RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Appendix 20.2 Water Environment Regulations Compliance Assessment

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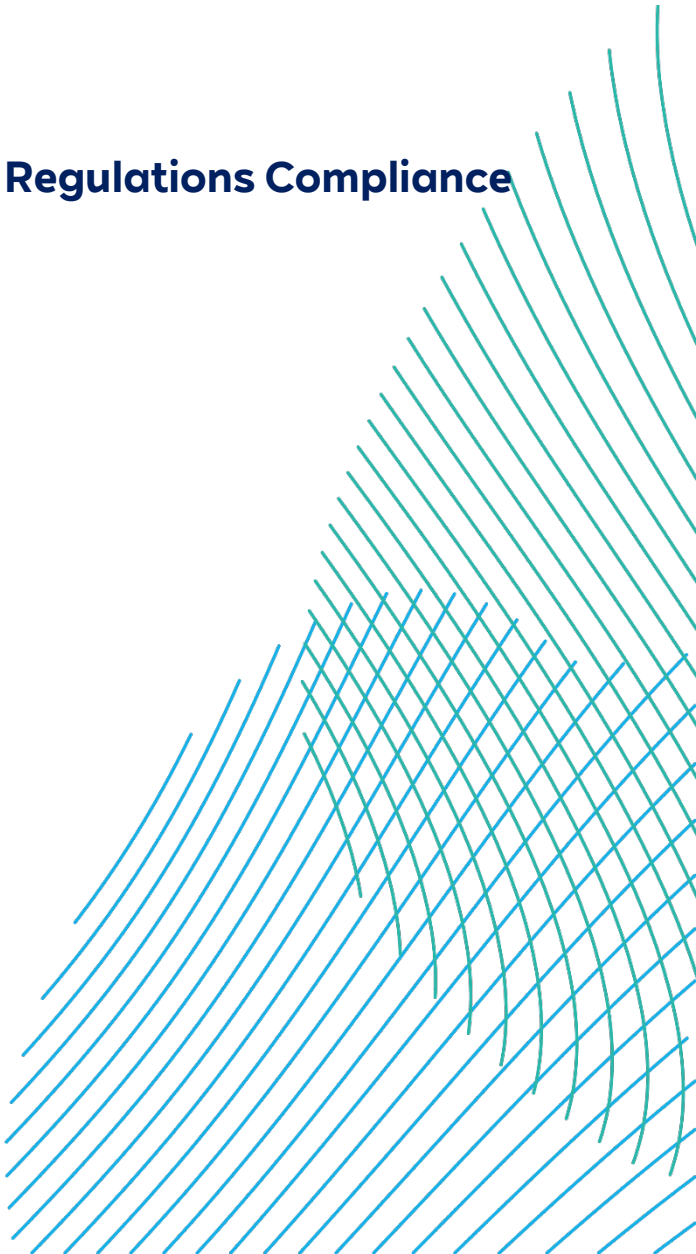

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Glossary

Term	Definition
Coastal Catchment	Land which drains directly to the coastal or estuarine waters, rather than through a river water body – not part of a river water body catchment.
Environment Agency	The Environmental Regulator in the UK.
Groundwater	Water stored below the ground in rocks or other geological strata.
Horizontal Directional Drill (HDD)	HDD is a trenchless technique to bring the offshore cables ashore at the landfall and can be used for crossing other obstacles such as roads, railways and watercourses onshore.
Landfall	The point on the coastline at which the offshore export cables are brought onshore, connecting to the onshore export cables at the Transition Joint Bay.
Offshore Development Area	The Offshore Development Area encompasses the wind farm site and the options for the offshore transmission works.
Onshore Development Area	The Onshore Development Area for PEIR is the boundary within which all onshore infrastructure required for the Projects will be located including landfall, onshore export cable route, accesses, construction compounds and onshore substations. The Onshore Development Area is to be refined through the consultation and engineering review process.
Onshore Export Cables	Onshore export cables take the electricity from the Transition Joint Bay to the onshore substations.
Onshore Export Cable Corridor	This is the area which includes cable trenches, haul roads, spoil storage areas, and limits of deviation for micro-siting. For assessment purposes, the cable corridor does not include the onshore substations, Transition Joint Bays or temporary access routes; but includes construction compounds (purely for the cable route).

Term	Definition
Onshore Substations	A compound containing electrical equipment required to transform and stabilise electricity generated by the Projects so that it can be connected to the electricity transmission network. There will be one onshore substation for each Project.
Other Trenchless Techniques	Other techniques (aside from HDD) for installation of ducts or cables where trenching may not be suitable such as micro tunnelling or auger boring.
Ordinary Watercourse	Other rivers are called 'Ordinary Watercourses'. Lead local flood authorities, district councils and internal drainage boards carry out flood risk management work on Ordinary Watercourses.
The Applicant	RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited as the owners of DBS West and DBS East respectively are the named undertakers that will have the benefit of the Development Consent Order. References in this document to obligations on, or commitments by, 'the Applicant' are given on behalf of RWE Renewables UK Dogger Bank South (West) Limited and RWE Renewables UK Dogger Bank South (East) Limited.
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South offshore wind farms).
Trenching	Open cut method for cable or duct installation.

Acronyms

Term	Definition
Cefas	Centre for Environment, Fisheries and Aquaculture Science
DBS	Dogger Bank South offshore wind farms
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DWSZ	Drinking Water Safeguarding Zones
EU	European Union
GEP	Good Ecological Potential
GES	Good Ecological Status
GWDTEs	Groundwater Dependent Terrestrial Ecosystems
HDD	Horizontal Directional Drilling
INNS	Invasive Non-Native Species
IP	In Place
NIP	Not In Place
NVZ	Nitrate Vulnerable Zones
PBDE	Polybrominated diphenyl ethers
PFOS	Perfluoro octane sulphonate
PPG	Pollution Prevention Guidance
PPP	Pollution Prevention Plan
RBMP	River Basin Management Plan
SAC	Special Area of Conservation

Term	Definition
SPA	Special Protection Area
SuDS	Sustainable Urban Drainage System
UKTAG	UK Technical Advisory Group
WER	Water Environment Regulations
WFD	Water Framework Directive

20.2 Water Environment Regulations (WER) Compliance Assessment

20.2.1 Introduction

1. The purpose of this report is to determine whether the Dogger Bank South (DBS) East and DBS West offshore wind farm (the Projects) are compliant with the requirements of the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Regulations continue to enforce Directive 2000/60/EC of the European Parliament and of the Council of 23 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 (EU Exit) Regulations 2019.

20.2.1.1 Construction and Operation Scenarios

2. The following principles set out the framework for how the Projects may be constructed (relating to both onshore and offshore works):

- DBS West and DBS East may be constructed at the same time, or at different times;
- If built concurrently, both Projects could be constructed in five years;
- If built non-concurrently, either Project could be built first;
- If built non-concurrently, each Project would require a five year period of construction;
- If built non-concurrently, it is anticipated that there would be up to a two year lag between the start of construction for the first project and the start of construction for the second project; and
- Assuming a maximum construction period per Project of five years, and taking the above into account, the maximum construction period over which the construction of both Projects could take place is seven years.

3. All possible construction scenarios allow for the flexibility to build out the Projects usings a phased approach. This will allow the Projects to adapt to the National Grid Electricity Transmission Operator's development plans for onshore grid connection points. Under a phased approach the maximum timescales for individual elements of construction have been assessed.

4. The three construction scenarios considered in **Chapter 20 Flood Risk and Hydrology** and this assessment are therefore:
   - Build DBS East or build DBS West in isolation;
   - Build DBS East and DBS West concurrently – reflecting the maximum peak effects; and
   - Build the Projects sequentially with a lag of up to two years – reflecting the maximum duration of effects.
5. Operation scenarios are described in detail in **Chapter 5 Project Description**. The assessment considers the following scenarios:
   - Only DBS East in operation;
   - Only DBS West in operation; and
   - The two projects operating concurrently, with or without a lag of two years between each Project commencing operation.
6. If the Projects are built out using a phased approach, there would also be a phased approach to starting the operational stage. The worst case scenario for the operational phase for the Projects have been assessed. See section 5.1.1 of Chapter 5 Project Description for further information on phasing scenarios for the Projects.
7. The operations lifetime of each Project is expected to be 30 years.

