Spiorad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 10.1: Water Framework Directive – Assessment and Technical Report, Volume 2c

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Contents

List of Tables

1 INTRODUCTION

1.1 OVERVIEW

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) presents the Water Framework Directive (WFD) Assessment of the proposed Spiorad na Mara Offshore Wind Farm (hereafter referred to as 'the Offshore Project') with respect to designated WFD water bodies affected by the Offshore Project. This appendix accompanies **Chapter 10: Marine Sediment and Water Quality, Volume 2a** of the EIAR.

1.1.1.2 This appendix should be read in conjunction with the project description provided in **Chapter 3: Offshore Project Description, Volume 1a** and the relevant parts of the following chapters, appendices and figures:

- **Chapter 9: Physical and Coastal Processes, Volume 2a;**
- **Appendix 9.2: Physical Processes Modelling Report, Volume 2c;**
- **Chapter 10, Volume 2a;**
- **Chapter 11: Benthic and Intertidal Ecology, Volume 2a;**
- **Chapter 12: Fish Ecology, Volume 2a.**
- **Figure 11.5: EUNIS habitat/biotope mapping across the Offshore Project Boundary from 2024 surveys, Volume 2b;**
- **Figure 12-3: Impact ranges for mortality (210cB)m recoverable injury (203dB) and TTS (186dB) based on stationary receptor for pile locations 2, 3, 4 and 5; Volume 2b).**

1.1.1 PROJECT BACKGROUND

1.1.1.1 Spiorad na Mara Limited (hereafter referred to as 'the Applicant') is proposing to develop the Project. The Project is an offshore wind farm (OWF) that will consist of up to 60 fixed-bottom Wind Turbine Generators (WTGs).

1.1.1.2 The Project will include both offshore and onshore infrastructure. This Offshore EIAR supports the application for the offshore components of the Project as outlined in **Chapter 1: Introduction, Volume 1a**. The offshore components of the Project (the Offshore Project) include all infrastructure and activities located seaward of Mean High Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (**Figure 1.2: Offshore Project Location, Volume 1b**). Further detailed information is provided in **Chapter 3, Volume 1a.**

1.1.1.3 The Offshore Project is situated off the northwest coast of Isle of Lewis/*Eilean Leòdhais* and the Array Area is located approximately 5-13 kilometres (km) offshore and is approximately 161 km^2 in size. It will comprise WTGs, foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required), and Landfall. The Array Area combined with the OCAS is defined as the Offshore Project

Boundary. The water depths across the Array Area range from 37- 67 metres (m) with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km^2, within the Array Area.

1.2 PURPOSE OF THIS APPENDIX

1.2.1.1 This appendix comprises the WFD compliance assessment for the Offshore Project. The Scottish Environment Protection Agency (SEPA) requires an assessment of the impact of any works/modifications to water bodies in the UK under the European Union's (EU) WFD (2000/60/EC) (The European Commission, 2000).The objectives of the WFD are implemented in Scotland/*Alba* through the Water Environment and Water Services (Scotland) Act (WEWS Act) 2003 (Scottish Parliament, 2003) and elements of The Environmental Authorisations (Scotland) Regulations 2018 (as amended) (Scottish Government, 2018). Under Section 2 of the EU (Withdrawal) Act 2018, these continue to have effect in domestic law following the UK's withdrawal from the EU.

1.2.1.2 The SEPA requires an assessment of the impact of any works/modifications to water bodies in the UK under the WFD. The Scottish Government's Marine Directorate – Licensing Operations Team (MD-LOT) is also responsible for ensuring WFD compliance for activities requiring a marine licence.

1.2.1.3 The purpose of this WFD assessment is to evaluate the potential impacts of the Offshore Project during construction, operation and maintenance (O&M) and decommissioning on WFD compliance.

1.2.1.4 A separate application for the Project's onshore elements (the OTW Project) that includes all infrastructure landwards of Mean Low Water Springs (MLWS) within the Onshore Transmission Works Boundary will be made, under the Town and Country Planning (Scotland) Act 1997 to Comhairle nan Eilean Siar (CnES). The OTW Project EIAR will provide a full description of the onshore elements of the Project landward of MLWS, and include an assessment of the onshore potential impacts from the OTW Project on onshore WFD waterbodies.

1.2.1.5 This WFD assessment will also consider the additive interactions between the Offshore Project and OTW Project to understand if there is the potential for any change to the assessment outcomes as a result of both elements of the Project.

1.2.1.6 This appendix describes the following:

- Section 0: Introduction;
- Section 2: Project overview;
- Section 3: Assessment methodology;
- Section 4: Screening and scoping;
- Section 5: Assessment of effects;
- Section 5.8: Conclusions.

