98	4.14	9.06
ST18	3.26	0	6.29	1.2	3.03	3.18	0	5.55	5.18
ST19	2.15	0	3.28	0	1.76	1.67	0	3	2.8
ST21	3.17	0	4.15	1.17	2.45	3.84	0	4.84	3.41
ST22	3.94	0	6.91	1.47	3.36	3.95	1.57	5.97	5.21
ST23	4.06	0	6.5	0	3.36	1.51	1.63	2.76	4.75
ST24	1.3	0	2.09	0	1.05	0	0	0	1.58
CEFAS AL1	100	10	100	100	100	100	100	100	100
CEFAS AL2	-	-	-	-	-	-	-	-	-
OSPAR BAC	-	-	39	-	103	8	-	-	24
OSPAR ERL	-	-	600	-	-	160	-	-	665

47. With respect to metals, concentrations indicate very low levels of contamination. Mercury was found at levels exceeding BAC at two stations (ST01 and ST09) but did not exceed Cefas AL1. Concentrations of nickel at ST01 very marginally exceeded Cefas AL1.

48. Concentrations of arsenic exceeded Cefas AL1 at four of the offshore stations; ST06, ST08, ST09 and ST10 (and BAC at three of those stations).

49. With respect to PAHs, five exceeded the BAC at only two stations (ST08 and ST09) but there were no exceedances of the Cefas AL1. Where exceedances occurred, concentrations were only marginally above the BAC value and do not approach ERL values. It can therefore be concluded that contamination across the wind farm site is very low.

9.4.2 Do nothing scenario

50. The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) require that "an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included within the ES (EIA Regulations, Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of the Offshore Project (operational lifetime anticipated to be a minimum of 25 years), long-term trends mean that the condition of the baseline environment is expected to evolve. This section provides a qualitative description of the evolution of the baseline environment, on the assumption that the Offshore Project is not constructed, using available information and scientific knowledge of Marine Water and Sediment Quality.

51. The existing environment within the study area has been largely shaped by a combination of the physical processes which exist within the Bristol Channel and Irish Sea (**Chapter 8: Marine Geology, Oceanography and Physical Processes**) and anthropogenic inputs which influence pollutant levels. These processes will continue to influence the area in the future although any release of pollutants should continue to reduce due to better regulation and diffuse pollution control initiatives. As such, in a Do Nothing Scenario, trends in marine water quality would be expected to continue to improve.

9.5 Potential impacts during construction

52. As set out in **Table 9.7** the worst-case scenario for effects on marine water quality may arise due to direct physical disturbance of the subtidal and intertidal seabed during installation of the cables which could increase suspended sediment concentrations in the water column due to trenching/backfilling. Installation of anchors within the Windfarm Site during the construction phase could disturb seabed sediments that may become entrained within the water column and potentially transported in suspension and ultimately deposited onto the seabed, however the magnitude of these impacts would be less than, and not discernible above, those described for the cable installation and as such are not assessed further. A description of the potential effects on water quality receptors caused by each identified impact is given in this section.

9.5.1 Impact 1: Localised temporary increases in suspended sediments due to cable burial

53. Activities which may release sediment into the water column include the installation of cables. Currently the maximum length of export cable that could be installed for the Offshore Project is up to 94km and the maximum length of inter-array cables is 30km.

54. As set out in **Table 9.7,** the worst-case assumption is that jetting/ploughing will be used to install the cables which is likely to cause the suspension of sediment into the water column. However, particle size analysis of sediment samples taken within the wind farm site and export cable corridor show the sediments are dominated by sand therefore, dispersion of fine sediment from these areas would be very low. Whilst the mud content increased closer to land would increase the proportion of finer sediments released into the water, it is predicted that increases for both sand and mud would be short in duration (lasting the maximum duration of cable installation – 6 months for inter-array cables and 12 months for the offshore export cables) and disperse over time.

55. Rapid settlement of coarser sediments would likely be close to the point of disturbance and whilst finer sediments would become entrained within a plume, it is predicted that they would quickly be widely dispersed by tidal and wave action.

56. The worst-case scenario for the installation of the cable at the landfall (up to MHWS) would require trenching across the intertidal and would therefore be a continuation of the jetting/ploughing of the offshore cable route. It is assumed that the majority of these works would be undertaken at low tide using land-based plant and as such the resuspension of sediment would be minimal. The excavated sediment would be backfilled into the trenches by mechanical means within a few days of excavation.

57. Consequently, the increase in suspended sediment concentrations is not likely to be high in magnitude for prolonged periods of time and is most likely to be within the range of natural variability in the system (e.g. during storms, suspended sediment concentrations will naturally be higher than during calm periods), particularly inshore where background levels are generally higher. Furthermore, with the cabling affecting different sections of the corridor progressively over time (rather than being instantaneous along the whole corridor at a single point in time) the effect would be localised, although this will be most concentrated in areas where jetting/ploughing is undertaken.

9.5.1.1 Magnitude of impact

58. Due to the short-term and highly temporary nature of the impact the magnitude is considered to be **negligible**.

9.5.1.2 Sensitivity of the receptor

59. Water quality in the offshore area is considered to be of **low** sensitivity. This is because it is not within a confined area so has a high capacity to accommodate change due to its size and ability to dilute any alterations to water quality parameters.

9.5.1.3 Significance of effect

60. This gives rise to an effect of **negligible** significance.

9.5.1.4 Further mitigation

61. No measures are required to mitigate this effect.

9.5.2 Impact 2: Remobilisation of existing contaminated sediments

62. Site specific data collected to inform this ES indicates that for all parameters, sediment contaminant concentrations are low (**Section 9.4.1**).

63. Where exceedances of sediment guidelines occur, these are marginal (i.e. only just above the lower guideline level value) which indicates that there is minimal risk to the marine environment. These exceedances are located in a discreet area within the wind farm site and along the cable corridor route and as such works within this area will be short term, lasting the duration of the cable installation only.

64. Additionally, sediments are not predicted to remain in suspension for long periods of time given that the seabed material is predominantly sand and as such will settle quickly and be a temporary impact. Therefore, the risk to the water column for

partitioning to occur (the transfer of contaminants bound to sediment particles to being dissolved into the water column) is reduced.

9.5.2.1 Magnitude of impact

65. The magnitude of the impact is predicted to be **negligible**.

9.5.2.2 Sensitivity of the receptor

66. Water quality in the offshore area is considered to be of **low** sensitivity. This is because it is not within a confined area so has a high capacity to accommodate change due to its size and ability to dilute any alterations to water quality parameters.

9.5.2.3 Significance of effect

67. This gives rise to an effect of **negligible** significance.

9.5.2.4 Further mitigation

68. No measures are required to mitigate this effect.

9.6 Potential impacts during operation and maintenance

69. Impacts may arise through the presence of the wind farm via scour causing the suspension of sediment. A description of the potential effect on water quality caused by each identified impact is given in this section.

9.6.1 Impact 1: Localised temporary increases in suspended sediments

70. There is potential for sediments to be re-suspended by the scouring effects of the catenary action of the mooring lines and around the foundations of the mooring anchors. However, particle size analysis of the sediments within the wind farm site show that the sediments are dominated by sand. As such, any sediment suspended during the operation and maintenance of the wind farm will fall out of suspension shortly after disturbance. Only the finest fractions will reside in the water column and in these cases for short durations and in the lower layers of the water column.

71. Additionally, the total volume of sediment that could be disturbed is relatively low. Even the largest catenary drag footprint of 2,400m^2 per turbine (19,200m^2 in total), affecting only a thin layer of surface sediment, equates to a few tens or, at most, a few hundred cubic metres of sediment per turbine, although this could be a frequent disturbance through the operation and maintenance phase. Scour is also only likely

to occur during higher energy conditions (i.e. storms) where the baseline suspended solids concentrations are also likely to be higher.

72. Maintenance activities undertaken within the wind farm site or along the export cable corridor route may also cause the suspension of sediment. These activities would be localised, short-term and small in scale, representing a much smaller effect than created during construction activities.

9.6.1.1 Magnitude of impact

73. Although this effect will persist throughout the operation and maintenance phase the effect on suspended sediment concentrations of catenary action or maintenance activities will be localised and small in magnitude, and hence the magnitude of effect is **negligible**.

9.6.1.2 Sensitivity of the receptor

74. Water quality in the offshore area is considered to be of **low** sensitivity. This is because it is not within a confined area so has a high capacity to accommodate change due to its size and ability to dilute any alterations to water quality parameters.

9.6.1.3 Significance of effect

75. This gives rise to an effect of **negligible** significance, which is deemed **not significant**.

9.6.1.4 Further mitigation

76. No measures are required to mitigate this effect.

9.6.2 Impact 2: Remobilisation of existing contaminated sediments

77. Site specific data collected to inform this ES indicates that for all parameters, sediment contaminant concentrations are low, any exceedances are only just above the lower guideline level value and are present in a discreet area along the cable route, not within the wind farm area (**Section 9.4.1**). Additionally, sediment suspension released via scour is only predicted to give rise to release of very small volumes of material (**Section 9.6.1**).

9.6.2.1 Magnitude of impact

78. The magnitude of the impact is predicted to be **negligible**.

9.6.2.2 Sensitivity of the receptor

79. Water quality in the offshore area is considered to be of **low** sensitivity. This is because it is not within a confined area so has a high capacity to accommodate change due to its size and ability to dilute any alterations to water quality parameters.

9.6.2.3 Significance of effect

80. This gives rise to an effect of **negligible** significance, which is deemed **not significant**.

9.6.2.4 Further mitigation

81. No further measures are required to mitigate this effect.

9.7 Potential impacts during decommissioning

1. No decision has been made regarding the final decommissioning policy for the Offshore Project as it is recognised that industry best practice, rules and legislation change over time. The decommissioning methodology would be finalised nearer to the end of the lifetime of the Offshore Project to be in line with current guidance, policy and legalisation at that point. Any such methodology would be agreed with the relevant authorities and statutory consultees. The decommissioning works are likely to be subject to a separate licencing and consenting approach.