20.2.1.1.1 Identification of Worst Case Scenarios

8. For the purposes of this assessment, and as described in **Chapter 20 Flood Risk and Hydrology**, a sequential scenario is considered the worst case for construction. This is due to the longer duration compared to concurrent construction.
9. For construction impacts associated with the direct disturbance of surface water bodies (e.g. trenched crossings, use of temporary structures (e.g. culverts and Bailey Bridges)), sequential construction is the worst case. This is because temporary structures associated with the construction of a trenched crossing, such as the haul road, would be in place for a longer continuous period compared to construction in isolation or concurrently.
10. For construction impacts associated with the supply of fine sediment and contaminants, and changes in surface runoff and groundwater flows, concurrent construction is the worst case. This is because concurrent construction will lead to a greater area of disturbance than if the Projects are built in isolation or sequentially, and hence has a greater chance of affecting surface and groundwater receptors.

11. Concurrent or sequential scenarios are the worst case for operational activities, as both scenarios would lead to a greater area of permanent infrastructure than construction in isolation.

12. Concurrent construction is also the worst case for offshore activities, as a larger area of seabed would be disturbed at one time.

13. Section 20.2.3.2 (Stage 2 scoping) and section 20.2.3.3 (Stage 3 detailed assessment) are based on these worst case scenarios.

20.2.2 Assessment Methodology

14. There is no detailed published methodology to assess whether strategies and plans are compliant with the requirements of the Water Environment Regulations (WER). 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. Note that these refer to the Water Framework Directive (WFD) rather than WER as they predate the Floods and Water (EU Exit) Regulations 2019. The following are the most relevant to the Projects:

- Planning Inspectorate (2017) Advice Note 18: The WFD, which provides an overview of the WFD and provides an outline methodology for considering WFD as part of the Development Consent Order (DCO) process;
- Environment Agency (2017) Clearing the waters for all. Outlines a detailed methodology for assessing impacts on transitional and coastal water bodies;
- Environment Agency (2016a) 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;
- Environment Agency (2016b) Protecting and improving the water environment: WFD compliance of physical works in rivers and associated supplementary guidance; and
- Environment Agency (2016c) Water Framework Directive assessment: estuarine and coastal waters. Guidance for assessing transitional and coastal water bodies.

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; and
- Stage 3: Detailed Compliance Assessment.

20.2.2.1 Stage 1: Screening Assessment

16. This stage consists of an initial screening exercise to identify relevant water bodies in the proposed Onshore and Offshore Development Areas . Water bodies will be selected for inclusion in the early stages of the compliance assessment using the following criteria, with reference to the Humber River Basin District Management Plan (RBMP), as presented in the online Catchment Data Explorer (Environment Agency, 2022):

- All surface water bodies that could potentially be directly impacted by the Projects;
- Any surface water bodies that have direct connectivity (e.g., upstream and downstream) that could potentially be affected by the Projects;
- Any groundwater bodies that underlie the Projects; and
- Any coastal water bodies within the Offshore Development Area.

20.2.2.2 Stage 2: Scoping Assessment

17. 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. This stage considers potential non-temporary impacts of the Projects and impacts on critical or sensitive habitats. Potential impacts on water body mitigation measures are also evaluated.

18. Water bodies and activities can be scoped out of further assessment if it can be satisfactorily demonstrated that there will be no impacts. If impacts are predicted, it will be necessary to undertake a detailed compliance assessment. The water body and activity under assessment will be progressed to the detailed compliance assessment (Stage 3) if potential impacts on quality elements cannot be ruled out.

20.2.2.3 Stage 3: Detailed Compliance Assessment

19. The 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.

20. 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.

21. If it is established that an activity or project component is 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), or that an opportunity may exist to contribute to improving status at a water body level, potential measures to avoid the effect or achieve improvement that can be reasonably delivered within the scope of the Projects will be investigated.

22. 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 developments and the nature of any impacts. Note that this stage is referred to as an Impact Assessment in the Planning Inspectorate guidance (Planning Inspectorate, 2017).

20.2.2.3.1 Determination of Deterioration

23. The Environment Agency has not issued guidance on how deterioration in the status of water bodies should be assessed. The assessment therefore draws upon the following guidance documents (note that these refer to the WFD rather than WER as they predate the Floods and Water (EU Exit) Regulations 2019):

- The WFD (Standards and Classification) Directions (England and Wales) (2017): Provides the most up to date standards used to determine the ecological and chemical status of surface water bodies, and the quantitative and chemical status of groundwater;
- UKTAG (2011) Defining and Reporting on Groundwater Bodies: Provides information on the approaches used to classify groundwater bodies;
- Joint Defra / Environment Agency Flood and Coastal Erosion Risk Management Research and Development Programme (2009) WFD Expert Assessment of Flood Management Impacts: Provides a framework for the assessment of changes to hydromorphology;

- UKTAG (2003) Guidance on Morphological Alterations and the Pressures and Impacts Analyses: Provides additional information on hydromorphological pressures;
- Environment Agency guidance on WFD deterioration and risk to the status objectives of river water bodies (Environment Agency, 2016a): Provides an assessment of the level of risk of deterioration in water body status associated with different activities, based upon activity type and risk screening thresholds; and
- Water Framework Directive Assessment: Estuarine and Coastal Waters (Environment Agency, 2016c): Provides guidance on assessing the impact of activities in estuarine (transitional) and coastal waters for the WFD.

24. The assessment considers the potential for deterioration in water body status between classes, within classes, and including temporary deterioration. Where deterioration is not predicted, the activity will also be considered against the water body objectives to ensure status objectives, i.e., Good Ecological Status (GES) or Good Ecological Potential (GEP)) will not be prevented.

20.2.2.3.2 Approach to Decommissioning

25. No decision has yet been made regarding the final decommissioning policy for onshore and offshore project infrastructure. It is recognised that legislation and industry best practice change over time.

26. 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 20.2.3.1) 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 20.2.3.2) – no additional quality elements for river, coastal or groundwater bodies would be scoped in or out.
- Detailed compliance assessment results (section 20.2.3.3) and overall conclusions (section 20.2.3.4) would be the same for decommissioning

as for construction and operation – the Projects would be compliant with WER requirements.

20.2.2.3.3 Article 4.7

28. In the unlikely event that no suitable measures can be identified to mitigate potential adverse impacts of the Projects, it may be necessary to present a case for a derogation under Article 4.7.

29. It should be noted that the Projects 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.

30. 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.

31. However, at this stage, it is envisaged that this assessment would include an assessment of whether:

- The Projects can be classified as being of imperative overriding public interest and whether the benefits to society resulting from the Projects outweigh the local benefits of 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 Projects; and
- The Projects can be delivered by an alternative, environmentally better option as discussed in the Planning Inspectorate (2017) guidance. This option will need to be technically feasible and not disproportionately costly to be feasible.

20.2.3 Results

20.2.3.1 Stage 1: Screening

20.2.3.1.1 Identification of Water Bodies

32. River, groundwater and coastal water bodies that could potentially be affected by the Projects are listed in **Table 20-1** and shown in **Figure 20-2-1** and **Figure 20-2-2**.

33. Water bodies have been screened into the assessment where there is potential for hydrological connectivity (direct or indirect) between the water body and construction and operational activities associated with the Projects.

Table 20-1 Water Bodies Screening Assessment

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770	River	Not designated as an artificial or heavy modified water body at Moderate Ecological Status due to Bad ammonia. Failed chemical status due to high levels of polybrominated diphenyl ethers (PBDE) and mercury and its compounds. Overall status objective of Moderate ecological status by 2021.	In	Screened in because components of the Projects will be located within the catchment of this water body.