1.2.1.7 The appendix is supported by the following figures:

- **Figure 10.2a and 10.2b: Water Framework Directive Protected Areas, Water Bodies, Marine Protected Areas for Marine Sediment and Water Quality, Volume 2b.**

1.3 THE WATER FRAMEWORK DIRECTIVE

1.3.1 OVERVIEW

1.3.1.1 Water bodies are the units used for reporting and assessing compliance with the principal environmental objectives of the WFD regulations in Scotland.

1.3.1.2 A surface water body is defined as a discrete and significant element of surface water such as a lake, reservoir, stream, river, loch, canal, estuary/transitional water, or a stretch of coastal water. For WFD classification in Scotland, coastal water bodies extend out to 3 nautical mile/5.5 km from the coast in line with SEPA's implementation of the Directive.

1.3.1.3 Grounwater is also divided into water bodies, where quantitative status and qualitative status are the two key quality elements.

1.3.1.4 The primary aim of the WFD is to improve/maintain the Ecological Status/Potential of all water bodies and to prevent deterioration in status of the water bodies and their associated WFD quality elements. Ecological Status/Potential is determined by assessing quality against a suite of hydromorphological, physico-chemical and biological quality elements. This WFD assessment aims to establish the baseline conditions, evaluate potential impacts of the Offshore Project and assess compliance against WFD objectives.

1.3.1.5 The overarching objective of the WFD is for surface water bodies in Europe to attain overall 'Good Ecological Status' (GES) or 'Good Ecological Potential' (GEP). GES refers to situations where the ecological characteristics show only a slight deviation from natural/near natural conditions. In such cases, the hydromorphological, physico-chemical and biological conditions are associated with limited or no human pressure. Artificial and heavily modified water bodies have a target to achieve GEP, which recognises their important uses, whilst ensuring the quality elements are protected as far as possible.

1.3.1.6 The WFD sets several objectives including the following:

- Prevent deterioration in status for water bodies;
- Aim to achieve 'Good' biological and 'Good' surface water chemical status in water bodies. Those water bodies that did not achieve GES by 2015 needed to achieve compliance by 2021 or 2027;
- For water bodies that are designated as artificial or heavily modified, the objective is to achieve GEP. Those artificial/heavily modified that did not achieve GEP by 2015 needed to achieve compliance by 2021 or 2027;

- Where it is considered either technically infeasible or disproportionately expensive to achieve GES or GEP by 2021 or 2027, alternative objectives have been set for the water body, such as a target to achieve 'Moderate' status;
- Comply with objectives and standards for WFD Protected Areas, as defined by Article 6 of the WFD, where relevant;
- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

1.3.1.7 Under the WFD, High Status water bodies have the lowest tolerance for change, and the 'no deterioration' principle applies strictly in that any measurable decline in any quality element (biological, hydromorphological or physico-chemical) is not permissible. To address this, the assessment applies a precautionary approach, evaluating whether the Offshore Project activities could result in any detectable alteration beyond natural variability at the water-body scale.

1.3.1.8 Any new modification, activity, or structural change in a water body must be assessed to determine whether it could cause deterioration in its Ecological Status or Potential. Such modifications or changes may also render existing mitigation measures ineffective, potentially resulting in failure to achieve GES or GEP. If a development is likely to cause deterioration, or prevent the water body from meeting its objectives, an Article 4.7 assessment is required. This assessment allows for deterioration only if the development is justified by overriding public interest and/or the benefits outweigh those of WFD compliance, and there are no feasible alternatives.

1.3.2 MEASURES TO ACHIEVE ENVIRONMENTAL OBJECTIVES

1.3.2.1 River Basin Management Plans (RBMPs) are a requirement of the WFD and are implemented in Scotland through the Water Environment and Water Services (Scotland) Act 2003 (WEWS). RBMPs set out the environmental objectives for each water body (as defined under Article 4 of the Directive) and the Programme of Measures needed to achieve or maintain these objectives (as required under Article 11) (European Parliament and Council, 2000). Together, these Articles form the basis for how Scotland plans, manages and protects its surface and groundwater bodies. RBMPs therefore provide the strategic framework used by SEPA to manage pressures, monitor status and ensure that no deterioration occurs within each river basin district.

1.3.2.2 For each River Basin District, a programme of measures has been drawn up to enable the achievement of objectives of the Scotland/*Alba* River Basin Management Plan (RBMP) (SEPA, 2025a). There is only 1 River Basin District defined for Scotland/*Alba*, covering all inland and coastal WFD water bodies in the country, with the exception of a small number of cross border rivers that flow into England.

1.3.2.3 These are integrated with measures for WFD Protected Areas via site specific action plans. Current measures in the Scotland/*Alba* RBMP include:

- Managing pollution from wastewater;
- Improving the physical condition of water bodies;
- Removing barriers to fish migration;
- Reducing diffuse pollution from rural land use.