2. The anticipated decommissioning activities are outlined in **Section 5.10** of **Chapter 5: Project Description**. The potential impacts of the decommissioning of the Offshore Project have been assessed for marine water and sediment quality on the assumption that decommissioning methods will be similar or of a lesser scale than those deployed for construction. A description of the potential effect on water quality receptors caused by each identified impact is given in this section.

9.7.1 Impact 1: Localised temporary increases in suspended sediments

3. Decommissioning impacts on suspended sediment concentrations will be similar to those experienced during the construction phase. This means there will be **negligible** effect on water quality, which is deemed **not significant**. Upon completion of decommissioning, there will be no notable effect remaining from the Offshore Project.

9.7.2 Impact 2: Remobilisation of existing contaminated sediments

4. Decommissioning impacts on suspended sediment concentrations will be similar to those experienced during the construction phase. It has been established that contamination within the sediments is in the majority below guideline levels, and where exceedances occur these are marginally above the lower guideline level value and located within a discreet area along the cable route. This means there will be **negligible** effect on water quality, which is deemed **not significant**. Upon completion of decommissioning, there will be no notable effect remaining from the Offshore Project.

9.8 Potential cumulative effects

5. The approach to cumulative effect assessment (CEA) is set out in **Chapter 6: EIA Methodology**. Only projects which are reasonably well described and sufficiently advanced to provide information on which to base a meaningful and robust assessment have been included in the CEA. Projects which are sufficiently implemented during the site characterisation for the Offshore Project have been considered as part of the baseline for the EIA. Where possible OWL has sought to agree with stakeholders the use of as-built project parameter information (if available) as opposed to consented parameters to reduce over-precaution in the cumulative assessment. The scope of the CEA has therefore been established on a topic-by-topic basis with the relevant consultees.

6. The cumulative effect assessment for Marine Water and Sediment Quality was undertaken in two stages. The first stage was to consider the potential for the impacts assessed as part of the Offshore Project to lead to cumulative effects in conjunction with other projects. The first stage of the assessment is detailed in **Table 9.16**.

Table 9.16 Potential cumulative effects considered for Marine Water and Sediment Quality

Impact	Potential for cumulative effect	Rationale
Localised temporary increases in suspended sediments	No	The assessment carried out above concludes that there will be a negligible effect on water quality arising from the construction of The Offshore Project. This is due to the coarse nature of the sediment and the open coast environment. Rapid settlement of coarser sediments would likely be close to the point of disturbance and whilst finer sediments would become entrained within a plume, it is predicted that they would quickly be widely dispersed by tidal and wave action and would be within the range of natural variability in the system.

Impact	Potential for cumulative effect	Rationale
		As such, cumulative effects with other plans or projects are unlikely and are not considered further.
Remobilisation of existing contaminated sediments	No	The assessment carried out above concludes that there will be a negligible effect on water quality arising from the release of contaminants. Contamination within The Offshore Project is low, with only minor exceedances of the lower limits. These exceedances are located in a discreet area along the cable corridor route and as such works within this area will be short term, lasting the duration of the cable installation only. Additionally, sediments are not predicted to remain in suspension for long periods of time given that the seabed material is predominantly sand and as such will settle quickly and be a temporary impact. Therefore, the risk of exposure to the water column for partitioning to occur is reduced. As such, cumulative effects with other plans or projects are unlikely and are not considered further.

7. The second stage of the CEA is to evaluate the projects considered for the CEA to determine whether a cumulative effect is likely to arise. The list of considered projects (identified in **Chapter 6: EIA Methodology Section 6.6.11**) and their anticipated potential for cumulative effects are summarised in **Table 9.17**.

Table 9.17 Projects considered in the cumulative effect assessment on Marine Water and Sediment Quality

Project	Status	Distance from windfarm site (km)	Included in the CEA?	Rationale
White Cross Onshore Project	Planned	0 (from MHWS)	No	All intertidal construction activities are assessed within this Chapter. The White Cross Onshore Project will not have a cumulative effect on marine water quality as they are the same activity. Cumulative effects with the cable crossing across the Taw and Torridge estuary are not anticipated

Project	Status	Distance from windfarm site (km)	Included in the CEA?	Rationale
				as this will be undertaken using trenchless technology such as HDD.

8. It is noted that the first (and only) project listed is the Town and Country Planning Application for the onshore infrastructure of the White Cross OWF which are a separate element to the offshore Section 36 consent application for which this ES is prepared. The specific combined project components are assessed cumulatively first and then cumulatively with all other projects.

9.9 Potential transboundary impacts

9. The Scoping Report identified that there was no potential for significant transboundary effects regarding Marine Water and Sediment Quality from the Offshore Project upon the interests of other EEA States.

9.10 Inter-relationships

10. Inter-relationship impacts are covered as part of the assessment and consider impacts from the construction, operation, maintenance, or decommissioning of the Offshore Project on the same receptor (or group). A description of the process to identify and assess these effects is presented in **Chapter 6: EIA Methodology**. The potential inter-relationship effects that could arise in relation to Marine Water and Sediment Quality include both:

- **Project lifetime effects:** Effects arising throughout more than one phase of the Offshore Project (construction, operation, maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation
- **Receptor led effects:** Assessment of the scope for all relevant effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

11. **Table 9.18** serves as a sign-posting for inter-relationships.

Table 9.18 Marine Water and Sediment Quality Inter-relationships

Topic and description	Related chapter	Where addressed in this Chapter	Rationale
Construction effects on suspended sediment concentrations and potential mobilisation of contaminants.	Chapter 10: Benthic and Intertidal Ecology Chapter 11: Fish and Shellfish Ecology Chapter 12: Marine Mammal and Turtle Ecology Chapter 14: Commercial Fisheries Chapter 18: Infrastructure and other Users Chapter 23: Socio-Economics (including Tourism and Recreation)	**Sections 9.5.1** and **9.5.2**	Suspended sediment could cause disturbance to fish and turtles by causing a barrier to movement and benthic species through smothering. Sediments may also be contaminated which could harm fish, turtles and benthic species. Marine mammals may be affected through changes in prey availability.
Operational effects on suspended sediment concentrations and potential mobilisation of contaminants.		**Sections 9.6.1** and **9.6.2**	Suspended sediments (which may also contain contamination) may affect beach users during construction or during maintenance of the cable in the inshore area.
Inter-relationships for impacts during the decommissioning phase will be the same as those outlined above for the construction phase.			

9.11 Interactions

12. The impacts identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts. The interactions between impacts are presented in **Table 9.19**, **Table 9.20** and **Table 9.21**, along with an indication as to whether the interaction may give rise to synergistic impacts.

13. An assessment for each receptor (or receptor group) related to these impacts should be considered in two ways. Firstly, the impacts are considered within a development phase (i.e., construction, operation, maintenance, or decommissioning) to see if, for example, multiple construction impacts could combine. Secondly, a lifetime assessment is undertaken which considers the potential for impacts to affect receptors across development phases. The significance of each individual impact is determined by the sensitivity of the receptor and the magnitude of effect; however, the sensitivity of a receptor is constant whereas the magnitude of the effect may differ. Therefore, when considering the potential for impacts to be additive it is the magnitude of effect which is considered – the magnitudes of the different effects combined upon the same sensitivity receptor.

14. The assessment set out in **Sections 9.5**, **9.6** and **9.7** concluded that the magnitude of potential effects on marine water and sediment quality arising from all impacts identified during the construction, operation, maintenance, and decommissioning of the Offshore Project was **negligible**. As such interactions between these effects within and between the development phases would not occur.

Table 9.19 Interaction between impacts during construction

Construction	Impact 1: Localised temporary increases in suspended sediments due to cable burial	Impact 2: Remobilisation of existing contaminated sediments
Impact 1: Localised temporary increases in suspended sediments due to cable burial		Yes
Impact 2: Remobilisation of existing contaminated sediments	Yes	

Table 9.20 Interaction between impacts during operation and maintenance

Operation and Maintenance	Impact 1: Localised temporary increases in suspended sediments	Impact 2: Remobilisation of existing contaminated sediments
Impact 1: Localised temporary increases in suspended sediments		Yes
Impact 2: Remobilisation of existing contaminated sediments	Yes	

Table 9.21 Interaction between impacts during decommissioning

Decommissioning	Impact 1: Localised temporary increases in suspended sediments	Impact 2: Remobilisation of existing contaminated sediments
Impact 1: Localised temporary increases in suspended sediments		Yes
Impact 2: Remobilisation of existing contaminated sediments	Yes	

9.12 Summary

15. This chapter has investigated the potential effects on Marine Water and Sediment Quality receptors arising from the Offshore Project. The range of potential impacts and associated effects considered has been informed by the Scoping Opinion, consultation, and agreed through an ETG Meeting, as well as reference to existing policy and guidance. The impacts considered include those brought about directly as well as indirectly.

16. The Offshore Project is located within an open coastal area within the Bristol Channel, characterised by low suspended sediment concentrations and sandy-coarse sediments. Sediment chemical analysis of samples taken from within the wind farm site and along the potential export cable route show that the sediments are relatively uncontaminated, with only marginal exceedances of AL1 and the lower OSPAR BAC guideline level value.

17. **Table 9.22** presents a summary of the impacts assessed within this ES chapter, any commitments made, and mitigation required and the residual effects. No significant effects on marine water quality were identified, with all effects assessed as of **negligible** significance.

18. As predicted effects on marine water and sediment quality arising from the Offshore Project are **negligible**, cumulative effects between the Project and other developments would be **negligible**.