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
Old Howe/ Frodingham Beck to River Hull GB104026067021	River	Heavily modified water body at Moderate Ecological Potential due to Moderate Supporting Elements (Surface Water) (Mitigation Measures Assessment). Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.
Mickley Dike GB104026066990	River	Artificial water body at Moderate Ecological Potential due to Poor dissolved oxygen. Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
Catchwater Drain GB104026066970	River	Artificial water body at Moderate Ecological Potential due to Bad ammonia and Bad dissolved oxygen. Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Moderate ecological potential by 2015.	In	Screened in because components of the Projects will be located within the catchment of this water body.
Foredyke Stream Upper GB104026066890	River	Artificial water body at Moderate Ecological Potential due to Bad fish. Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
Foredyke Stream Lower to Holderness Drain GB104026066910	River	Artificial water body at Moderate Ecological Potential due to Bad ammonia. Failed chemical status due to high levels of perfluorooctane sulphonate (PFOS), PBDE and mercury and its compounds. Overall status objective of Moderate ecological potential by 2015.	In	Screened in because components of the Projects will be located within the catchment of this water body.
Holderness Drain Source to Foredyke Stream GB104026066950	River	Artificial water body at Moderate Ecological Potential due to Bad dissolved oxygen. Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
Hull from Arram Beck to Humber GB104026067212	River	Heavily Modified water body at Moderate Ecological Potential due to Moderate phosphate and Moderate Supporting Elements (Surface Water) (Mitigation Measures Assessment). Failed chemical status due to high levels of benzo(b)fluoranthene, benzo(g-h-i)perylene, benzo(k)fluoranthene, PBDE, mercury and its compounds and tributyltin compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.
Beverley and Barmston Drain GB104026067211	River	Artificial water body at Moderate Ecological Potential due to Bad dissolved oxygen. Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
High Hunsley to Arram Area GB104026066841	River	Artificial water body at Moderate Ecological Potential due to Poor phosphate. Failed chemical status due to high levels of benzo(b)fluoranthene, benzo(g-h-i)perylene, benzo(k)fluoranthene, PBDE, and mercury and its compounds. Overall status objective of Moderate ecological potential by 2015.	In	Screened in because components of the Projects will be located within the catchment of this water body.
High Hunsley to Woodmansey Area GB104026066820	River	Artificial water body at Moderate Ecological Potential due to Moderate Fish, and Moderate Supporting Elements (Surface Water) (Mitigation Measures Assessment). Failed chemical status due to high levels of PBDE and mercury and its compounds. Overall status objective of Good ecological potential by 2027.	In	Screened in because components of the Projects will be located within the catchment of this water body.

Water Body Theme	Water Body Type	Description	Screened in/ out?	Reason for Screening Decision
Yorkshire South GB640402491000	Coastal	Designated as a heavily modified water body. At Moderate Ecological Status due to Moderate Supporting Elements (Surface Water) (Mitigation Measures Assessment). Failed chemical status due to high levels of benzo(g-h-i)perylene, PBDE, mercury and its compounds and tributyltin compounds.	In	Screened in because components of the Projects will be located within this water body.
Hull and East Riding Chalk GB40401G700700	Groundwater	Groundwater body that underlies the Onshore Development Area. At Poor Quantitative and Poor chemical status. Overall water body objective of Poor by 2015.	In	Screened in because components of the Projects will be underlain by this water body. The Projects could affect the quality and quantity of groundwater.

20.2.3.2 Stage 2: Scoping

34. The aim of this section is to highlight the quality elements within each water body that could be impacted by the Projects, as identified in Stage 1 of the compliance assessment. This assessment therefore determines the scope for any future detailed compliance assessment (Stage 3) which may be required for the Projects.

35. Potential impacts of the Projects on quality elements for river, coastal and groundwater bodies are presented in **Table 20-2**, **Table 20-3** and **Table 20-4**.

36. Section 20.2.3.2.4 evaluates impacts on RBMP improvement and mitigation measures, and section 20.2.3.2.5 discusses protected areas that could be affected by the Projects. Section 20.2.3.2.6 provides a summary of Stage 2 scoping.

20.2.3.2.1 River Water Bodies

Table 20-2 Scoping Assessment for the River Water Bodies

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
All river water bodies identified in **Table 20-1**			
Project components assessed: onshore export cable corridor, onshore substations			
Biology	Could the activity change the hydromorphology and/or physico-chemistry of the water body, or lead to the direct loss or modification of habitats for aquatic plants?	**Construction** Impacts from ground disturbance for onshore export cable trenching (open-cut or trenchless) (including use of a temporary haul road) and construction of the onshore substations could increase the amount of fine sediment in water bodies. This could smother bed habitats and reduce light penetration. This could also lead to the loss or modification of aquatic flora communities. Changes to physico-chemistry from proposed onshore construction activities could also lead to loss or modification of habitats for aquatic plants.	In

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
		Operation Impacts from localised operational maintenance activities could have potential impacts on morphology and the hydrological regime. Increased fine sediment via surface runoff to water bodies could smother bed habitats and reduce light penetration. This could lead to loss or modification of aquatic flora communities. Changes to physico-chemistry from operational activities could also lead to loss or modification of habitats for aquatic plants.	
	Could the activity change the hydromorphology and/or physico-chemistry of the water body, or lead to the direct loss or modification of habitats for aquatic invertebrates?	**Construction** Increased fine sediment inputs to the water body originating from ground disturbance for onshore export cable trenching (open-cut or trenchless) (including use of a temporary haul road and temporary crossings) and construction of the onshore substations, could smother bed habitats and reduce light penetration. This could lead to the loss or modification of habitats which support benthic invertebrates. Changes to physico-chemistry from onshore construction activities could also lead to loss or modification of aquatic invertebrate habitat.	In

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
		Operation Impacts from operational maintenance activities could have potential impacts to morphology and the hydrological regime. Increased fine sediment via surface runoff to the water body could smother bed habitats and reduce light penetration. This could lead to loss or modification of aquatic invertebrate communities. Changes to physico-chemistry from operational activities could also lead to loss or modification of habitats for benthic invertebrates.	
	Could the activity change the hydromorphology and/or physico-chemistry of the water body, or lead to the direct loss or modification of shelter, feeding and spawning habitats for fish?	**Construction and operation** Increased turbidity due to increased fine sediment loads from onshore construction and operational maintenance activities could alter niche habitats and lead to the loss or modification of shelter, feeding and spawning habitats for fish. Furthermore, potential changes to physico-chemistry could also reduce the capacity of the water body to support feeding and spawning fish.	In

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
Hydromorphology	Could the activity change the volume, energy or distribution of flows in the water body?	**Construction** Ground disturbance for cable trenching (open-cut or trenchless) and changes to land use from temporary construction areas and the onshore substations could potentially alter the hydrological regime of river water bodies screened into the assessment. More impermeable surfaces and disturbed ground could alter surface water drainage pathways, resulting in changes to the volume, energy or distribution of flows.	In
		Operation Permanent onshore infrastructure could change surface water drainage patterns which has the potential to affect the hydrological regime of nearby water bodies.	
	Could the activity change the width, depth, bank conditions, bed substrates and structure of the riparian zone?	**Construction** Ground disturbance for cable trenching (open-cut or trenchless) and changes to land use from temporary construction areas and onshore substations are likely to increase fine sediment input to water bodies, which could have impacts on hydromorphology. Any increase in surface runoff has the potential to increase scour to the bed and banks and structure of the riparian zone.	In

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
		Operation Permanent onshore infrastructure could change surface water drainage patterns and have the potential to affect the morphological conditions of nearby water bodies through increased bed and bank erosion. Morphology of water bodies could also be impacted by increased sediment supply via runoff from any planned or unplanned operational maintenance activities.	
	Could the activity create a permanent barrier to the downstream movement of water and/or sediment, or the upstream movement of fish?	**Construction and operation** Onshore infrastructure will not create a permanent barrier to the downstream movement of water or sediment, or the upstream movement of fish. Although temporary barriers to river continuity may be required during construction (e.g., to facilitate watercourse crossings), they would be removed following construction and any effects would be reversed.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
Physio-chemistry and chemistry	Could the activity change the temperature, pH, oxygenation, salinity or nutrient concentrations in the water body?	**Construction** There is potential for increased sediment supply, which could impact on turbidity levels and oxygenation within the water body. There will also be increased risk of contaminant supply to water bodies, from accidental spillage or leakage of fuel oils or lubricants from construction vehicles. This has the potential to impact on physico-chemistry.	In
		Operation Maintenance of the onshore export cable infrastructure at operational sites could increase sediment supply to the water bodies. There is also a risk of contaminants and spillage from vehicles during operation.	