1.3.2.4 These measures are delivered by a wide range of partners including public bodies, industry, and land managers, with the Scottish Government providing policy direction and investment.

1.4 WFD STUDY AREA

1.4.1.1 In Scotland/*Alba*, coastal water bodies extend 5.5 km from the shore and the WFD Study Area for this WFD assessment includes all coastal designated water bodies that are situated within the Offshore Project Boundary, as well as areas that could be affected by tidal movement that sit outside the Offshore Project Boundary. River and loch WFD water bodies are to which salmon may migrate through the Study Area are also identified as possible receptors of effects of the Offshore Project. This might be the case if effects of the Offshore Project affected the passage of salmon through the coastal water bodies when migrating to and from the rivers and lochs.

1.4.1.2 In terms of coastal and transitional water bodies, the extent of potential effects or Zone of Influence (ZoI) has been taken as the length of the tidal ellipse parallel to the coast on spring tides. On this basis, water bodies within 6 km (a peak spring tidal excursion ellipse) from the Offshore Project Boundary have been included. See **Figure 10.2b, Volume 2b.**

1.4.1.3 Additionally, the WFD Study Area incorporates quantitative underwater noise criteria to define impact zones relevant to fish. Underwater noise modelling was undertaken to define the maximum spatial extent of underwater noise impacts that will not be exceeded during construction. To define this maximum extent, 6 representative piling locations were selected across the Turbine Area (see **Figure 12-3, Volume 2b**). The locations are at the outermost positions within the Turbine Area where percussive piling is proposed thus reflecting the maximum potential spatial extent of underwater noise exposure. The Temporary Threshold Shift (TTS) impact contours for 4 locations intersect with the west coast of Lewis/*Eilean Leòdhais* north of Loch Roag/*Loch Ròg* over a total length of approximately 25 km. This length of coastline, which includes the mouths of the River Barvas and Carloway/*Càrlabhagh* as well as potential coastal migratory pathway to Loch Roag/*Loch Ròg*, would fall within the 186 dB TTS ensonified zone (as shown in **Figure 12-3, Volume 2b**).

1.4.1.4 The Lewis and Harris Groundwater Body (reference 150030) underlies the terrestrial area alongside the coastline within the WFD Study Area but does not extend out to sea. This water body is at Good quantitative and qualitative status, including absence of saline intrusion. As this water body has no link with the marine environment, there is no pathway for effects on it due to the Offshore Project. The groundwater body is therefore not considered further in this report.

2 THE PROJECT

2.1.1 PROJECT DESIGN ENVELOPE

2.1.1.1 The Project Design Envelope (PDE) follows the principle of the Rochdale Envelope approach, that allows for the definition of appropriate design parameters to inform assessment where details of a proposal have not been confirmed. The Rochdale Envelope approach is discussed further in **Chapter 5: Approach to the EIA, Volume 1a**. Following this approach, the PDE maintains flexibility for the Offshore Project to accommodate:

- Further refinement during detailed design;
- Opportunities such as those afforded by technological advancements;
- Uncertainties in the development process.

2.1.1.2 In accordance with current best practice and guidance provided by the Scottish Government (Nature Scot, 2024), the Applicant has defined a range of design parameters relating to the location, design and size of the Offshore Project, which provide the basis for the Maximum Design Scenario (MDS) presented within the technical chapters of this EIAR.

2.1.2 PROJECT SUMMARY

2.1.2.1 The main infrastructure of the Offshore Project (below Mean High Water Springs (MHWS)) will include:

- WTGs;
- Fixed bottom foundations and associated protection;
- OSP and associated foundation and protection (if required);
- Array Cables to OSP/final WTG and Offshore Cables (either Array Cables or Export Cables) to Landfall and associated cable protection;
- Horizontal Direct Drilling (HDD) Exit Pits below MHWS (located in the Exit Pit Area); and
- Other associated infrastructure such as navigation markers.

2.1.2.2 Landfall is the interface between the offshore and onshore elements for the Project, and the Offshore Cable to Landfall comes ashore at a coastal cliff via HDD at Barvas/*Barabhas*.

2.1.2.3 Further details of the project description are provided in **Chapter 3, Volume 1a.**

2.1.3 CONSTRUCTION, OPERATION AND MAINTENANCE, AND DECOMMISSIONING ACTIVITIES

2.1.3.1 **Chapter 3, Volume 1a** provides a comprehensive description of the construction, O&M and decommissioning activities associated with the Offshore Project. At this stage of the design, the Offshore Project comprises the activities summarised in **Table 2-1** which have the potential for impacts on the WFD water bodies and quality elements.