Table 9.22 Summary of potential impacts for Marine Water and Sediment Quality during construction, operation, maintenance and decommission of the Project

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Potential mitigation measure	Residual impact
Construction						
Impact 1: Localised temporary increases in suspended sediments due to cable burial	Water column	Low	Negligible	Negligible	n/a	Negligible
Impact 2: Remobilisation of existing contaminated sediments	Water column	Low	Negligible	Negligible	n/a	Negligible
Operation and Maintenance						
Impact 1: Localised temporary increases in suspended sediments	Water column	Low	Negligible	Negligible	n/a	Negligible
Impact 2: Remobilisation of existing contaminated sediments	Water column	Low	Negligible	Negligible	n/a	Negligible
Decommissioning						
Impact 1: Localised temporary increases in suspended sediments	Water column	Low	Negligible	Negligible	n/a	Negligible
Impact 2: Remobilisation of existing contaminated sediments	Water column	Low	Negligible	Negligible	n/a	Negligible

9.13 References

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WHITE CROSS

White Cross Offshore Windfarm Environmental Statement

Appendix 9.A: Water Environment Regulations Compliance Assessment

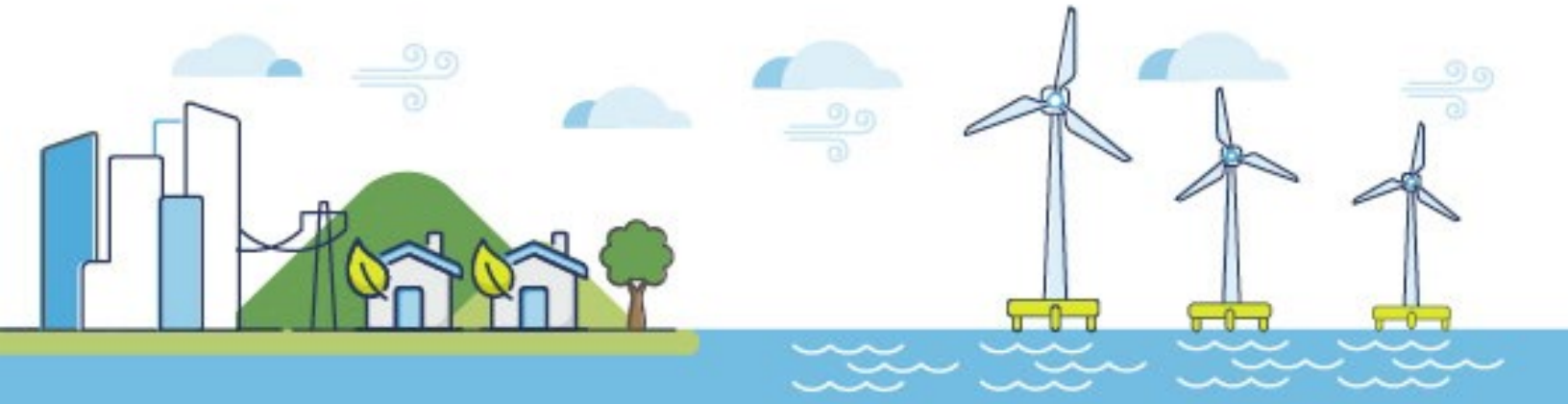

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Table of Contents

Table of Figures

Table of Tables

Glossary of Acronyms

Acronym	Definition
AHMWB	Artificial or Heavily Modified Water Body
Cefas	Centre for Environment, Fisheries and Aquaculture
CEMP	Construction Environmental Management Plan
CoCP	Code of Construction Practice
DCO	Development Consent Order
EIA	Environmental Impact Assessment
ES	Environmental Statement
ETG	Expert Topic Group
GEP	Good Ecological Potential
GES	Good Ecological Status
GPP	Guidance for Pollution Prevention
HMWB	Heavily Modified Water Body
INNS	Invasive Non-Native Species
MARPOL	International Convention for the Prevention of Pollution from Ships
MHWS	Mean High Water Springs
NVZ	Nitrate Vulnerable Zone
OSP	Offshore Substation Platform
OWL	Offshore Wind Ltd
PAH	Polyaromatic Hydrocarbon
PBDE	Polybrominated Diphenyl Ethers
PCB	Polychlorinated Biphenyls
PINS	Planning Inspectorate
PPG	Pollution Prevention Guidance
PSD	Particle Size Distribution
RIAA	Report to Inform Appropriate Assessment
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest
TCPA	Town and Country Planning Act
THC	Total Hydrocarbons
WER	Water Environment Regulations
WFD	Water Framework Directive
ZoI	Zone of influence

Glossary of Terminology

Defined Terms	Description
Landfall (up to MHWS)	Where the Offshore Export Cables come ashore.
Main River	Usually, larger rivers and streams. The Environment Agency carries out maintenance, improvement or construction work on Main Rivers to manage flood risk.
Mean high water springs	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Offshore Export Cables	The cables which bring electricity from the Offshore Substation Platform or the inter-array cables junction box to the Landfall (up to MHWS)
Offshore Export Cable Corridor	The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall (up to MHWS)
Offshore Infrastructure	All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009
the Offshore Project	The Offshore Project for the offshore Section 36 and Marine Licence application includes all elements offshore of MHWS. This includes the infrastructure within the windfarm site (e.g., wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and all infrastructure associated with the export cable route and landfall (up to MHWS) including the cables and associated cable protection (if required).
Offshore Substation Platform	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore
the Project	the Project is a proposed floating offshore windfarm called White Cross located in the Celtic Sea with a capacity of up to 100MW. It encompasses the project as a whole i.e., all onshore and offshore infrastructure and activities associated with the Project
Transition joint bay	Underground structures at the Landfall (up to MHWS) that house the joints between the Offshore Export Cables and the Onshore Export Cables

Appendix 9.A: Water Environment Regulations Compliance Assessment

1. Project Overview

1. White Cross Offshore Windfarm (hereafter referred to as 'the Project') is a proposed floating offshore windfarm located in the Celtic Sea. The Windfarm Site is located over 52 km off the North Cornwall and North Devon coast (west-north-west of Hartland Point).

2. The Project encompasses the project as a whole (i.e., all onshore and offshore infrastructure and activities associated with the Project). However, for consenting purposes, separate onshore and offshore applications will be submitted. Therefore, the Offshore Project for the offshore Section 36 and Marine Licence application includes all infrastructure seaward of Mean High Water Springs (MHWS) (hereafter referred to as 'the Offshore Project'). This includes the infrastructure within the Windfarm Site, all infrastructure associated with the Offshore Export Cable, Landfall (up to MHWS) and the Taw Estuary Crossing (MHWS to MHWS).

3. The current assumption for the Offshore Project is that one Offshore Substation Platform (OSP) will be required and will be located within the Windfarm Site. However, the requirement for an offshore substation will not be confirmed until further detailed design has been completed. If an OSP is needed, the Offshore Export Cables will connect the OSP to shore. The Offshore Export Cables will come ashore at a landfall (up to MHWS) at Saunton Sands on the North Devon Coast, and then be routed underground to the confirmed National Grid connection at East Yelland Onshore Substation. A full project description of the Offshore Project is given in **Chapter 5: Project Description**.

4. The trenchless crossing beneath the River Taw is included as part of the Offshore Project because the Onshore Export Cable will be installed below MHWS either side of the Taw Estuary.

5. The Onshore Project will require separate planning permission under the Town and Country Planning Act 1990 (TCPA, 1990), and a separate onshore WER Compliance Assessment.

2. The Water Environment Regulations (WER)

6. The purpose of this report is to determine whether the Offshore Project is compliant with the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended). The Regulations continue to

enforce Directive 2000/60/EC of the European Parliament and of the Council of 23rd October 2000. They establish a framework for Community action in the field of water policy following Britain's withdrawal from the European Union under the terms of the Floods and Water (Amendment etc.) (EU Exit) Regulations 2019.

7. The Water Environment Regulations require the competent authorities in England and Wales to prevent deterioration and protect and enhance the status of aquatic ecosystems. This means that these authorities must ensure that new schemes do not adversely impact upon the status of aquatic ecosystems, and that historical modifications that are already impacting it need to be addressed. The Water Environment Regulations apply to all bodies of water, including those that are artificial.

8. There are two separate components used to classify the status of surface water bodies (rivers, lakes, estuaries and coastal waters); ecological and chemical. For the purposes of this report (i.e., the Offshore Project), only coastal and transitional water bodies are considered. The ecological status of a surface water body is assessed according to the condition of:

   - Biological quality elements, including fish, benthic invertebrates and aquatic flora
   - Physico-chemical quality elements, including thermal conditions, salinity, pH, nutrient concentrations and concentrations of specific pollutants such as copper
   - Hydromorphological quality elements, including morphological conditions, hydrological regime and tidal regime.

9. The ecological status of surface waters is recorded on a scale of "high", "good", "moderate", "poor" and "bad". The ecological status of a water body is determined by the worst scoring quality element, which means that the condition of a single quality element can cause a water body to fail to reach its classification objectives. The overall environmental objective of reaching Good Ecological Status (GES) applies to these water bodies.

10. Where the hydromorphology of a surface water body has been significantly altered because of anthropogenic activities, it can be designated as an Artificial or Heavily Modified Water Body (AHMWB). An alternative environmental objective (to GES), Good Ecological Potential (GEP), applies in these cases

11. The chemical status of surface waters is assessed by compliance with environmental standards that are listed in the Environmental Quality Standards Directive (2008/105/EC). These chemicals include priority substances and priority hazardous

substances. Chemical status is recorded as either "good" or "fail" and is determined by the lowest scoring chemical.

12. This assessment forms part of the wider Environmental Impact Assessment (EIA) for **Chapter 9: Marine Water and Sediment Water Quality**. Potential impacts on habitats and species are considered in detail in the separate Report to Inform Appropriate Assessment (RIAA).

3. Consultation

13. Stakeholder consultation has taken place as part of the EIA for Marine Water and Sediment Water Quality (**Chapter 9: Marine Water and Sediment Water Quality** of the Environmental Statement (ES)) and Water Resources and Flood Risk (**Chapter 18: Infrastructure and Other Users** of the ES). Full details of consultee comments and how they have been addressed can be found in Chapter 9 and Chapter 18. A summary is provided in **Table 3.1**.

Table 3.1 Consultation summary

Consultee Scoping	Date/document/meeting	Consultation summary
Natural England	17/03/2022 Scoping response	The consultee stated that the assessment should take account of the risks of water pollution and how these can be managed or reduced.
Cefas	25/03/2022 Scoping response	The consultee noted the need for HDD to avoid surface disturbance, for sediment sampling, and assessment of impacts on suspended sediment
North Devon Council	05/04/2022 Scoping response (pre-application enquiry)	The consultee questioned the scoping (Case reference: EIA/2022/00002) out of contamination arising from accidental spills and leaks.
Environment Agency	06/04/2022 Scoping response	The consultee noted that the ES should identify how the proposed development would affect the River Taw (and wider estuary), River Torridge (and wider estuary), Sir Arthurs Pill (main river) and other minor watercourse along with any relevant bathing waters and shellfish waters.