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Could the activity dangerous chemicals into the water body?	**Construction and operation** Construction and any maintenance machinery in or adjacent to water bodies has the potential to accidentally release lubricants, fuels and oils into a surface water body. This could also be caused by spillage, leakage and in-wash from vehicle storage areas following rainfall, accidental release of foul waters (e.g., from welfare facilities) and construction materials, such as concrete and inert drilling fluids from trenchless crossings. Dangerous chemicals could also be released from construction materials (e.g., concrete).	In

20.2.3.2.2 Coastal Water Bodies

Table 20-3 Scoping Assessment for Coastal Water Bodies

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
Yorkshire South GB640402491000			
Project components assessed: offshore export cables, cable protection			
Biology	Is the footprint of the activity 0.5km^2 or larger?	**Construction and operation** The Offshore Development Area within the coastal water body is 7.5km^2. However, this is the area within which offshore infrastructure will be sited. The actual construction footprint over which effects will occur will be significantly smaller once the offshore export cable corridor has been refined. The indicative trench width for pre-lay ploughing for a concurrent (worst case) scenario is 6m. The distance to the boundary of the coastal water body is approximately 1.92km, giving a footprint area of 0.01km^2. For operational activities, the maximum width of unburied cable protection is 15.2m. Assuming a worst case scenario that the entire cable length would require protection within the coastal water body, which is unlikely, gives an area of 0.03km^2.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Is the area of either activity greater than 1% or more of the water body's area?	**Construction and operation** The Yorkshire South coastal water body has a total area of 163.3km^2. For construction, the worst case footprint of activity equates to 0.006%. For operation, the figure is 0.018%.	Out
	Is the footprint of activity within 500m of any higher sensitivity habitat?	**Construction and operation** The Offshore Development Area is not located within 500m of a coastal higher sensitivity habitat.	Out
	Is the footprint of activity 1% or more of any lower sensitivity habitat?	**Construction and operation** The Offshore Development Area crosses an zone of subtidal soft sediment (sand, mud and mixed A5.2, A5.3, A5.4). Subtidal soft sediment characterises nearly all of the coastal water body (approximately 158km^2). For construction, the percentage of lower sensitivity habitat affected is 0.006%, and 0.019% for operation.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	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 and operation** The Offshore Development Area is not located close to an estuary. The closest estuary (Humber) is approximately 45km to the south.	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 and operation** 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. Given the small area of coastal water body affected by construction and operation, impacts on normal fish behaviour are not anticipated.	Out
	Could cause entrainment or impingement of fish?	**Construction and operation** No mechanism for fish entrainment or impingement has been identified for construction or operation.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Could introduce or spread Invasive non-native species (INNS)?	**Construction and operation** 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
Hydromorphology	Could impact on the hydromorphology, e.g., for example morphology or tidal patterns, of a water body at high status?	**Construction and operation** Following offshore export cable installation, the trench would be backfilled, and the mobility of soft subtidal sediments that characterise the coastal water body would ensure the seabed and beach are reconfigured close to their original morphology (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 hydromorphology or tidal patterns at a water body scale are unlikely. For operational activities, the maximum possible area of unburied cable protection equates approximately 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.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Could significantly impact the hydromorphology of any water body?	**Construction and operation** The offshore export cables would be brought ashore and jointed to the onshore cables within transition pits using horizontal directional drilling (HDD) and duct installation. Given the use of HDD, effects in the coastal water body are not predicted. For operational activities, the area of unburied cable protection equates to 0.018% of the water body's area; no significant impacts on hydromorphology 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 designated as heavily modified for coastal protection, flood protection and navigation purposes.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
Physico-chemistry and Chemistry	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 and operation** There will be an increase in suspended sediment concentrations because of transition pit works associated with the subtidal HDD exit point and cable burial techniques to facilitate cable installation. These activities could increase turbidity and alter oxygen and nutrient levels. The seabed of the coastal water body is characterised by sand, mud and mixed soft sediments. Dispersion of fine sediment from these areas would likely be low. If areas are disturbed with a higher mud content, more fine sediment could be released into the water column. However, any increases in fine sediment suspension for both sand and mud would be short in duration (lasting the maximum duration of offshore export cable installation), temporary and likely to be within natural baselines already experienced in the water body. The presence of unburied cable protection will not impact water quality.	Out
	Is in a water body with a phytoplankton status of moderate, poor or bad?	**Construction and operation** No – status is good.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Is in a water body with a history of harmful algae?	**Construction and operation** Not monitored.	Out
	The chemicals are on the Environmental Quality Standards Directive list?	**Construction and operation** No chemicals would be directly released from potential works associated with the project. Best practice measures will be used to reduce the likelihood of spillages during construction and operation/maintenance.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	It disturbs sediment with contaminants above Cefas Action Level 1?	**Construction and operation** Sediments have not been sampled within the Offshore Development Area within the coastal water body (i.e. within one nautical mile). However, data is available for other wind farm projects in the same area. Studies undertaken as part of the Dogger Bank A & B and Dogger Bank C and Sofia Offshore Wind Farms revealed low levels of contamination in the sediments. This project data is considered relevant due to the nearby location and similarities in sediment types likely to be found in the Offshore Development Area. Within the array areas, only one site had generally higher levels of metals of which chromium and nickel exceeded Action Level 1. All other sites were below Action Level 1. Within the Dogger Bank A & B export cable corridor, one site had generally higher levels of metals, with arsenic, chromium, copper and lead exceeding Action Level 1 and all nearshore sites containing elevated levels of one or more metals. However, given the relatively localised nature of the plume and short duration over which the effects would occur, no risk to long term environmental quality standards was identified.	Out

20.2.3.2.3 Groundwater Bodies

Table 20-4 Scoping Assessment for Groundwater Bodies

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
Hull and East Riding Chalk GB40401G700700			
Project components assessed: landfall, onshore export cables, onshore substations			
Groundwater quantity	Will the activity change groundwater levels affecting Groundwater Dependent Terrestrial Ecosystems (GWDTEs) or dependent surface water features?	**Construction and operation** During construction of the onshore export cable corridor, subsurface HDD methods used to cross watercourses could cause localised changes to groundwater flows. There may be local changes to infiltration rates into the groundwater bodies due to installation of buried infrastructure causing alterations to subsurface flow routes. However, these changes are not expected to have permanent impacts on GWDTEs or dependent surface water features.	Out
	Will the level of proposed groundwater abstraction exceed recharge at a water body scale?	**Construction and operation** No consumptive abstraction is planned, and there will be no mechanism for impact on groundwater recharge. Any groundwater abstraction would be limited to localised dewatering of near-surface groundwaters during subsurface excavations in the construction phase.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Could the activity lead to an additional surface water body that will become noncompliant and lead to failure of the dependent surface water test?	**Construction and operation** No construction or operational activities will abstract any water from the groundwater bodies identified.	Out
	Could the activity result in additional abstraction that will exceed any groundwater body scale headroom between the fully licensed quantity and the limit imposed by the total recharge?	**Construction and operation** No consumptive abstraction is planned, and there will be no mechanism for impact on groundwater recharge. Any groundwater abstraction would be limited to localised dewatering of near-surface groundwaters during subsurface excavations in the construction phase.	Out

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
Groundwater quality	Will the activities have the potential to result in or exacerbate widespread diffuse pollution at a water body scale?	**Construction and operation** If any pollution from the construction and operation of the Projects does accidently occur, this will be limited to a very small proportion of both groundwater bodies identified (highly localised) and will not have an impact at the water body scale.	Out
	Will the activities have the potential to result in pollution of GWDTEs or cause deterioration in the quality of a drinking water abstraction?	**Construction and operation** Activities such as HDD and open cut trench excavations to construct the onshore export cable corridor could potentially introduce contaminants into the groundwater bodies identified. This could lead to an increase in pollutant concentrations affecting the quality of licensed and unlicensed abstractions.	In

Parameter	Scoping Question	Scoping Assessment	Scoping Decision
	Could the activities have the potential to result in increasing trends in pollutant concentrations or reduce the ability of the water body being able to reverse significant trends in groundwater pollutants?	**Construction and operation** Construction of the onshore export cable from open cut trench excavations and HDD could potentially introduce contaminants into groundwater. This could lead to an increase in pollutant concentrations within the groundwater bodies identified.	In
	Will the activity lead to saline intrusion?	**Construction and operation** Although there may be some very localised increases in salinity in the vicinity of the HDD bore, there will not be any consumptive abstraction of groundwater during construction or operation, which would case a drawdown in the underlying aquifer. As the landfall is above mean sea level, the head difference will also limit any minor changes in salinity.	Out

20.2.3.2.4 Impacts on River Basin Management Plan Improvement and Mitigation Measures

37. The Environment Agency has not published any details of improvement measures that are required to improve the status of any of the water bodies that have been scoped in to the assessment. However, the Environment Agency has identified the mitigation measures that are required to achieve GEP in the artificial or heavily modified river water bodies identified in **Table 20-1**. These measures are listed in **Table 20-5**. These measures are classed as either in place (IP) or not in place (NIP).

38. The measures identified are relevant to those water bodies designated as either heavily modified or artificial. Measures identified for the river water bodies are intended to address physical modification pressures associated with land drainage, flood protection, navigation (including ports) and urbanisation (i.e., the uses for which the water bodies are designated as heavily modified).