Table 2-1: Construction, operational and decommissioning Offshore Project activities

Activity	Description
Construction Phase	
Activity 1 – Installation and decommissioning of WTG and OSP (if required).	Construction of up to 60 WTGs and 1 OSP (if required), associated foundations and scour protection. Decommissioning through removal of WTG and OSP and associated infrastructure. This activity will be located between approximately 6 km offshore of the seaward boundary of WFD coastal water bodies (which only extend 5.5 from the shore), so has potential to interact with WFD surface water bodies.
Activity 2 - Installation and decommissioning of Offshore Cables	The offshore transmission infrastructure will include Offshore Cables, which will require seabed preparation, and will either be buried (e.g. jet trenching) or surface laid, in which case cable stabilisation or protection will be required. These cables would be removed during decommissioning. This activity may interact with WFD surface water bodies, which extend 5.5 km from the shore, where they are crossed by the Offshore Cables to Landfall.
Activity 3 – Construction of HDD exit pits and breakout from HDD drilling activities within the Landfall Exit Pit Area	Trenchless techniques (such as HDD) are a method of installation for the Offshore Cable at Landfall during the construction phase (construction of up to 13 HDD Exit Pits and 13 bores drilled within the Exit Pit Area). This activity can release drilling fluid, muds (comprising bentonite) into the water column. This activity will take place within the WFD surface water bodies.
Activity 4 – Vessel movements during construction, operation and maintenance and decommissioning	There will be vessel movements associated with: • Activity 1 - Installation and decommissioning of WTGs and OSP (if required) • Activity 2 - Installation and decommissioning of Offshore Cables • Activity 3 - Construction of HDD Exit Pits and HDD drilling activities and • Activity 7 – Offshore maintenance activities during the O&M phase. Therefore, during construction, operation and maintenance and decommissioning activities vessels will transit through the coastal water bodies resulting in a potential interaction with the WFD surface water body.
Operation & Maintenance Phase	
Activity 5 - Presence and operation of subsea infrastructure	This will include the presence and operation of WTGs (including either multi-leg jacket foundations with pin piles or hybrid multi leg jacket with gravity base structures and scour protection), OSP (if required), Offshore Cables (including cable stabilisation or protection) and HDD Exit Pits. This activity may interact with WFD coastal water bodies, which extend 5.5 km from the shore, where they are crossed by the Offshore Cables to Landfall. There is also a small overlap with the coastal waterbodies and the Array Area.
Activity 6 - Landfall operations seaward of MHWS mark	This will include operation of ducts and Offshore Cables to Landfall in the HDD Exit Pit Area seaward of MHWS mark. This activity will take place within with WFD coastal water bodies.

Activity	Description
Activity 7 – Offshore maintenance activities during O&M	Offshore maintenance activities include major/minor component replacement and repairs, scheduled inspections and unscheduled maintenance of offshore infrastructure, with repairs and replacement required on an ad hoc basis during the O&M phase of the Offshore Project. This will result in increased vessel traffic which will transit through the coastal water bodies resulting in a potential interaction with the WFD water body.

2.1.3.2 The anticipated maximum design scenario total construction duration for all offshore works is approximately 5 years. Offshore construction will take place between April and October each year from 2028/2029 and conclude in 2032/2033. This phased approach ensures that construction activities are aligned with favourable weather conditions and minimises disruptions to the local marine environment.

2.1.3.3 **Outline Offshore Environmental Management Plan (OOEMP), Volume 3** aims to provide a mechanism to ensure that measures to mitigate potentially adverse environmental impacts are implemented during the construction and O&M phases. The Final Offshore Environmental Management Plan will be completed and approved post-consent as part of condition discharge prior to construction by Scottish Ministers in accordance with s.36 and associated Marine Licences.

2.1.3.4 At this stage, the maximum potential for interaction with WFD water bodies during the decommissioning stage can be taken as being the same as for the construction stage for each of the activities described. In practice, the interactions may be reduced if infrastructure, such as underground cables, is left in place.

2.1.4 DESIGN LIFE

2.1.4.1 It is anticipated that the Offshore Project will become operational in 2032/2033. The operational lifetime of the Offshore Project is up to 35 years.

2.1.4.2 A Decommissioning Programme will be developed post consent but prior to construction. It will be updated during the O&M stage of the Offshore Project to account for any changes to industry best practice, relevant legislation, guidance and policy, or developments in technology.

2.2 CONSULTATION AND ENGAGEMENT

2.2.1.1 The Offshore Project's design evolution has taken account of consultation feedback received throughout the design process. This includes responses from MD-LOT's and the Comhairle nan Eilean Siar (CnES) Scoping Opinions and other engagement undertaken by the Applicant. See Section 10.3 of **Chapter 10, Volume 2a**, Section 11.3 of **Chapter 11, Volume 2a** and Section 12.3 of **Chapter 12, Volume 2a** for details of the consultation process for these chapters.