Consultee	Date/document/meeting	Consultation summary
		The consultee also noted the need for a Water Quality Monitoring Strategy, to set out a pre- and post-development water quality sampling scheme, and any monitoring during the works which may be required The consultee noted the need for a pollution contingency plan to deal with spills or leaks. The consultee stated that construction within any water course must be considered in the context of timing, with a view to minimising disturbance to migratory fish species' movement and activity.
Marine Management Organisation	30/05/2022 Scoping response	The consultee raised points concerning the need for a Water Environment Regulations Compliance Assessment; detailed plans and methods for all water course crossings, and the requirement of the correct permits and licences for impoundment and work near main rivers and flood defences.
Environment Agency	30/05/2022 Scoping response	The consultee stated that to help manage risks (i.e., any increased silt loads) to the water environment, a Construction Environment Management Plan (CEMP) should be developed.
Expert Topic Group meetings		
Devon County Council, North Devon District Council, North Devon AONB partnership	14/04/2022 Water Resources and Flood Risk ETG meeting 1	The Project was introduced and described, and a summary of key water resources receptors (including water bodies) and mitigation was provided. A detailed summary of proposed construction mitigation measures was sent to stakeholders.
Environment Agency	Water Resources and Flood Risk 16/05/2022 ETG meeting 2	
Marine Management Organisation, Environment Agency	05/05/2022 Marine Water and Sediment Quality ETG	Agreement was reached with all consultees that the data collected, and the sources used to define the baseline characterisation for Marine

Consultee	Date/document/meeting	Consultation summary
		Water and Sediment Quality, are fit for purpose.

4. Methodology

14. There is no detailed published methodology to assess whether strategies and plans are compliant with the requirements of the WER and supporting UK legislation. There are, however, several sets of guidance that have been developed to support these assessments at project level in the different water body types, predominantly written by the Environment Agency. The following are the most relevant to the Offshore Project:

    - Environment Agency (2017) Clearing the waters for all. Outlines a detailed methodology for assessing impacts on transitional and coastal water bodies
    - Planning Inspectorate (2017) Advice Note 18: The WFD. This document provides an overview of the WFD and an outline methodology for considering WFD as part of the Development Consent Order (DCO) process. Although the Offshore Project is not an NSIP and does not require a DCO application, the advice note has been followed for other non-DCO projects and is of relevance to the Offshore Project consent application
    - Environment Agency (2016) WFD risk assessment: How to assess the risk of your activity. Guidance for bodies planning to undertake activities that would require a flood risk activity permit.

15. For the purposes of this assessment, the broad methodologies outlined in the guidance documents listed above have been brought together to develop an assessment methodology that can be used for strategies in all types of water bodies. The assessment process therefore covers the following stages, which are described in more detail in the subsequent sections:

    - Stage 1: Screening assessment
    - Stage 2: Scoping assessment
    - Stage 3: Detailed compliance assessment (if required).

4.1 Data sources

16. Data were acquired to inform the assessment through a desktop review of existing studies and datasets. Agreement was reached with all consultees that the data collected, and the sources used to define the baseline characterisation for Marine Water and Sediment Quality are fit for purpose (Marine Ecology ETG Meeting 1, 5th

May 2022). The agreed sources of information are summarised in **Table 4.1**. To further inform the baseline, a benthic characterisation survey was undertaken, as agreed with the statutory consultees during the Marine Water and Sediment Quality ETG Meeting 1 on the 5th May 2022. Details are provided in **Table 4.1**.

Table 4.1 Data sources used to inform the assessment

Source	Summary
Environment Agency Catchment Data Explorer (Environment Agency, 2022a)	Database for information related to river basin management plans (RBMP) in England. Contains information on river basin districts and catchments and compliance data.
Environment Agency Bathing Waters Information and classification (Environment Agency, 2022b)	Data for designated bathing waters.
Benthic Characterisation Survey (Ocean Ecology, 2022)	25 stations (22 offshore and 3 nearshore) sampled with a 0.1 m^2 grab sampler with prior investigation by drop-down camera. Single Particle Size Distribution (PSD) analysis and macrobenthic samples collected from each sampling station. Additional samples were collected at a subset of 14 of the 25 stations for subsequent chemical contaminant analysis. The samples were analysed for the following parameters: • Trace metals • Organotins • Polyaromatic Hydrocarbons (PAHs) and Total Hydrocarbons (THC) • Polychlorinated biphenyls (PCBs). Chemical analysis was undertaken in line with the MMO accreditation scheme regarding sediment sampling for disposal to sea licensing at SOCOTEC. A 0.1m^2 Day grab sampler was used to collect the samples.

4.2 Data limitations

17. Data used to inform the assessment is part of the River Basin Management Planning Cycle 3, accessed through the Environment Agency Catchment Data Explorer. The most recent data and classification date from 2019. It is assumed that these data are robust for this assessment. This limitation is not considered to significantly affect the certainty or reliability of the impact assessments presented. Data limitations

specific to the Benthic Characterisation Survey can be found in Ocean Ecology (2022).

4.3 Stage 1: Screening

18. This stage consists of an initial screening exercise to identify the zone of influence (ZoI) and relevant water bodies in the proposed Offshore Development Area. The ZoI has been defined using the following criteria, with reference to the South West River Basin Management Plan (RBMP), as presented in the online Catchment Data Explorer (Environment Agency, 2022a):

- All surface water bodies that could potentially be directly impacted by the Project. In line with Clearing the Waters for All guidance, activities in the marine environment are assessed out to one nautical mile offshore
- Any surface water bodies that have direct connectivity (e.g., upstream and downstream) that could potentially be affected by the Project.

4.4 Stage 2: Scoping

19. This stage identifies whether there is potential for deterioration in water body status or failure to comply with objectives for any of the water bodies identified in Stage 1. Scoping determines whether there is the:

- Potential for impacts of the Offshore Project on water body quality elements
- Potential for temporary and non-temporary impacts on water body improvement and mitigation measures
- Potential for impacts on protected areas and critical habitats
- Potential for impacts on invasive non-native species.

20. The water body and activity under assessment will be progressed to Stage 3 (detailed compliance assessment) if potential impacts on quality elements cannot be ruled out. Conversely, if sufficient information can be provided at this stage to demonstrate that impacts on quality elements would not occur, the quality element is scoped out of further assessment.

4.5 Stage 3: Detailed Compliance Assessment

21. Stage 3 assessment determines whether any project activities that have been put forward from Stage 2 will cause deterioration, and whether this deterioration will have a significant non-temporary effect on the status of one or more quality elements at water body level. For priority substances, the process requires the assessment to consider whether the activity is likely to prevent the quality element achieving a good chemical status.

22. If it is established that an activity or project component is:

    1. Likely to affect a water body (by causing deterioration or preventing achievement of objectives and the implementation of mitigation measures for heavily modified water bodies (HMWBs)
    2. Or that an opportunity may exist to contribute to improving status at a water body level.

23. Potential measures to avoid the effect or achieve improvement that can be reasonably delivered within the scope of the proposed project will be investigated.

24. Where applicable to a development, this stage considers such measures and, where necessary, evaluates them in terms of cost and proportionality in relation to the scale of the project and the nature of any impacts. Note that this stage is referred to as an Impact Assessment in the Planning Inspectorate guidance (PINS, 2017). Note that although this is not a DCO application, the PINS (2017) guidance remains an authoritative source of guidance on how compliance with the Water Environment Regulations should be assessed and is complementary to the 'Clearing the waters for all' guidance (Environment Agency, 2017).

4.6 Approach to decommissioning

25. No decision has yet been made regarding the final decommissioning policy for infrastructure associated with the Offshore Project. It is recognised that legislation and industry best practice change over time.

26. Options for decommissioning the Offshore Project are as follows:

    - At the end of the operational lifetime of the Offshore Project, provisionally anticipated to be a minimum 25 years. The decommissioning sequence will be undertaken in reverse of the construction sequence, involving similar types and numbers of vessels and equipment
    - It is anticipated that all offshore structures above the seabed will be removed. All electrical cables will be left in-situ to minimise environmental impacts associated with their removal. The possibility of removing the subsea cables and leaving structures above the seabed in-situ with appropriate navigation markers will also be assessed
    - However, the initial operational life of 25 years may be extended, should re-powering of the site happen. If this was to occur, a further consenting process would be required to allow for operation beyond the initial 25 years assumed for this consent process and accompanying ES. Any consent will likely be conditioned to require a decommissioning plan to be submitted to the

consenting authority for approval in accordance with the Energy Act 2004 decommissioning requirements. Guidance from the Department of Business, Energy and Industrial Strategy states that the default position for decommissioning should be full removal unless there are strong reasons for any exceptions (see **Chapter 3: Policy and Legislation**)

- At this stage, the full detail of the required decommissioning activities is not currently known. A decommissioning plan will be prepared during detailed design and developed and refined during the Project's lifetime and as decommissioning approaches. To reflect future best practice and new technologies, the approach and methodologies of the decommissioning activities will be compliant with the relevant legislation, guidance and policy requirements at the time of decommissioning
- The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time of decommissioning and will be agreed with the regulator. It is anticipated that for the purposes of a worst-case scenario, the impacts will be no greater than those identified for the construction phase.

27. For the purposes of this assessment, it is assumed that:

- The same water bodies screened into the assessment for construction and operation (**Section 6**) would also be affected during decommissioning - no additional water bodies would be affected
- Scoping answers would be the same for decommissioning as for construction and operation (**Section 7**) – no additional quality elements for river, coastal or groundwater bodies would be scoped in or out. Therefore, decommissioning is not discussed further in this assessment.

4.7 Article 4.7

28. In the unlikely event that no suitable measures can be identified to mitigate potential adverse impacts of the project, it may be necessary to present a case for a derogation under Article 4.7. It should be noted that the project would look to prevent deterioration in water body status in the first instance (e.g., through project design and, where necessary, the adoption of further mitigation measures) therefore avoiding the need for an application for an exemption under Article 4.7.