39. Although the Projects involve localised construction works within these water bodies, the very limited impacts on hydromorphology identified in section 20.2.3.2.1 means that there is no mechanism to affect the proposed measures. There would also be no mechanism to affect the maintenance and sediment management measures listed in **Table 20-5**. The future implementation or effectiveness of mitigation measures will not be affected.

Table 20-5 Measures Identified in the RMBP for the River Water Bodies Identified in Table 20-1

Water body	Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770	Old Howe/ Frodingham Beck to River Hull GB104026067021	Mickley Dike GB104026066990	Catchwater Drain GB104026066970	Foredyke Stream Upper GB104026066890	Foredyke Stream Lower to Holderness Drain GB104026066910	Holderness Drain Source to Foredyke Stream GB104026066950	Hull from Arram Beck to Humber GB104026067212	Beverley and Barmston Drain GB104026067211	High Hunsley to Arram Area GB104026066841	High Hunsley to Woodmansey Area GB104026066820
Flood bunds	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Set-back embankments	-	NIP	-	-	NIP	NIP	-	NIP	NIP	NIP	-
Floodplain connectivity	-	NIP	-	-	NIP	NIP	-	NIP	NIP	NIP	-
Fish passes	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Reduce fish entrainment	-	NIP	-	-	-	-	IP	NIP	NIP	NIP	-
Enhance ecology	-	NIP	-	NIP	-	-	-	NIP	NIP	NIP	-
Remove obsolete structures	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Changes to locks etc	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Selective vegetation control	IP	NIP	IP	IP	IP	IP	IP	NIP	NIP	NIP	IP
Vegetation control	IP	NIP	IP	IP	IP	IP	IP	NIP	NIP	NIP	IP
Vegetation control timing	IP	NIP	IP	-	IP	IP	IP	NIP	NIP	NIP	IP
Invasive species techniques	-	NIP	-	-	-	NIP	-	NIP	NIP	NIP	IP
Retain habitats	-	NIP	-	NIP	-	-	-	NIP	NIP	NIP	-
Maintenance – minimise habitat impact	-	NIP	-	NIP	-	-	-	NIP	NIP	NIP	-
Remove or soften hard bank	-	NIP	-	NIP	-	-	-	NIP	NIP	NIP	-
Maintenance – prevent sediment transfer	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-

Water body	Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770	Old Howe/ Frodingham Beck to River Hull GB104026067021	Mickley Dike GB104026066990	Catchwater Drain GB104026066970	Foredyke Stream Upper GB104026066890	Foredyke Stream Lower to Holderness Drain GB104026066910	Holderness Drain Source to Foredyke Stream GB104026066950	Hull from Arram Beck to Humber GB104026067212	Beverley and Barmston Drain GB104026067211	High Hunsley to Arram Area GB104026066841	High Hunsley to Woodmansey Area GB104026066820
Water level management	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Align and attenuate flow	IP	NIP	IP	-	IP	IP	IP	NIP	NIP	NIP	-
Preserve or restore habitats	-	NIP	-	NIP	-	-	-	NIP	NIP	NIP	-
Educate landowners	-	NIP	-	-	-	-	-	NIP	NIP	NIP	IP
In-channel morph diversity	-	NIP	-	NIP	-	-	-	NIP	NIP	NIP	-
Re-opening culverts	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Alter culvert channel bed	-	NIP	-	-	-	-	-	NIP	NIP	NIP	-
Sediment management strategy	-	NIP	NIP	-	NIP	NIP	NIP	NIP	NIP	NIP	-
Avoid the need to dredge	-	-	-	-	-	-	-	NIP	-	-	-
Dredging disposal strategy	-	-	-	-	-	-	-	NIP	-	-	-
Reduce impact of dredging	-	-	-	-	-	-	-	NIP	-	-	-
Reduce sediment re-suspension	-	-	-	-	-	-	-	NIP	-	-	-
Retime dredging or disposal	-	-	-	-	-	-	-	NIP	-	-	-
Sediment management	-	-	-	-	-	-	-	NIP	-	-	-
Dredge disposal site selection	-	-	-	-	-	-	-	NIP	-	-	-
Manage disturbance	-	-	-	-	-	-	-	NIP	-	-	-
Phased de-watering	-	-	-	-	-	-	-	NIP	-	-	-
Modify vessel design	-	-	-	-	-	-	-	NIP	-	-	-

Water body	Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770	Old Howe/ Frodingham Beck to River Hull GB104026067021	Mickley Dike GB104026066990	Catchwater Drain GB104026066970	Foredyke Stream Upper GB104026066890	Foredyke Stream Lower to Holderness Drain GB104026066910	Holderness Drain Source to Foredyke Stream GB104026066950	Hull from Arram Beck to Humber GB104026067212	Beverley and Barmston Drain GB104026067211	High Hunsley to Arram Area GB104026066841	High Hunsley to Woodmansey Area GB104026066820
Vessel management	-	-	-	-	-	-	-	NIP	-	-	-
Boats in central track	-	-	-	-	-	-	-	NIP	-	-	-
Invasive species awareness	-	-	-	-	-	-	-	NIP	-	-	-
Boat wash awareness	-	-	-	-	-	-	-	NIP	-	-	-
Bank rehabilitation	-	-	-	-	-	-	-	NIP	-	-	-

20.2.3.2.5 Impacts on Protected Areas

40. The Environment Agency's 'Clearing the Waters For All' guidance (Environment Agency, 2017) recommends further assessment of potential impacts on any water-dependent protected areas that are within 2km of a proposed new project activity. This 2km Zone Of Influence has therefore been adopted across all water bodies for each project activity and the results of the process are summarised in **Table 20-6**, **Table 20-7** and **Table 20-8** and evaluated below.

20.2.3.2.5.1 Nitrate Vulnerable Zones

41. The Onshore Development Area passes through the following Nitrate Vulnerable Zones (NVZs), as indicated in **Table 20-6**:

- River Hull from Arram Beck to Humber NVZ (S254)
- Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)
- Holderness Drain from Foredyke Stream to Humber NVZ (S251)
- Yorkshire Chalk (G106)

42. Foul drainage from construction and operational welfare facilities will be tankered off-site for treatment, preventing impacts to NVZs. The construction site drainage systems will also prevent increasing nitrate volumes from entering the surface drainage network following soil excavations.

43. The construction and operation activities are therefore unlikely to significantly alter NVZ nitrate and nutrient concentrations. Impacts on NVZs are scoped out of the assessment.

20.2.3.2.5.2 Drinking Water Safeguard Zones

44. The Onshore Development Area passes through the following Drinking Water Safeguard Zones (DWSZ):

- Toplow Hill (surface water);
- Cottingham, Dunswell, Keldgate, Springhead (groundwater).

45. Control measures, which will prevent the supply of contaminants to surface and groundwater, and associated protected areas, are described in Stage 3 (section 20.2.3.3.1 and section 20.2.3.3.2). These measures will minimise the likelihood of an accidental release and put in place procedures for an effective response to any pollution event. This means there will be no mechanism for impact on each DWSZ, which are scoped out of the assessment.

20.2.3.2.5.3 Bathing Waters

46. Accidental spillage of dangerous chemicals from construction materials and machinery could adversely affect bathing water quality.

47. Skipsea Bathing waters are located within the Offshore Development Area and adjacent to the Onshore Development Area. Hornsea Bathing waters are located approximately 5.3km south of the Offshore Development Area and 1.9 km south of the Onshore Development Area (access track only). Fraisthorpe bathing waters are located 5.9km north of the Offshore Development Area and 5.1km north of Onshore Development Area (access track only).

48. The risk of accidental spills or leaks occurring during construction will be adequately mitigated through the production and adherence to a Construction Environmental Management Plan (or similar). 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.

20.2.3.2.5.4 Habitats Network Sites

49. WER compliance assessments require the consideration of the potential effects on quality elements (hydromorphological, physico-chemical, chemical and biological), many of which support ecological interest features for which Habitats Network Sites are designated (e.g. Special Areas of Conservation (SAC) and Special Protection Areas (SPA)).

50. There are several Habitats Network Sites in the area. The Greater Wash SPA is crossed by the Offshore Development Area. Flamborough Head SAC and Flamborough and Filey Coast SPA are located approximately 10.5km north of the landfall at Skipsea, and Hornsea Mere SPA is located approximately 7 km to the south of the landfall. The Humber Estuary, which receives freshwater flows from the river water bodies discussed in section 20.2.3.3.1, is also designated as a SAC and SPA.

51. The Report to Inform Appropriate Assessment builds on the output of this assessment to assess the potential effects on designated site interest features. To avoid duplication, impacts on the designated site interest features themselves are not considered here.