3 METHODOLOGY

3.1 DATA COLLECTION

3.1.1 DESK STUDY

3.1.1.1 A desk-based study was carried out to collect baseline information and inform the WFD assessment. The following data sources were used for the desk study:

- Current aerial photography (Google Earth, 2025);
- Status of individual WFD quality elements and overall status and objectives from the SEPA Water Classification Hub (SEPA, 2025;);
- Hydrological data (UK Centre for Ecology & Hydrology, 2025);
- Maps of designated areas, habitats and species, landscape and marine data from National Marine Plan (NMPi) interactive mapping (Scottish Government, 2025);
- Invasive non-native species (INNS) plants map viewer (National Biodiversity Network Trust, 2025);
- Various literature sources, including published articles and technical reports produced in relation to site-specific surveys undertaken by the Project (see Section 3.1.2);
- WFD status and objectives from The RBMP for Scotland (2021) (SEPA, 2021).

3.1.1.2 Further desktop studies were carried out to inform the EIA baseline and the following chapters in the EIAR have been used to help establish the baseline for this WFD assessment:

- **Chapter 9, Volume 2a;**
- **Chapter 10, Volume 2a;**
- **Chapter 11, Volume 2a;**
- **Chapter 12, Volume 2a.**

3.1.2 SITE SURVEYS

3.1.2.1 Numerous site-specific surveys have been undertaken to inform other chapters and analyses and the Offshore Project more widely. The findings of these surveys are referred to within this WFD assessment where relevant for environmental context. **Table 3-1** details these surveys undertaken to date.

Table 3-1: Site specific surveys undertaken to inform the other chapters baselines within the EIAR

Survey Type and Date	Scope of Survey	Coverage of WFD Study Area
Spiorad na mara OWF Subtidal Environmental Baseline Survey: Habitat Assessment (**Appendix 11.1, Volume 2c**: October 2023)	55 combined Drop Down Camera (DDC)/grab sampling stations and 12 DDC video transects were undertaken. Day grabs were used to collect sediment samples for chemical contaminant analysis during environmental characterisation surveys carried out by Ocean Ecology. All chemical contaminant analyses on sediment samples were undertaken by UKAS accredited and Marine Management Organisation (MMO) validated laboratory SOCOTEC UK Limited. Sediment samples were processed and analysed for total hydrocarbon content (THC), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organotins and heavy and trace metals.	Full coverage of the WFD Study Area
Priority Marine Feature Survey (5 – 7 September 2024)	During the Environmental Characterisation Survey areas of the Priority Marine Feature (PMF) habitat 'Kelp beds' were noted within the OCAS (see **Appendix 11.1, Volume 2c**). A dedicated survey was carried out targeting kelp beds and their boundaries/extent within the OCAS. This survey also aimed to further define the extent of Annex I reef and update previous habitat mapping within the OCAS and is referred to throughout as the 'PMF survey'.	Partial coverage of the WFD Study Area
Juvenile salmonid acoustic fish tracking study	Acoustic tracking of 100 juvenile salmon smolt caught, tagged and released at the lower River Grimersta to investigate the travel paths of out-migrating salmon post-smolts through East Loch Roag/*Loch Ròg* and within the Array Area.	Full coverage of the WFD Study Area

Survey Type and Date	Scope of Survey	Coverage of WFD Study Area
Environmental Deoxyribonucleic Acid (Edna) Survey (**Annex 12.1.2: Annex 2: eDNA Report, Volume 2c**): 17-27 October 2023	Sediment eDNA samples were collected from successfully sampled chemical contaminant grab stations. This equated to 5 stations which were targeted for eDNA analysis. This included eukaryotes and invertebrates. Water eDNA samples were collected from 10 stations within the Offshore Project Boundary. These 10 locations were positioned at the centroid of 10 of the 12 DDC video transects run as part of the Environmental Characterisation Survey (**Appendix 11.1, Volume 2c**), as DDC transects were positioned specifically to ground truth changes in substrate type which could indicate a different habitat type. Collecting water eDNA from these locations targeted detection of potentially rare or cryptic species. Water eDNA samples were collected from 3 water depths: surface, middle and bottom. This was specifically undertaken to detect vertebrates.	Partial coverage of the WFD Study Area

3.2 WATER FRAMEWORK DIRECTIVE ASSESSMENT PROCESS

3.2.1.1 The WFD assessment process for each water body is tailored, based on the type of water body assessed. Based on the activities detailed in **Table 2-1**, coastal, river and loch water bodies are considered in this assessment.