29. To determine the scope of any assessment required to demonstrate compliance with the requirements of Article 4.7, consultation with the Environment Agency would be required. However, at this stage, it is envisaged that this assessment would include an assessment of whether:

- The project can be classified as being of imperative overriding public interest and whether the benefits to society resulting from the project outweigh the local benefits of WER implementation
- All practicable steps to avoid adverse impacts have been taken. These steps are defined as those that are technically feasible, not disproportionately costly, and compatible with the overall requirements of the project
- The project can be delivered by an alternative, environmentally better option (as discussed in the Planning Inspectorate guidance (PINS, 2017). This option will need to be technically feasible and not disproportionately costly to be feasible.

5. Project Description

5.1 Installation of Offshore Export Cables (up to MHWS)

30. Construction and operation and maintenance activities are assessed from the Landfall (up to MHWS) to one nautical mile offshore.

5.1.1 Construction activities

31. Pre-lay works would be undertaken to clear any identified obstacles, such as boulders, debris and high slope megaripples/sandwaves, by means of pre-sweeping or dredging. Pre-lay works would take place a minimum two weeks prior to installation, for a duration of one week, dependant on the width and amount of debris.

32. Following the pre-lay works, the Offshore Export Cables would be installed and buried as far as possible. They will be installed within an Offshore Export Cable Corridor of up to 25m width. The following methods may be used for cable burial and would be dependent on the results of the pre-construction survey:

    - Ploughing
    - Trenching or mechanical cutting
    - Jetting.

33. Burial would displace a volume of 1,684,800m^3 of sediment assuming 3m wide by 3m deep excavations. Excavated sediment would be backfilled into the trenches to re-instate the seabed close to its original morphology.

5.1.2 Operation and maintenance activities

34. Operation and maintenance activities for the Offshore Export Cables are as follows:

- Presence of cable protection where the Offshore Export Cables are unburied
- Repair/maintenance of the Offshore Export Cables.

5.1.2.1 Cable protection

35. The Offshore Export Cables will be buried for the majority of their length. However, there will be some areas where this is not possible due to seabed characteristics, or where it is crossing existing subsea cables. In these locations, external cable protection that may be used, including at the subtidal HDD exit. Cable protection would be a hard-protective layer, such as rock or concrete mattresses. Cable protection dimensions are up to 7m width and 1m height.

36. Cable protection may also be required where the Offshore Export Cables cross existing infrastructure. Detailed methodologies for the crossing of cables and pipelines will be determined in consultation with the owners of the infrastructure to be crossed. However, a number of techniques may be utilised, including:

- Pre-lay and post lay concrete mattresses
- Pre-lay and post lay rock placement.

5.1.2.2 Maintenance and repair of the Offshore Export Cables and cable protection

37. The Offshore Export Cables will normally be inspected at intervals between three and five years. To conduct a cable repair, a section of cable will be recovered either side of the fault of sufficient length to enable a repair. Repair would involve two new joints connecting a new section of cable with the ends of the original cables. The total length of cable exposed and replaced in any one repair event is unlikely to exceed 200m.

38. If mechanical re-burial is required, jetting with a mass flow excavator suspended approximately 1 to 2m above the seabed will be conducted. The target burial depth will be 0.5 to 3m. These techniques do not permanently add or remove any material from the seabed and take place along the existing Offshore Export Cable route. The operation is not expected to disturb more than 2m width of seabed sediment (maximum 7m if the cable cannot be reburied to the original trench from where it was initially recovered).

39. Where jetting is not feasible, trenching could be undertaken with the use of a backhoe dredger as a last resort. Both methods will occupy a similar seabed footprint, however trenching represents the realistic worst-case scenario due to the potential for more seabed sediment to be suspended into the water column.

- In addition to maintenance of the Offshore Export Cables, it may be necessary to replenish rock protection as additional cable and scour protection where the cable is unburied, and at crossing points.

5.2 Landfall (up to MHWS)

40. The landfall up to MHWS is part of the Offshore Project – this includes the subtidal HDD exit point on the seabed. The transition joint bay (where the offshore and Onshore Export Cables will be connected) is above MHWS and therefore part of the Onshore Project.

5.2.1 Construction activities

5.2.1.1 Cable installation

41. Cable installation methodology at the landfall (up to MHWS) will be selected based on a comparative assessment of environmental, commercial and technical factors. It is assumed that suitable technologies will include a mix of open cut trenching and HDD.

42. If HDD is chosen as the appropriate installation methodology at the landfall, the HDD will be drilled from an onshore construction compound and will exit the seabed in an exit pit at a suitable water depth. The length of the HDD will depend upon factors such as water depth, seabed topography, shallow geology/soil conditions and environmental constraints. Minimum and maximum drill length estimates are 500 to 1500m.

43. As part of the landfall Offshore Export Cables installation process, the worst case is open trenching to bury two cables across the entire width of Saunton Sands. Trench dimensions across the beach would be 270m (l) x 0.5m (w) x 1.2m (d). The trench would be excavated with a mechanical digger over an indicative period of up to 24 hours. This excavated sediment would be backfilled into the trench by mechanical means to re-instate the beach to its original morphology. The landfall (up to MHWS) activities would cause a temporary short-term cessation of longshore beach sediment transport, due to the presence of the trench and its potential to trap sediment.

5.2.2 Operation and maintenance activities

44. If unplanned repair work is required, activities would be the same as those described for installation (i.e., trench excavation to a width and depth of 0.5m and 1.2m, over the length that repair work is required).

5.3 River Taw estuary trenchless crossing

45. The Taw River crossing is proposed as a trenchless cable installation crossing below the River Taw estuary. Options for the river crossing are likely to consist of a Horizontal Directional Drill (HDD) or Direct Pipe, with connections likely being completed by an open-cut method. Open cut trench connections will be located onshore, north and south of the Taw/Torridge transitional water body.

46. A Conceptual Ground Model for the Taw River crossing (Stockton Drilling, 2022) indicates that bedrock may be encountered at shallow depth on the southside of the river. For this reason, it is recommended that the crossing works are undertaken based on the works being completed from south to north, to reduce the risks associated with drilling from soft to hard material.

5.3.1 Construction activities

47. A cabling engineer has not yet been engaged and therefore, at this location is has been assumed that an onshore cable of 150mm outside diameter will be required. Typically, cabling will require the duct to be a minimum of 1.5 times the cable diameter (225mm). Due to available duct sections, a nominal 250mm diameter duct will be required. The initial HDD pilot hole would therefore be reamed out to approximately 312mm diameter prior to the 250mm duct being pulled through the bore.

48. An inert material (typically bentonite) will be used as a drilling fluid. Bentonite his is mainly used to keep the borehole open and to transport the soil or sand from the borehole to the surface.

49. The length of HDD across the Taw estuary over a distance of approximately 1.3km.

50. For the Direct Pipe option, the likely Direct Pipe diameter would be 1422mm (subject to ground investigation).

5.4 Operation and maintenance

51. Operation of the trenchless cable crossing would involve the presence of the export cables up to 13m below the estuary bed. Invasive maintenance is not planned along the cable duct at the trenchless crossing. It would only occur in the event of an accident – such as the cable being dug through or damaged in some way. Any routine maintenance work would take place at the joint bays, located either end of the trenchless crossing (i.e., onshore).

6. Stage 1: Screening

52. The first stage of screening consists of an initial exercise to identify the individual activities associated with the construction and operation and maintenance of the Offshore Project that could potentially impact on compliance parameters (Section 6.1). The relevant water bodies that could be affected by the Offshore Project are then identified (Section 6.2). The baseline characteristics of each water body are presented, and each water body is assessed for inclusion into the scoping assessment. Protected areas within 2km of the Offshore Project are also screened for inclusion into Stage 2 (**Table 6.3**).

6.1 Identification of activities

53. **Table 6.1** provides a summary of the construction and operation and maintenance activities described in Section 5 that pose potential risks to compliance with the WER.

Table 6.1 Summary of construction and operation activities for consideration in Stage 2 (scoping)

Phase	Activity	Potential impact on water bodies	Compliance parameter potentially at risk
Coastal water bodies			
Construction	Installation of Offshore Export Cables (up to MHWS)	Potential temporary impact associated with resuspension of sediment.	Hydromorphology, physico-chemistry and biology (habitats and fish)
	Landfall (up to MHWS)	Potential temporary impact associated with resuspension of sediment as a result of HDD methodology.	Hydromorphology, physico-chemistry and biology (habitats and fish)
Operation	Presence of offshore Export cable protection	Potential hydrodynamic impacts associated with	Hydromorphology and biology, INNS

Phase	Activity	Potential impact on water bodies	Compliance parameter potentially at risk
	maintenance/repair of the Offshore Export Cables and cable protection	the presence of the offshore cable protection and subsequent loss of habitat. Creation of artificial reef that could be colonised by INNS.	
Transitional water bodies			
Construction	River Taw estuary cable crossing using trenchless technique (HDD or Direct Pipe method)	Changes to water quality associated with any leakage or accidental spills and physico-chemical changes	Physico-chemistry and priority substances, biological elements
Operation	Presence of the offshore export cables	The Offshore Export Cables will be located up to 13m below the estuary bed. Invasive maintenance is not planned along the cable duct at the trenchless crossing. It would only occur in the event of an accident – such as the cable being dug through or damaged in some way. No impacts are anticipated, and no compliance parameters would be at risk.	