Table 20-6 Protected Areas Associated with Surface Water Bodies in the Onshore Development Area as Designated by the Nitrates Directive

Water body and reference number	Nitrate Vulnerable Zone			
	River Hull from Arram Beck to Humber NVZ (S254)	Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)	Yorkshire Chalk (G106)	Holderness Drain from Foredyke Stream to Humber NVZ (S251)
Barmston Sea Drain/Skipsea Drain to Conf Water GB104026077770	✓	✓	×	×
Old Howe/Frodingham Beck to River Hull GB104026067021	✓	×	✓	×
Mickley Dike GB104026066990	✓	×	×	×
Catchwater Drain GB104026066970	×	×	×	✓
Foredyke Stream Upper GB104026066890	×	×	×	✓

Water body and reference number	Nitrate Vulnerable Zone			
	River Hull from Arram Beck to Humber NVZ (S254)	Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)	Yorkshire Chalk (G106)	Holderness Drain from Foredyke Stream to Humber NVZ (S251)
Foredyke Stream Lower to Holderness Drain GB104026066910	×	×	×	✓
Holderness Drain Source to Foredyke Stream GB104026066950	✓	×	×	✓
Hull from Arram Beck to Humber GB104026067212	✓	×	✓	×
Beverley and Barmston Drain GB104026067211	✓	×	✓	×
High Hunsley to Arram Area GB104026066841	✓	×	✓	×

Water body and reference number	Nitrate Vulnerable Zone			
	River Hull from Arram Beck to Humber NVZ (S254)	Barmston Sea Drain from Skipsea Drain to N Sea NVZ (S259)	Yorkshire Chalk (G106)	Holderness Drain from Foredyke Stream to Humber NVZ (S251)
High Hunsley to Woodmansey Area GB104026066820	✓	×	✓	×

Table 20-7 Protected Areas Associated with the Coastal Water Body within 2km of Offshore Development Area

Protected Area	ID number	Directive/ Designation
Greater Wash	UK9020329	Special Protection Area
Skipsea	UK08600	Bathing Water Directive
Hornsea	UK08700	Bathing Water Directive

Table 20-8 Protected Areas Associated with the Hull and East Riding Chalk Groundwater Water Body within 2km of the Onshore Development Area

Protected Area	ID number	Directive/ Designation
Cottingham	GWSGZ0240	Safeguard Zone
Dunswell	GWSGZ0241	Safeguard Zone
Keldgate	GWSGZ0246	Safeguard Zone
Springhead	GWSGZ0248	Safeguard Zone
Tophill Low	SWSGZ6010	Safeguard Zone
Barmston Sea Drain from Skipsea Drain to N Sea NVZ	S259	Nitrates Directive
River Hull from Arram Beck to Humber NVZ	S254	Nitrates Directive
Holderness Drain from Foredyke Stream to Humber NVZ	S251	Nitrates Directive
Yorkshire Chalk	G106	Nitrates Directive
Greater Wash	UK9020329	Special Protection Area

20.2.3.2.6 Stage 2 Summary

52. Stage 2 scoping has established that activities associated with the Projects in the following water bodies should be taken forward to Stage 3 Detailed Compliance Assessment:

- River water body (all quality elements):
  - Barmston Sea Drain/ Skipsea Drain to Conf GB104026077770;
  - Old Howe/ Frodingham Beck to River Hull GB104026067021;
  - Mickley Dike GB104026066990;
  - Catchwater Drain GB104026066970;
  - Foredyke Stream Upper GB104026066890;
  - Foredyke Stream Lower to Holderness Drain GB104026066910;
  - Holderness Drain Source to Foredyke Stream GB104026066950;
  - Hull from Arram Beck to Humber GB104026067212;
  - Beverley and Barmston Drain GB104026067211;
  - High Hunsley to Arram Area GB104026066841; and
  - High Hunsley to Woodmansey Area GB104026066820.
- Groundwater body (groundwater quality element only):
  - Hull and East Riding Chalk GB40401G700700.

20.2.3.3 Stage 3: Detailed Compliance Assessment

53. This section presents the results of the impact assessment undertaken on the water bodies identified in section 20.2.3.1.1 of this report, using the method outlined in section 20.2.2. This assessment determines whether elements of the Projects brought forward from Stage 2 would cause deterioration of water bodies, and whether such deterioration would have a significant non-temporary effect on the status of one or more quality elements at a water body level.

20.2.3.3.1 River Water Bodies

20.2.3.3.1.1 Hydromorphology (Hydrological Regime and Morphological Conditions)

20.2.3.3.1.1.1 Construction Activities

54. There is the potential for construction activities to alter surface water flows entering river water bodies. An increase in areas of hard-standing land use associated with the haul road, onshore substations and temporary compound areas, could change flow conveyance pathways. This could result in localised changes to the volume, energy or distribution of flows of the identified water bodies. Such an increase in surface runoff could potentially increase local bed and bank scour.

55. Greater levels of fine sediment could be released directly into watercourses, predominantly from ground disturbance and vegetation cover removal associated with construction. This could result in increased sediment deposition and smothering of existing substrates. However, all water bodies surveyed during the geomorphological baseline survey (**Appendix 20.1**) are low energy (depositional) environments and bed substrates are typically fine (silts and clays) – none of the surveyed watercourses have clean gravel substrates that could be smothered. Baseline fine sediment supply is likely to be high in most catchments, associated with evidence of channel maintenance (vegetation clearance and desilting) and the dominance of arable land use.

56. The onshore export cable corridor will use trenchless methods to cross Main Rivers. This means that Main Rivers will not be directly disturbed. The majority of Ordinary Watercourses will be crossed using open-cut trenching.

57. There is potential for indirect impacts upon the hydrological regime and morphological condition of water bodies from the use of multiple trenched crossings and culverts on Ordinary Watercourses which drain into the main water body. A large number of trenched crossings in water body catchments could alter flow regimes, disrupt coarse sediment transport patterns and increase the input of fine sediment into water bodies, impacting upon its morphological condition.

58. As shown in **Table 20-9** there are generally a low number of trenched crossings required within each water body catchment. The exceptions being the catchments of Catchwater Drain, Beverley and Barmston Drain and High Hunsley to Woodmansey Area. The relatively high number of crossings in these catchments reflects the fact that they would be occupied by relatively large areas of the Onshore Development Area (e.g., the catchment of Beverley and Barmston Darin is crossed by the Onshore Development Area in three different locations). However, **Chapter 20 Flood Risk and Hydrology** has assessed significance of effect following mitigation as minor adverse in these three catchments. Residual significance of effect in all other catchments is either no impact (i.e., no trenched crossings), negligible or minor adverse.

59. It is therefore likely that hydrological regime and morphological impacts on Ordinary Watercourses, will not have a significant or permanent impact on any downstream WFD water body.

Table 20-9 Watercourse Crossings in River Water Body Catchments

Catchment	Trenchless crossings		Trenched crossings
	Main River	Ordinary Watercourse	Ordinary Watercourse
Barmston Sea Drain/Skipsea Drain to Conf	0	2	7
Coastal catchment	0	0	3
Mickley Dike catchment	0	0	0
Old Howe/Frodingham Beck to R Hull	0	0	4
Catchwater Drain	0	1	11
Foredyke Stream Upper	1	0	4
Foredyke Stream Lower to Holderness Dr	2	0	1
Holderness Drain Source to Foredyke Stream	1	3	6
Beverley and Barmston Drain	1	5	28
Hull from Arram Beck to Humber	1	0	0
High Hunsley to Arram Area	1	0	1
High Hunsley to Woodmansey Area	0	2	13

20.2.3.3.1.1.2 Construction of the Projects Concurrently or Sequentially

60. As described in section 20.2.1.1.1, the sequential build scenario is the worst case for impacts associated with the direct disturbance of surface water bodies (e.g. trenched crossings and temporary structures), and the concurrent scenario is the worst case for impacts associated with increased sediment supply, supply of contaminants and changes to surface water flows.