3.2.1.2 The Water Framework Directive assessment has been structured with reference to the Planning Inspectorate's Advice on the Water Framework Directive, formerly Advice Note 18, (HM Government, 2017). This guidance outlines a 3-stage process to WFD assessment: screening, scoping, and impact assessment. The outcome of each stage determines whether the assessment needs to progress to the next stage.

3.2.1.3 Whilst it is acknowledged that Advice Note 18 applies to Development Consent Order applications in England and Wales, it is not specific to Scotland/*Alba,* however the guidance is considered appropriate as it provides a structured, consistent approach to undertaking WFD assessments. The assessment follows SEPA's water body classifications and status objectives as set out in the Scotland River Basin District plans (SEPA, 2021) and Advice Note 18 is used simply to structure the chapter. The assessment applies the Scottish interpretation of the no-deterioration principle, considers impacts at the water-body scale in line with SEPA practice, and evaluates relevant biological, hydromorphological and physico-chemical quality elements based on SEPA's methods and datasets.

3.2.2 STAGE 1: SCREENING

3.2.2.1 The screening process identifies the water bodies to be screened into the assessment. It is then required to identify activities which have the potential to result in deterioration of a water body or failure to comply with the objectives of that water body. Screening also serves to identify those proposed activities (e.g. proposed decommissioning methods) that are required to be taken through to scoping and those activities that are unlikely to result in the deterioration of the water body. Low risk activities may be screened out and not progressed to the scoping stage.

3.2.3 STAGE 2: SCOPING

3.2.3.1 If Stage 1 identifies any activities that have the potential to result in deterioration of a water body or failure to comply with the objectives of that water body, and therefore screens in those proposed activities, the assessment progresses to Stage 2. Stage 2 is required to identify risks to receptors from a project's activities, based on the relevant water bodies and their water quality elements (including information on status, objectives, and the parameters for each water body). The receptors, as specified in the 'Clearing the Waters for All' guidance, are:

- Hydromorphology;
- Biology – habitats;
- Biology – fish (only required if the project is in an estuary or could affect fish in an estuary, or delay fish entering an estuary or affect migration to freshwater);
- Water quality;
- Protected areas;
- INNS.

3.2.3.2 The 'Clearing the Waters for All' guidance provides specific criteria for each of the receptors outlined above to determine if an assessment of effects is required and recommends the use of a scoping template as part of the WFD assessment process. These criteria are considered for each receptor in Section 4.2 of this appendix, using the recommended scoping template.

WFD quality elements

3.2.3.3 Under the WFD, the ecological and chemical condition of a water body is assessed using a series of quality elements. These elements reflect the structure, function, and environmental conditions of a water body and provide the basis for determining whether a water body meets its environmental objectives. The quality elements fall into three main groups: hydromorphological, biological, physico-chemical elements, alongside a separate assessment of chemical status. Hydromorphological and physico-chemical quality elements are referred to as supporting elements as they refer to the hydromorphological, physical and chemical processes that support the biological quality elements.

Hydromorphology

3.2.3.4 Hydromorphology is a set of physical characteristics which support biological elements such as the quantity and dynamics of water flow in a river or the depth, structure of the seabed and intertidal zone, tidal currents and wave exposure in a coastal water body. Where the hydromorphology of a surface water body is artificial or has been significantly altered for anthropogenic purposes (e.g. navigation or flood defence), such that it cannot meet GES, it can be designated as an Artificial or Heavily Modified Water Body (A/HMWB). An alternative environmental objective, GEP applies in these cases.

Biology – habitats

3.2.3.5 As per Environment Agency (2023) guidance, benthic habitats in transitional or coastal water bodies are divided into higher sensitivity and lower sensitivity habitats and are listed in **Table 3-2.** Higher sensitivity habitats must be included in the WFD assessment if the Offshore Project is within 500 m of such habitats, whereas lower sensitivity habitats are scoped in if the activity footprint effects more than 1% of that habitat within the water body. **Table 3-2** describes the recognised higher and lower sensitivity habitats.

Table 3-2: Habitat Sensitivity as defined by WFD guidance

Higher Sensitivity	**Lower Sensitivity**
Chalk reef	Cobbles, gravel and shingle
Clam, cockle and oyster beds	Intertidal soft sediments like sand and mud
Intertidal seagrass	Rocky shore
Maerl	Subtidal boulder fields
Mussel beds, including blue and horse mussel	Subtidal rocky reef
Polychaete reef	Subtidal soft sediments
Saltmarsh	
Subtidal kelp beds	
Subtidal seagrass	

Biology – Fish

3.2.3.6 Fish species should be considered if activities:

- Are in an estuary designated as a transitional water body;
- Are in a coastal water body outside an estuary but could delay or prevent fish from entering an estuary; or
- Could affect fish migration through an estuary to freshwater.