6.2 Identification of water bodies

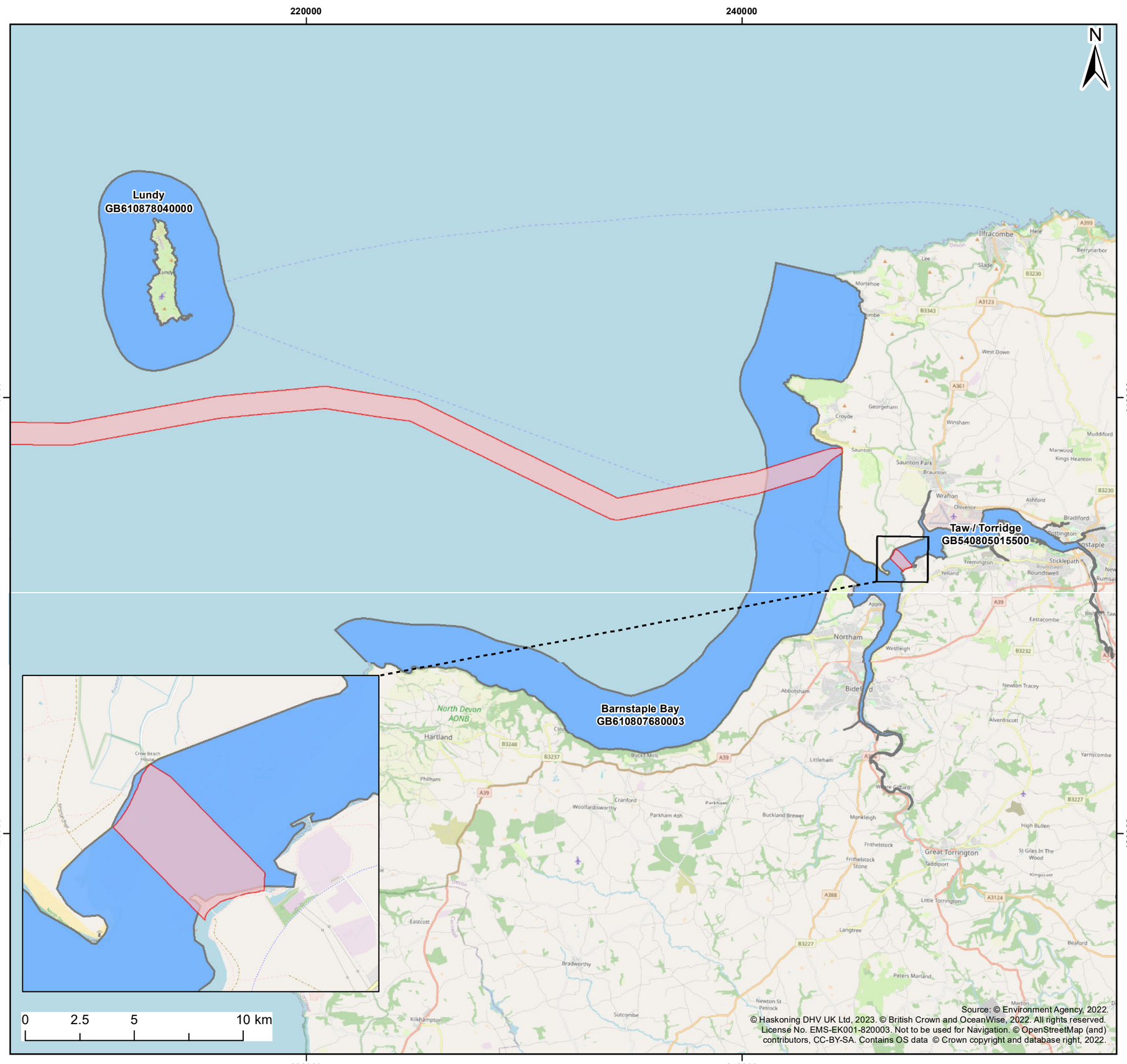
54. The status, characteristics and overall objectives of water bodies that could potentially be impacted by the construction and operation and maintenance of the Offshore Project are summarised in **Table 6.2** and shown in **Figure 6.1**. Water bodies were identified using the Environment Agency's Catchment Data Explorer (Environment Agency, 2022a). Water bodies have been screened into the assessment in response to the proposed works being close to and/or hydrologically connected to those water bodies (as described in **Section 4.3**).

55. Protected areas associated with each water body that has been screened into the assessment are shown in **Table 6.3**.

Table 6.2 Offshore water bodies screening assessment

Water body	Type and designation	Ecological status/potential	Chemical status	Objectives	Screened in to Stage 2?
Taw/Torridge (GB540805015500)	Transitional Heavily modified	Moderate potential Moderate dissolved inorganic nitrogen and Moderate supporting elements (surface water).	Fail Failure in 2019 was due to high levels of benzo(g-h-i)perylene, polybrominated diphenyl ethers (PBDE) and mercury and its compounds. The water body was also at Fail for chemical status in 2013, 2014, due to high levels of tributyltin compounds and fluoranthene.	No overall water body objective beyond 2015.	Yes. Screened in because components of the Offshore Project will be located within the catchment of this water body.
Barnstaple Bay (GB610807680003)	Coastal Not designated artificial or heavily modified	Good status	Fail Failure in 2019 was due to high levels of PBDE and mercury and its compounds. The water body was also at Fail for chemical status in 2013, 2014, due to high levels fluoranthene.	No overall water body objective beyond 2015.	Yes. Screened in because components of the Offshore Project will be located within this water body.
Lundy (GB610878040000)	Coastal Not designated artificial or heavily modified	Good status	Fail Failure in 2019 was due to high levels of PBDE and mercury and its compounds.	No overall water body objective beyond 2015.	No. Screened out because components of the Offshore Project will not be located within this water body. The water

Water body	Type and designation	Ecological status/potential	Chemical status	Objectives	Screened in to Stage 2?
					body is approximately 10 nautical miles offshore.



Legend:
- Offshore Export Cable Corridor
- WFD Coastal Water body

Client: Offshore Wind Ltd.	Project: White Cross Offshore Windfarm

Title: Offshore Water Bodies

Figure: 6.1 | Drawing No: PC2978-RHD-ZZ-XX-DR-Z-0537

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
P01	10/02/2023	AB	SF	A3	1:175,000

Co-ordinate system: British National Grid

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Table 6.3 Water dependent protected areas within 2km of the Offshore Project screened into the assessment

Water body/protected area	ID	Directive	Current status
Taw/Torridge (GB540805015500)			
Taw Estuary ET6	ET6	Nitrates Directive	Not known
Taw Estuary	UKSW80	Shellfish Water Directive	Monitoring of shellfish waters is undertaken at two sites in the estuary (Environment Agency IDs: SW-73010147, SW-73010260). Most recent data from 2015 and 2016 are either good or greater (high).
Braunton Burrows SAC	UK0012570	Habitats Directive	Favourable: 22.6% Unfavourable recovering: 68% Unfavourable declining: 9.4%
Taw Estuary	UKENCA52	Urban Waste Water Treatment Directive	Not known
Taw-Torridge Estuary	UKSW79	Shellfish Water Directive	As above. See comment for shellfish water UKSW80.
Torridge Estuary	UKSW81	Shellfish Water Directive	
Barnstaple Bay (GB610807680003)			
Braunton Burrows SAC	UK0012570	Habitats Directive	See comment above for the Taw/Torridge water body.
Taw-Torridge Estuary	UKSW79	Shellfish Water Directive	As above. See comment for shellfish water UKSW80.
Saunton Sands	UK34100	Bathing Water Directive	Most recent water quality classification (2022) is excellent. Water quality also excellent 2018-2021.
Croyde Bay	UK34200	Bathing Water Directive	Most recent water quality classification (2022) is excellent. Water quality was good from 2019 to 2021, and excellent in 2018.

7. Stage 2: Scoping

56. The scoping assessment determines:

- The potential impacts of the Offshore Project on water body quality elements

- Impacts on protected areas and critical habitats
- Impacts on invasive non-native species
- The potential temporary and non-temporary impacts on improvement and mitigation measures.

7.1 Impacts on water body quality elements

57. The aim of this section is to highlight the water body quality elements that have the potential to be impacted by the proposed construction and operation and maintenance activities screened into the assessment (**Table 6.1**). This stage will determine the scope of a detailed compliance assessment, if it is required for the Offshore Project.

58. The results of the scoping assessment for the identified transitional and coastal water body quality elements are presented in **Table 7.1** and **Table 7.2**. Scoping questions in this assessment are taken directly from the Environment Agency's scoping template for estuarine and coastal waters (Environment Agency, 2017).

59. A summary of protected area scoping is provided in **Table 7.1** and **Table 7.2** and assessed in detail in **Table 7.3**. Potential temporary and non-temporary impacts on improvement and mitigation measures are assessed in **Section 7.3**.

7.1.1 Transitional water bodies

Table 7.1 Scoping assessment for the Taw/Torridge (GB540805015500) transitional water body