20.2.3.3.1.1.3 Control Measures

61. Given the construction works will be confined to a small area of each water body, the potential release of fine sediment is expected to be localised and temporary in nature. To mitigate for any localised hydromorphological impact under either scenario, the following construction control measures will be implemented:

- Trenchless crossing methods where the onshore cable corridor must cross Main Rivers will prevent significant direct changes to the bed and bank conditions within each water body. This method will cause no direct disturbance to the surface water bodies.
- Following removal of the temporary crossings, the banks will be reinstated to their pre-construction condition to ensure localised impacts are not permanent.
- Topsoil and sub-soil removed as part of site preparation will be stored separately within the working width and away from the open-cut trench. Both will be managed to minimise soil erosion.
- Construction drainage will be developed and implemented to minimise water within the cable trench and ensure ongoing drainage of surrounding land. Where water enters the trenches during installation, this will be pumped via settling tanks or ponds to remove sediment, before being discharged into local ditches or drains via temporary interceptor drains.
- Construction drainage will be developed in consultation with landowners, the Lead Local Flood Authority, Environment Agency and relevant Internal Drainage Board.
- Specific drainage measures for each area of land will be specified based on information identified and recorded by a land drainage consultant prior to construction.
- Surface water drainage requirements will be designed to meet the requirements of the National Planning Policy Framework 2021 (NPPF, 2021). The Sustainable Drainage Systems (SuDS) philosophy will be employed to limit run-off, where feasible, through the use of infiltration techniques which can be accommodated within the Onshore Development Areas.

62. With implementation of each control measure to manage sediment supply and surface runoff, combined with the small scale of direct impacts to each water body, the onshore construction activities cannot be considered under any scenario to cause deterioration in water body status or the prevention of achieving GEP or GES.

20.2.3.3.1.1.4 Operational Activities

63. The increase in impermeable area from the presence of above ground infrastructure (permanent access tracks, onshore substations) will reduce infiltration and potentially alter surface runoff rates and subsurface flows. This could impact upon surface water volumes to the extent to which rates of bed and bank erosion may increase and could lead to larger scale geomorphological change.

20.2.3.3.1.1.5 Operation of the Projects Concurrently or Sequentially

64. The extent of the impact to hydrological regime and hydromorphological condition is likely to be dependent on the area of permanent infrastructure (onshore export cable corridor, onshore substations and permanent access roads) and the frequency of operational activities within each river water body catchment during operation. If the Projects operate concurrently or sequentially, the substation operational compound would be 199,416m^2 compared to 135,000m^2 under the in isolation scenario. Conversion of 64,416m^2 (6.4ha) more arable land to hard-standing ground, could lead to greater changes to surface water drainage pathways and increased runoff.

20.2.3.3.1.1.6 Control Measures

65. To ensure impacts are minimal to each water body, the following operational control measure will be in place:

- Onshore drainage will be designed for all permanent onshore infrastructure. This will include measures to ensure existing land drainage will be reinstated following construction and maintained to retain pre-development discharge rates.
- With this control measure in place, impacts from the operational activities on the hydrological regime and hydromorphological condition of water bodies will be very low. There will therefore be no risk of deterioration in water body status or the prevention of achieving GEP or GES.

20.2.3.3.1.2 Physico-chemistry (General, Priority substances)

20.2.3.3.1.2.1 Construction Activities

66. Construction activities could result in accidental release of lubricants, oils and runoff into nearby water bodies, impacting upon surface water quality. This could occur accidentally from construction machinery (e.g. fuels and lubricants) and construction materials (e.g. concrete) located near water bodies. Vehicle and construction material storage areas could be an additional source of leaks and spills. Additionally, the presence of welfare facilities may potentially lead to foul water runoff into water bodies.

67. An increase in sediment supply from any disturbed soils along the onshore export cable corridor and at the substations during construction, could increase surface runoff into the river water bodies. Greater fine sediment in the water body could reduce light penetration and affect local oxygenation and temperature conditions.

68. Construction activities which disturb the ground, including excavations for cable trenching, could result in the remobilisation of contaminants that are already present in the soil. This could include in situ contaminated land and nutrients such as nitrogen and phosphorus from nitrogen-rich arable soils. Nutrients could also be supplied through discharges of foul water from temporary welfare facilities and construction compounds. The supply of nutrients to surface waters could result in adverse effects on water quality (including, in extreme cases, eutrophication) and aquatic plant, invertebrate and fish communities supported by surface waters.

69. During construction the presence of temporary culverts and use of open cut trenching methods across Ordinary Watercourses could increase conveyance of pollutants and fine sediment to the downstream water body, impacting on overall dissolved oxygen, pH and temperature.

70. However, as shown in **Table 20-9,** there are generally a low number of trenched crossings required within each water body catchment. In catchments where there are higher numbers of crossings, **Chapter 20 Flood Risk and Hydrology** has assessed significance of effect following mitigation as minor adverse. It is therefore likely that the above impacts on Ordinary Watercourses will not have a significant or permanent cumulative physico-chemical impact on any river water body.

20.2.3.3.1.2.2 Construction of the Projects Concurrently or Sequentially

71. As described in section 20.2.1.1.1, the sequential build scenario is the worst case for impacts associated with the direct disturbance of surface water bodies (e.g. trenched crossings and temporary structures), and the concurrent scenario is the worst case for impacts associated with increased sediment supply, supply of contaminants and changes to surface water flows.

20.2.3.3.1.2.3 Control Measures

72. To prevent the activities from impacting upon both 'General' and 'Priority' substances parameters, the Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors CIRIA (C650); and CIRIA - SuDS Manual (CIRIA, 2015) will be applied. This will include the following specific control measures:

- No discharge to surface watercourses will occur without permission from the Environment Agency.
- Wheel washers and dust suppression measures to be used as appropriate to prevent the migration of pollutants.
- Regular cleaning of roads of any construction waste and dirt to be carried out.
- Measures will be employed to intercept and treat run-off from the working corridor, for example by using sandbags, settlement tanks and lagoons. After treatment, discharge of any waters will be carried out so as to minimise physical impacts on channel morphology.
- A Pollution Prevention Plan (PPP) will be developed and will include details of an emergency spill procedures. Good practice guidance detailed in the Environment Agency's Pollution Prevention Guidance (PPG) notes (including PPG01, PPG05, PPG08 and PPG21) will be followed where appropriate. Although EA PPG notes have been revoked, they have been updated as Guidance for Pollution Prevention (GPP notes) for use in Scotland and Northern Ireland (NetRegs, 2022).
- Oil, chemicals and other potentially harmful liquids will be handled in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001, refuelling of machinery would be undertaken within designated areas where spillages can be easily contained. Machinery would be routinely checked to ensure it is in good working condition; and any tanks and associated pipe work containing oils and fuels would be double skinned and be provided with intermediate leak detection equipment.
- Areas at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) will be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system or the local watercourses.
- All plant machinery and vehicles will be maintained in a good condition to reduce the risk of fuel leaks.

- Post-construction, the working area will be reinstated to pre-existing condition as far as reasonably practical in line with Defra 2009 Construction Code of Practice for the Sustainable Use of Soils on Construction Sites PB13298 (Co10).
- Foul drainage will be collected through a mains connection to existing local authority sewer system if available or septic tank located within the project boundary. The specific approach will be determined during detailed design with consideration for the availability of mains connection and the number of visiting hours for site attendees.

73. Following implementation of the control measures set out, the construction activities will have minimal impacts on the physico-chemical elements of the water bodies. There will be therefore very low risk of deterioration in water body status or the prevention of achieving GEP or GES in the water bodies.

20.2.3.3.1.2.4 Operational Activities

74. Any routine maintenance along the onshore export cable corridor and at the onshore substations that is in proximity to the water bodies, has potential to impact upon the physico-chemistry quality elements. This risk is primarily from maintenance vehicles and the potential for lubricants and oils to runoff into the water bodies.

75. In addition, welfare facilities at the onshore substations could increase the supply of nutrients such as nitrogen and phosphorus to the drainage system, either as direct discharges from the site or as increased loadings to the sewage treatment network and associated treated effluent discharges. The supply of additional nutrients to surface waters could result in adverse effects on water quality (including, in extreme cases, eutrophication) and aquatic plant, invertebrate and fish communities supported by surface waters.

20.2.3.3.1.2.5 Operation of the Projects Concurrently or Sequentially

76. Concurrent or sequential operation of the Projects would result in the conversion of 64,416m^2 (6.4ha) more arable land to hard-standing ground, which could increase the risk of accidental spillages or leakages during operation. This is because there could be more maintenance activity and more potential contaminants stored on site in comparison to construction in isolation.