3.2.3.7 In this case, although fish are not a quality element for coastal water bodies, any effects of the Offshore Project on migratory fish as they pass through a coastal water body have the potential to affect the status of the fish quality element in the freshwater rivers to which they are migrating.

Effects of the Offshore Project on migratory fish (specifically) have therefore been taken into account.

Biology - Phytoplankton

3.2.3.8 Phytoplankton is assessed under the biological quality elements and forms part of SEPA's ecological status classification for coastal and transitional waters. Phytoplankton status reflects the seasonal abundance, biomass and composition of the phytoplankton community, which can be influenced by nutrient availability, water clarity and stratification, thus is closely linked to physico-chemical status.

Water Quality

3.2.3.9 Water quality encompasses the chemical status of the water body in relation to hazardous substances but also physico-chemical elements that support the biology, such as clarity, temperature, salinity, oxygen levels, nutrients and specific pollutants. Water quality should be considered as a receptor where activities could cause sustained changes to these parameters (e.g. beyond a spring-neap cycle).

Water Framework Directive Protected Areas

3.2.3.10 WFD protected areas encompass sites protected under the National Site Network (formerly Natura 2000) (i.e. Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)), bathing waters, shellfish waters and nutrient sensitive areas (NSAs). Guidance stipulates that WFD protected areas located within 2 km of the proposed activity must be identified (Environment Agency, 2023).

3.2.3.11 For WFD Protected Areas incorporating parts of river water bodies, most effects will be exerted downstream of the activity and extent will need to be examined on a site-specific basis. However, it should be noted that, where a WFD Protected Area includes migratory fish as a specific interest feature, effects on the WFD fish quality element may be translated upstream by fish migration.

Invasive Non-Native Species

3.2.3.12 The introduction and spread of INNS can occur directly through the release of individuals of INNS species into the environment via activities, e.g. through release of ballast water (Ware, Yguel & Majerus, 2009), or on the hull of ships even if recently cleaned or anti-fouled, or indirectly by creating opportunities for organisms to settle or spread (e.g. habitat creation or disturbance), thereby allowing them to out-compete native species (IMO, 2012; Davidson et al., 2010). Therefore, activities should be considered where:

- Materials or equipment have come from, have been used in or travelled through other water bodies;
- Activities are involved that help spread existing INNS, either within the immediate water body or to other water bodies.

3.2.3.13 INNS are not specifically mentioned in WFD but may constitute an anthropogenic pressure that prevents attainment of the required status for particular biological quality elements.

3.2.4 STAGE 3: IMPACT ASSESSMENT

Overview

3.2.4.1 If Stage 2 scopes in any risks to receptors from a project's activities the assessment progresses to Stage 3. During this stage, a further assessment is undertaken to review environmental measures set to protect the water body and an assessment of the proposed activities against WFD status objectives.

3.2.4.2 For coastal water bodies, the WFD methodology adopts the process set out in the more specific guidance 'Clearing the Waters for All - Water Framework Directive Assessment: estuarine and coastal waters' (Environment Agency, 2023) as best practice.

3.2.4.3 The guidance (HM Government, 2017; Environment Agency, 2023) recommends that the whole lifecycle of the development is considered, including construction, O&M, and decommissioning. Maintenance is not specifically mentioned in the guidance, but the O&M stage of the Offshore Project inherently requires maintenance activities as these are considered integral to the operation in the context of this WFD compliance assessment. Given that the Offshore Project's construction stage will last for 5 years and its operational life is expected to be approximately 35 years, decommissioning may not occur until the 2070s or 2080s. The statuses of the relevant water bodies may have changed over the decades and therefore it is more appropriate and robust to assess decommissioning activities at that time, against the then prevailing baseline.

3.2.4.4 Although both of these sets of guidance have been developed in the context of English legislation, they are both equally technically relevant in a Scottish context.

Marine Strategy Framework Directive

3.2.4.5 As the majority of the Array Area (and the whole of the Turbine Area) lies outside the WFD boundary and within waters governed by the Marine Strategy Framework Directive (MSFD), an MSFD assessment is required to address aspects such as biodiversity, underwater noise, and marine litter that fall outside the scope of WFD. The descriptors considered for this assessment include:

- Descriptor 1: Marine biodiversity
- Descriptor 2: Non-indigenous species
- Descriptor 5: Eutrophication
- Descriptor 6: Seabed integrity
- Descriptor 7: Hydrographical conditions
- Descriptor 8: Contaminants
- Descriptor 10: Marine litter

- Descriptor 11: Energy, including underwater noise

3.2.4.6 The objective of the MSFD, transposed in Scotland/*Alba* through the Marine (Scotland) Act 2010 and the Marine Strategy Regulations 2010, was to achieve Good Environmental Status of the EU's marine waters by 2020, now extended to 2025, and beyond. It establishes a framework for the protection and sustainable use of Europe's seas, ensuring they remain healthy and resilient for current and future generations. Key objectives include reducing marine pollution, protecting biodiversity, promoting sustainable fishing, and mitigating the impacts of human activities on marine ecosystems.