Parameter	Scoping question	Scoping assessment	Scoping decision
Construction activities: HDD/Direct Pipe cable crossing of the River Taw estuary Operation and maintenance activities: Presence of the Offshore Export Cables			
Hydromorphology	Could the activity change the hydrological regime or morphological conditions of the water body, or create a permanent barrier to upstream continuity, of a water body at high status?	**Construction** The Taw/Torridge transitional water body will not experience any direct disturbance during construction because a trenchless technique (HDD or Direct Pipe) will be used to cross the estuary. Where trenchless methods are used, the export cables will be installed up to 13m below the bed of the watercourse. Although ground disturbance will occur at trenchless crossing entry and exit points, these are not located in the transitional water body, and they are above MHWS (i.e., onshore). For all construction activities, a Construction Environmental Management Plan (CEMP) will be developed and agreed with stakeholders to identify the measures needed to avoid, minimise or mitigate any construction effects on the environment. There is no direct mechanism for impacts to occur to the hydrological regime and morphological condition of the transitional water body.	Out
		Operation The presence of the Offshore Export Cables up to 13m below the bed of the water body will not affect the hydrological regime or morphological conditions of the water body.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
	Could significantly impact the hydromorphology of any water body	**Construction** The Taw/Torridge transitional water body will not experience any direct disturbance during construction because trenchless techniques will be used to cross the estuary. This means there is no mechanism for impact on the hydromorphology of any water body.	Out
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed will not lead to any direct impacts on the hydromorphology of any water body.	Out
	Is the activity in a water body that is heavily modified for the same use as the activity?	**Construction and operation** No. The water body is designated heavily modified for flood protection.	Out
Water quality	Could the activity change water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (c. 14 days)?	**Construction** The Taw/Torridge transitional water body will not experience any direct disturbance during construction because a trenchless technique (HDD or Direct Pipe) will be used to cross the estuary. Where trenchless methods are used, the export cables will be installed up to 13m below the bed of the watercourse. For all construction activities, a CEMP will be developed and agreed with stakeholders to identify the measures needed to avoid, minimise or mitigate any construction effects on the environment. This means there is direct mechanism for impacts to occur to salinity, oxygen levels, nutrients or microbial patterns.	Out
		Operation The presence of the export cables up to 13m below the estuary bed will not lead to any direct impacts on the water body. There is no mechanism for impact on salinity, oxygen levels, nutrients or microbial patterns.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
	Is the activity in a water body with a phytoplankton status of moderate, poor or bad?	**Construction and operation** Phytoplankton status is Good.	Out
	Is the activity in a water body with a history of harmful algae?	**Construction** The water body has a history of harmful algae. However, as described above, the Taw/Torridge transitional water body will not experience any direct disturbance during construction because trenchless techniques will be used to cross the estuary. This means there is no mechanism for impact on algae (e.g., entrained algae can promote new algal growth by causing nutrient enrichment within the sediment).	Out
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed will not have any impacts on algae at the surface.	Out
	Does the activity use or release chemicals? If so, are they on the Environmental Quality Standards Directive (EQSD) list?	**Construction** An inert drilling fluid (bentonite) will be used for the trenchless crossing. A Pollution Environmental Management Plan (or similar) and CEMP will be in place for the Offshore Project. This mitigation will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event.	Out
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed and any maintenance activities will not release any chemicals.	Out
	Will the activity disturb sediment with contaminants above Cefas Action Level 1?	**Construction** The Taw/Torridge transitional water body will not experience any direct disturbance during construction or operation because trenchless techniques will be used to cross the estuary (up to 13m below the channel bed).	Out
		Operation	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		The presence of ethe Offshore Export Cables up to 13m below the estuary bed will not disturb estuarine sediments.	
Biology (habitats)	Will the footprint of the activity cover an area of 0.5km^2 or larger?	**Construction** The Taw/Torridge transitional water body will not experience any direct disturbance during construction because the Offshore Export Cables will be installed up to 13m below the bed of the watercourse. The HDD pilot hole will be ~0.31m in diameter over a distance of ~1.3km – this equates to an area significantly less than 0.5km^2. A larger Direct Pipe installation (1.422m diameter) would still be less than 0.5km^2 (0.002km^2)	Out
		Operation During operation, the Offshore Export Cables will occupy an area significantly less than 0.5km^2.	Out
	Is the area of either activity greater than 1% or more of the water body's area?	**Construction** Construction activity will consist of HDD and cable installation (~0.31m diameter pilot hole) below the bed of the estuary over approximately 1.3km. As the water body measures 14.4km^2, this equates to significantly less than 1% of the water body's area. For a larger Direct Pipe installation (1.422m diameter) the figure is 0.013%.	Out
		Operation The presence of the Offshore Export Cables below the estuary will affect significantly less than 1% of the water body's area.	Out
	Will the footprint of the activity be within 500m of any higher sensitivity habitat?	**Construction** Although the Offshore Export Cable Corridor is within 500m of two higher sensitivity habitats (saltmarsh (A2.5) and mussel beds (A1.22, A2.72, A5.62, A4.24, A3.361), the Taw/Torridge transitional water body will not experience any direct disturbance during construction because trenchless techniques will be used to cross the estuary. The offshore export cables will be installed up to 13m below the bed of the estuary and there is no mechanism for impact.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed will not have an impact on higher sensitivity habitats at the surface.	Out
	Will the footprint of the activity cover 1% of lower sensitivity habitats in the water body?	**Construction and operation** Two lower sensitivity habitats characterise the transitional water body where it is crossed by the Onshore Export Cables (sub tidal soft sediment (A5.2, A5.3, A5.4) and rocky shore (A1). However, the Taw/Torridge transitional water body will not experience any direct disturbance during construction or operation because trenchless techniques will be used to cross the estuary. The export cables will be installed up to 13m below the bed of the estuary.	Out
		Operation The presence of Offshore Export Cables up to 13m below the estuary bed will not have an impact on lower sensitivity habitats at the surface.	Out
Biology (fish)	Is the activity in an estuary and could it affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary?	**Construction** HDD/Direct Pipe installation of the Offshore Export Cables up to 13m below the estuary bed means there is no mechanism for impact on fish migration in the estuary.	Out
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed means there is no mechanism for impact on fish migration in the estuary.	Out
	Could the activity impact on normal fish behaviour like movement,	**Construction** HDD/Direct Pipe installation of the Offshore Export Cables up to 13m below the estuary bed means there is no mechanism for impact on normal fish behaviour in the estuary.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
	migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)?	**Operation** The presence of the Offshore Export Cables up to 13m below the estuary bed will not affect the normal behaviour of fish in the estuary.	Out
	Could the activity cause entrainment or impingement of fish?	**Construction** HDD/Direct Pipe installation of the Offshore Export Cables up to 13m below the estuary bed means there is no mechanism for fish impingement in the estuary.	Out
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed will not cause fish impingement in the estuary.	Out
Invasive Non-Native Species	Could introduce or spread INNS?	**Construction** Works have the potential to release invasive species if materials and equipment used in the process have not been properly cleaned after use at a previous location that may have had invasive species present. However, good practice measures will be employed to ensure all equipment is cleaned and checked before use.	Out
		Operation The presence of the Offshore Export Cables up to 13m below the estuary bed will enable the spread on INNS.	Out
Protected areas	Is the activity within 2km of any protected area?	**Construction** The Offshore Project is within 2km of protected areas designated under the Habitats Directive, Urban Waste Water Treatment Directive, Nitrates Directive, Bathing Waters Directive and Shellfish Water Directive (**Table 6.3**). Potential construction impacts on protected areas are assessed separately in **Table 7.3**. No mechanism for impact has been identified.	Out
		Operation	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		The Offshore Project will operate within 2km of the protected areas listed for construction. Potential operation and maintenance impacts are assessed separately in **Table 7.3**. No mechanism for impact has been identified.	

7.1.2 Coastal water bodies

Table 7.2 Scoping assessment for Barnstaple Bay (GB610807680003) coastal water body

Parameter	Scoping question	Scoping assessment	Scoping decision
Construction activities: Installation of the Offshore Export Cables; landfall (subtidal HDD exit point) Operation and maintenance activities: Presence of cable protection; maintenance and repair of the Offshore Export Cables and cable protection			
Hydromorphology	Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status?	**Construction** The water body is at high status for hydromorphological supporting elements. However, after installation of the Offshore Export Cables, the trench would be backfilled, and the mobility of the sediment would reconfigure the subtidal seabed and beach close to its original morphology before installation (including re-formation of subtidal sand waves). This, in addition to the small scale of proposed works in relation to overall water body size, mean that impacts on morphology or tidal patterns at a water body scale are unlikely.	Out
		Operation For operational activities, the area of unburied cable protection equates to ~0.018% of the water body's area and gross patterns of bedload transport across the unburied export cable would not be significantly affected. As such no significant effects on hydromorphology are anticipated. The total length of cable that could be exposed and replaced in any one repair event is unlikely to exceed 200m. As such no significant effects on hydromorphology are anticipated.	Out
	Could significantly impact the hydromorphology of any water body?	**Construction** After installation of the Offshore Export Cables, the trench would be backfilled, and the mobility of the sediment would reconfigure the subtidal seabed and beach close to its original morphology before installation (including re-formation of subtidal sand waves). This, in addition to the	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		small scale of proposed works in relation to overall water body size, mean that impacts on of any water body are unlikely.	
		Operation For operational activities, the area of unburied cable protection equates to ~0.018% of the water body's area and gross patterns of bedload transport across the unburied export cable would not be significantly affected. Any maintenance and repair activities associated with the Offshore Export Cables or cable protection would be highly localised (the total length of cable that could be exposed and replaced in any one repair event is unlikely to exceed 200m) and infrequent. As such no significant effects on the hydromorphology on any water body are anticipated.	Out
	Is in a water body that is heavily modified for the same use as your activity?	**Construction and operation** No – the water body is not designated artificial or heavily modified.	Out
Water quality	Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)?	**Construction** There will be an increase in suspended sediment concentrations because of transition pit works associated with the subtidal trenchless crossing exit point and cable burial techniques to facilitate cable installation. These activities could increase turbidity and alter oxygen and nutrient levels. However, particle size analysis of sediment samples taken within the Offshore Export Cable Corridor show the sediments are dominated by sand therefore, dispersion of fine sediment from these areas would be very low. The mud content increases closer to land which would increase the proportion of finer sediments released into the water, it is predicted that increases for both sand and mud would be short in duration (lasting the maximum duration of cable installation), temporary and likely to be within natural baselines already experienced in the water body.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		Operation The presence of unburied cable protection will not impact water quality. Any maintenance and repair activities associated with the Offshore Export Cables could have localised impacts similar to those described for operation. As such, adverse impacts on water quality are unlikely.	Out
	Is in a water body with a phytoplankton status of moderate, poor or bad?	**Construction and operation** No – status is good.	Out
	Is in a water body with a history of harmful algae?	**Construction and operation** Not monitored.	Out
	Could the activity release chemicals that are on the Environmental Quality Standards Directive (EQSD) list?	**Construction** There is a risk that a pollution event could occur through the accidental release of pollutants into the water column which could have a detrimental effect on Marine Water and Sediment Quality. All vessels involved with construction and operation of The Project will be required to comply with the International Convention for the Prevention of pollution from Ships (MARPOL)73/78. A Pollution Environmental Management Plan (or similar) will be in place. A CEMP will also be put in place for the Offshore Project to ensure all works are undertaken in line with best practice for working in the marine environment. This mitigation will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event.	Out
		Operation Any maintenance/repair activities associated with the Offshore Export Cables would employ similar best practice mitigation measures as described for construction. Such measures will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
	It disturbs sediment with contaminants above Cefas Action Level 1?	**Construction and operation** The preliminary benthic characterisation report (Ocean Ecology, 2022) shows that sediments are not contaminated above Cefas Action Level 1 within the coastal water body.	Out
Biology (habitats)	Is the footprint of the activity 0.5km^2 or larger?	**Construction** The Offshore Export Cable Corridor footprint within the coastal water body is approximately 0.046km^2 (based on an indicative installation corridor width of 25 m and extending to one nautical mile offshore).	Out
		Operation For operational activities, the width on unburied cable protection is 7 m. Assuming an unlikely worst-case scenario of the cable being protected out to one nautical mile gives an area of 0.01km^2. The footprint of any cable maintenance/repair work would be very small (the total length of cable that could be exposed and replaced in any one repair event is unlikely to exceed 200m).	Out
	Is the area of either activity greater than 1% or more of the water body's area?	**Construction** Out to one nautical mile offshore, the Offshore Export Cable Corridor equates to ~0.04% of the water body's area (which measures 111.14km^2).	Out
		Operation For operational activities, the maximum area of unburied cable protection (assuming the cables are unburied out to one nautical mile) equates to 0.009% of the water body's area.	Out
	Within 500m of any higher sensitivity habitat?	**Construction** At the northern end of Saunton Sands, along the rocky shoreline, the Offshore Export Cable Corridor is within 500m of a small area (~120m^2) of polychaete reef. However, within the vicinity of the beach the cable will be installed using trenchless technology. There will be an increase in	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		suspended sediment concentrations because of transition pit works associated with the subtidal trenchless crossing exit point and cable burial techniques to facilitate cable installation. These activities could increase turbidity and alter oxygen and nutrient levels. However, particle size analysis of sediment samples taken within the export cable corridor show the sediments are dominated by sand and mud therefore, dispersion of fine sediment from these areas would be very low, short in duration (lasting the maximum duration of cable installation), temporary and likely to be within natural baselines already experienced in the water body.	
		Operation There is no mechanism for impact whereby the presence of Offshore Export Cable protection could impact the higher sensitivity habitat. Any maintenance activities associated with the Offshore Export Cables would result in localised impacts no worse, and very likely less, than would occur during construction.	Out
	1% or more of any lower sensitivity habitat?	**Construction** There are two lower sensitivity habitats that will be affected by the project within Barnstaple Bay water body. These are intertidal soft sediment and subtidal soft sediment. The project will affect 0.16% and 0.11% of these environments.	Out
		Operation The maximum area of unburied cable protection that will affect subtidal soft sediments within the water body is 0.02km^2 (0.2%). The footprint of any cable maintenance/repair work would be very small (the total length of cable that could be exposed and replaced in any one repair event is unlikely to exceed 200m).	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
Biology (fish)	Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary?	**Construction** The works are not within an estuary. However, the Taw/Torridge transitional water body is 2.5km to the south. There will be an increase in suspended sediment concentrations because of transition pit works associated with subtidal trenchless exit point, and cable burial techniques to facilitate cable installation. However, this effect will be minor and temporary, and unlikely to impact the estuary given the distance involved. Effects on environmental parameters that could impact on fish are not predicted.	Out
		Operation For operational activities, given the small scale of unburied cable protection and potential cable repairs in the context of the wider water body, effects on fish are not predicted.	Out
	Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)?	**Construction** The area of construction work within the water body would be small scale and would occur in an open area of coastline. This would therefore not create a physical barrier to fish.	Out
		Operation For operational activities, given the small scale of unburied cable protection in the context of the wider water body, effects on the normal behaviour of fish are not predicted. The footprint of any cable maintenance/repair work would be very small (the total length of cable that could be exposed and replaced in any one repair event is unlikely to exceed 200m). This would not affect fish.	Out
	Could cause entrainment or impingement of fish?	**Construction** No mechanism for fish entrainment or impingement has been identified for during construction.	Out