20.2.3.3.1.2.6 Control Measures

77. To ensure deterioration in status is prevented, the following operational control measures will be in place:

- A PPP will be developed for operational activities, which will include details of emergency spill procedures.
- All machinery and vehicles used for operational maintenance activities will be maintained in a good condition to reduce the risk of fuel leaks.
- Foul waters from welfare facilities will either be discharged through a mains connection to an existing mains sewer (if such a connection is available) or collected in a septic tank located within the development boundary and transported off site for disposal at a licensed facility with appropriate treatment capacity within its existing permit. The operational use of the site is likely to be limited to a low number of weekly/monthly visits, and as such additional nutrient loadings are likely to be very low.
- All fuels, oils, lubricants and other chemicals used at the onshore substation will be stored in an impermeable bund with at least 110% of the stored capacity. Damaged containers will be removed from site and all refuelling will take place in a dedicated impermeable area, using a bunded bowser. The refuelling and fuel storage area will be located at least 10m from the nearest watercourse. Biodegradable oils will be used where possible.
- Spill kits will be available on site at all times. Sand bags or stop logs will also be available for deployment on the outlets from the site drainage system in case of emergency.
- Given the sporadic nature of maintenance activities along the onshore export cable corridor and the predicted lack of impact, no permanent mitigation is proposed beyond that suggested for the substation site. Any excavations would employ best-practice measures to manage runoff and the supply of sediment and contaminants from construction sites.
- With these control measures in place, the onshore operational activities will have minimal impacts on the physico-chemistry elements of water bodies. There will be very low risk of deterioration in water body status or the prevention of achieving GEP or GES.

20.2.3.3.1.3 Biological (Aquatic Flora, Benthic Invertebrates, Fish)

20.2.3.3.1.3.1 Construction Activities

78. Construction activities could impact on aquatic flora, benthic invertebrates and fish fauna based on potential impacts to the hydromorphology and physico-chemistry quality elements. Increased fine sediment in the water body could smother bed habitats, reducing light penetration and dissolved oxygen. Additionally, changes to physico-chemistry could lead to loss or modification of in-channel and riparian habitats. This disturbance would limit the communities of all three biological parameters.

79. During construction the presence of temporary culverts and use of open cut trenching methods across Ordinary Watercourses could increase conveyance of pollutants and fine sediment to the downstream water body, impacting on species and habitat populations.

80. However, as described in section 20.2.3.3.1.1, effects associated with the direct disturbance of surface water bodies (i.e. trenched crossings) has been assessed as either negligible or minor adverse across the Onshore Development Area. It is therefore likely that impacts at Ordinary Watercourses, will not have a significant or permanent cumulative biological impact on any water body.

20.2.3.3.1.3.2 Construction of the Projects Concurrently or Sequentially

81. As described in section 20.2.1.1.1, the sequential build scenario is the worst case for impacts associated with the direct disturbance of surface water bodies (e.g. trenched crossings and temporary structures), and the concurrent scenario is the worst case for impacts associated with increased sediment supply, supply of contaminants and changes to surface water flows.

20.2.3.3.1.3.3 Control Measures

82. Given the proposed control measures that will be implemented to prevent construction impacts to hydromorphology and physico-chemistry, these measures will indirectly reduce impacts to biological quality elements, preventing contaminants and fine sediment production from reaching the water bodies and causing risk of deterioration.

20.2.3.3.1.3.4 Operational Activities

83. The potential risk of contaminant spills from maintenance vehicles would impact on the hydromorphology and physico-chemistry of the water bodies which will ultimately impact upon the supporting biological communities of aquatic flora, benthic invertebrates and fish fauna.

20.2.3.3.1.3.5 Operation of the Projects Concurrently or Sequentially

84. Concurrent or sequential operation of the Projects would result in the conversion of 64,416m^2 (6.4ha) more arable land to hard-standing ground, which could increase the risk of accidental spillages or leakages during operation. This is because there could be more maintenance activity and more potential contaminants stored on site in comparison to construction in isolation.

20.2.3.3.1.3.6 Control Measures

85. Given the proposed control measures that will be implemented to prevent operational impacts to hydromorphology and physico-chemistry, these measures will indirectly reduce impacts to biological quality elements, preventing contaminants and fine sediment production from reaching the water bodies and causing risk of deterioration.

20.2.3.3.2 Groundwater Bodies (Water Quality)

20.2.3.3.2.1 Construction and Operational Activities

86. The use of trenchless crossing techniques will help to avoid any direct impact on river water bodies, however there is a risk that excavations to facilitate trenchless crossings, could potentially introduce contaminants to the Hull and East Riding Chalk groundwater body and associated aquifers, Source Protection Zones (SPZ) and DWSZs. Accidental release of lubricants, fuels and oils from construction or operational maintenance machinery could occur as a result of spillages, leakage from vehicle storage areas and direct release from machinery working directly in or adjacent to water bodies. If not prevented, these contaminants could enter connected groundwaters through run-off. An increase in groundwater contaminant concentrations could subsequently lead to an overall deterioration in groundwater quality. These contaminants could then be transferred to GWDTEs via subsurface flow routes.

20.2.3.3.2.2 Construction and Operation of the Projects Concurrently or Sequentially

87. It is considered that construction of the Projects concurrently is likely to lead to a greater impact on the groundwater body within the Onshore Development Area. A greater proportion of land disturbed at any one time to facilitate installation of the onshore export cables for both Projects would place the highest pressure on both groundwater bodies. Under the sequential scenario, land exposed for the first Project would be reinstated prior to commencement of the second Project. This would reduce the potential for a deterioration in groundwater quality with less construction activity occurring at one time.

88. For operational activity, concurrent or sequential scenarios would result in the conversion of 64,416m^2 (6.4ha) more arable land to hard-standing ground at the substations compared to construction in isolation. This could increase the risk of accidental spillages or leakages during operation because there could be more maintenance activity and more potential contaminants stored on site in comparison to construction in isolation.

20.2.3.3.2.3 Control Measures

89. To mitigate against these potential impacts and to prevent deterioration in water body status, the following groundwater control measures will be implemented during construction phase:

- Use of best practice techniques and due diligence regarding the potential for pollution throughout all construction, operation and maintenance, and decommissioning activities. This provides a robust approach to managing pollution incidents on site to reduce the probability and impact of leaks and spills.
- Ground investigations and a hydrogeological risk assessment meeting the requirements of Groundwater Protection Guides (Environment Agency, 2018), will be undertaken at each HDD crossing location.
- A written scheme dealing with contamination of any land and groundwater will be submitted and approved by the Local Planning Authority before construction activities commence.
- No deep excavation will be undertaken in SPZ 1 areas to ensure there is no direct impact on sensitive potable abstractions. The Onshore Development Area does cross into SPZ 1 to the south of the onshore substation zones – this is where the onshore export cables will go to a new National Grid substation. The onshore export cables (which have an indicative burial depth of 1.6. m) will be part of the DCO application, but National Grid will be responsible for building their own substation. It is anticipated that the National Grid will consult with the Environment Agency and conduct ground investigations and a hydrogeological risk assessment at the new substation site.

90. Given the small scale of construction work and permanent infrastructure (0.037%) in the groundwater body catchment, and with control measures in place, construction and operation of the Projects is very unlikely to cause a deterioration in water body status or prevent it achieving a Good overall status.

20.2.3.4 Assessment Summary

91. Results of the WER compliance assessment process are summarised in **Table 20-10**.

Table 20-10 WER Assessment Summary

Water body	Stage 2	Stage 3	Deteriorati on in status	Prevent of objectives being achieved
Barmston Sea Drain/ Skipsea Drain to Conf	✓	✓	×	×
Mickley Dike catchment	✓	✓	×	×
Old Howe/ Frodingham Beck to R Hull	✓	✓	×	×
Catchwater Drain	✓	✓	×	×
Foredyke Stream Upper	✓	✓	×	×
Foredyke Stream Lower to Holderness Dr	✓	✓	×	×
Holderness Drain Source to Foredyke Stream	✓	✓	×	×
Beverley and Barmston Drain	✓	✓	×	×
Hull from Arram Beck to Humber	✓	✓	×	×
High Hunsley to Arram Area	✓	✓	×	×
High Hunsley to Woodmansey Area	✓	✓	×	×
Yorkshire South	✓	×	×	×
Hull and East Riding Chalk	✓	✓	×	×

92. The implementation of outlined control measures during construction and operation phases means there will be no activities that 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 river and groundwater bodies assessed. Construction and operation will also not prevent water body status objectives being achieved in the future. The Projects are therefore considered to be compliant with WER requirements.

93. For decommissioning, 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 (section 20.2.2.3.2). Detailed compliance assessment results (section 20.2.3.3) and overall conclusions would be the same for decommissioning as for construction and operation – the Projects would be compliant with WER requirements.

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