Parameter	Scoping question	Scoping assessment	Scoping decision
		Operation No mechanism for fish entrainment or impingement has been identified for during operation.	Out
Invasive Non-Native Species	Could introduce or spread Invasive non-native species (INNS)?	**Construction** Works have the potential to release invasive species if materials and equipment used in the process have not been properly cleaned after use at a previous location that may have had invasive species present. However, good practice measures will be employed to ensure all equipment is cleaned and checked before use.	Out
		Operation Maintenance works have the potential to release invasive species if materials and equipment used in the process have not been properly cleaned after use at a previous location that may have had invasive species present. However, good practice measures will be employed to ensure all equipment is cleaned and checked before use. In theory, cable protection could create an artificial reef that could be colonised by INNS. However, it is anticipated that the Offshore Export Cables will be buried for most of their length. The risk of INNS colonisation is unlikely.	Out
Protected areas	Is the activity within 2km of any protected area?	**Construction** The Offshore Project is within 2km of protected areas designated under the Habitats Directive, Bathing Waters Directive and Shellfish Water Directive (**Table 6.3**). Potential construction impacts on protected areas are assessed separately in **Table 7.3**. No mechanism for impact has been identified.	Out
		Operation The Offshore Project will operate within 2km of the protected areas listed for construction. Potential operation and maintenance impacts are assessed separately in **Table 7.3**. No mechanism for impact has been identified.	Out

7.2 Impacts on protected areas

60. Water-dependent protected areas identified in the screening assessment (**Table 6.3**) are evaluated below.

Table 7.3 Scoping assessment of protected areas within 2km of the Offshore Project

Protected area name	Directive	ID	Water body	Assessment
Taw Estuary	Nitrates Directive	ET6	Taw/Torridge	Foul drainage from construction and operational welfare facilities will be tankered off-site for treatment, preventing impacts to Nitrate Vulnerable Zones (NVZs). Construction site drainage systems will also prevent increasing nitrate volumes from entering the surface drainage network following soil excavations. Construction and operation activities are therefore unlikely to significantly alter NVZ nitrate and nutrient concentrations. Impacts on NVZs and urban wastewater are scoped out of the assessment.
Taw Estuary	Urban Waste Water Directive	UKENCA52		
Taw-Torridge Estuary	Shellfish Water Directive	UKSW79	Taw/Torridge; Barnstaple Bay	The Taw/Torridge transitional water body will not experience any direct disturbance during construction because a trenchless technique (HDD or Direct Pipe) will be used to cross the estuary. Where trenchless methods are used, the export cables will be installed up to 13m below the bed of the watercourse. Although ground disturbance will occur at trenchless crossing entry and exit points, these are not located in the transitional water body, and they are above MHWS (i.e., onshore). This means there is no mechanism for impact on shellfish waters in the estuary. In the coastal water body (Barnstaple Bay) all vessels involved with construction and operation of the Offshore Project will be required to comply with the International Convention for the Prevention of pollution from Ships (MARPOL)73/78. A Pollution Environmental Management Plan (or similar) will be in place. A CEMP (Construction Environmental Management Plan) will also be put in place to
Taw Estuary		UKSW80	Taw/Torridge	
Torridge Estuary		UKSW81	Taw/Torridge	

Protected area name	Directive	ID	Water body	Assessment
				ensure all works are undertaken in line with best practice for working in the marine environment. This mitigation will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event. As a result of these measures, shellfish waters are scoped out.
Saunton Sands	Bathing Water Directive	UK34100	Barnstaple Bay	The landfall (up to MHWS) is within the Saunton Sands Bathing Water and 1.8km to the south of Croyde Bay Bathing Water. The risk of accidental spills or leaks occurring during construction is adequately mitigated through the production and adherence to a CEMP. Impacts from sediment or contaminant plumes are considered to be short-term and temporary, lasting for the duration of the works only. As such, bathing waters are scoped out of the assessment.
Croyde Bay		UK34200		
Braunton Burrows SAC	Habitats Directive	UK0012570	Taw/Torridge; Barnstaple Bay	Whilst Braunton Burrows SAC is located in or within 2km of the Offshore Project, the RIAA does not identify any Likely Significant Effects on Braunton Burrows SAC alone or in-combination with the Offshore Project. Impacts on the SAC are therefore scoped out at this stage.

7.3 Impacts on RBMP improvement and mitigation measures

61. The Environment Agency has not published any details of improvement measures that are required to improve the status of the water bodies that have been scoped in. However, the Environment Agency has identified the mitigation measures that are required to achieve Good Ecological Potential in Taw/Torridge (GB540805015500) transitional water body. Measures are classified as being in place or not in place. They are:

- Realign flood defence
- Remove obsolete structure
- Enhance ecology.

62. Measures in the Taw/Torridge transitional water body are intended to address physical modification pressures associated with flood protection use (i.e., the reason why the water body was designated as heavily modified). The Offshore Project involves a trenchless crossing (HDD or Direct Pipe) of the Taw/Torridge water body. This means there is no mechanism to affect the proposed measures which are not yet in place in this catchment.

7.4 Stage 2 summary

63. The following activities have been assessed as to their potential to impact quality elements of water bodies screened for inclusion in the assessment:

- Coastal water body (Barnstaple Bay)
  - Construction
    - Installation of the Offshore Export Cables (up to MHWS)
    - Landfall (subtidal HDD exit)
  - Operation
    - Presence of cable protection where the Offshore Export Cables are unburied
    - Repair/maintenance of the Offshore Export Cables and cable protection
- Transitional water body (Taw/Torridge)
  - Construction
    - River Taw estuary trenchless crossing (HDD or Direct Pipe)
  - Operation
    - Presence of the Offshore Export Cables.

64. The activities listed above have also been assessed for their potential to impact protected areas within 2km of the Offshore Project, as well as RBMP improvement and mitigation measures.

65. Scoping has established that all construction and operation and maintenance activities associated with the Offshore Project can be scoped out of the assessment. The Offshore Project is very unlikely to cause a deterioration in the status of any water body or prevent it achieving a Good overall status (Barnstaple Bay) or potential (Taw/Torridge).

8. WER assessment summary

66. Results of the Water Environment Regulations Compliance Assessment process are summarised in **Table 8.1**.

Table 8.1 Summary of WER Compliance Assessment

Water body	Stage 2	Stage 3	Deterioration in status	Prevent objectives being achieved
Taw Estuary (GB108050020000)	✓	×	×	×
Barnstaple Bay (GB610807680003)	✓	×	×	×

67. An assessment has been made of the potential for construction, operation and maintenance and decommissioning activities to impact water body receptors. None of the identified activities have the potential to cause non-temporary effects (i.e., effects that are not permanent, but could last for the duration or beyond the current River Basin Planning Cycle) to the status of any of the assessed water bodies. All phases of the Offshore Project will also not prevent water body status objectives being achieved in the future. The Offshore Project is therefore considered to be compliant with WER requirements.

9. References

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