3.2.4.7 The concept of Good Environmental Status is defined by the Marine Directive through eleven descriptors. These describe the state of the marine environment, such as conserving biodiversity or food webs. They also describe anthropogenic pressures on the marine environment such as commercial fisheries, or pollutants such marine litter, contaminants, or the input of energy.

3.2.5 LIMITATIONS AND ASSUMPTIONS

3.2.5.1 Following a review of the scope of work with respect to the collection and analysis of water samples, the Offshore Project has considered that the water samples did not need to be collected to inform the WFD or MSFD assessments. The decision was made based on the following considerations:

- The collection of water samples from the proposed locations would only provide a snapshot of water quality within the WFD Study Area. The WFD requires consideration of potential effects at the water body scale and in the context of established water body status classifications, which are derived from multi-year monitoring programmes and long-term datasets (as set out in the RBMPs). A single sampling campaign would not significantly benefit the characterisation of baseline conditions, particularly in High Status coastal water bodies where natural variability occurs across seasonal and interannual cycles. Instead, the assessment draws on reliable datasets and project specific hydrodynamic and sediment transport modelling, in line with standard practice set out in WFD scoping templates such as 'Clearing the Waters for All' which emphasise use of existing datasets during screening and scoping;
- The Offshore Project is only likely to impact water quality in terms of suspended sediment concentrations. There are no other significant discharges predicted as part of the construction, O&M and decommissioning phases of the Offshore Project that could impact on the physicochemical water quality;
- Sediment plume modelling has been undertaken as part of the EIA, identifying changes in Suspended Sediment Concentrations (SSC) using a validated 2D model negating the need to collect water samples to determine suspended sediment/turbidity (see **Appendix 9.2, Volume 2c**);
- It is assumed that the water quality associated with the coastal areas of the Isle of Lewis/*Eilean Leòdhais* is high as there are few inputs from anthropogenic sources and the hydrodynamic

regime is well mixed due to the highly exposed nature of the coastline. This means it is unlikely stratification or changes in water quality would be observed spatially though targeted sampling;

- The WFD guidance from the EA does not specify that water samples need to be collected as part of undertaking a WFD assessment;
- The MSFD is applied at a much wider scale than WFD and reliance on existing broad scale water quality monitoring and conclusions reported in Scotland/*Alba*'s Marine Atlas and data available on NMPi are sufficient to describe the baseline.

4 SCREENING AND SCOPING

4.1 STAGE 1: WATER FRAMEWORK DIRECTIVE SCREENING

4.1.1 OVERVIEW

4.1.1.1 The purpose of the WFD screening stage is to identify which water bodies and which Offshore Project activities should be screened in and taken forward to Stage 2 - WFD Scoping (see Section 4.2).

4.1.2 WATER BODIES

4.1.2.1 **Table 4-1** identifies all coastal water bodies intersected by the Offshore Project Boundary or located within the WFD Study Area, as well as associated river and loch water bodies that provide potential spawning habitat for migratory fish species that may interact with the Offshore Project on their migration to these coastal areas. Any effects on the migration of fish as they pass through the Offshore Project Area could potentially affect fish populations and therefore associated water bodies have been screened.

Table 4-1: Screening of waterbodies

Water Body Name	Water Body ID	Water Body Type	Rationale for screening
Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais*	200476	Coastal	The marine works are confined to this water body; the southwest corner of the Array Area and the OCAS are located within this coastal water body.
Loch Roag/*Loch Ròg*	200205	Coastal	The Array Area is located in the proximity (~5 km southwest) of the Loch Roag/*Loch Ròg* water body. This is also designated as an SAC.
Loch Carloway/*Loch Chàrlabhaig*	200204	Coastal	Loch Carloway/*Loch Chàrlabhaig* forms an inlet at the mouth of east Loch Roag/*Loch Ròg* but is its own coastal water body.
Abhainn Shiaboist	20796	River	The following water bodies have been screened in because they provide potential migratory destinations for fish passing through coastal waters where the marine works will be undertaken. In freshwaters, fish are a quality element assessed in Scotland/*Alba* using the
Abhainn Arnol	20797		
Abhainn Eirearigh d/s Loch Urghag	20798		
Abhainn Shiadair	20803		
Abhainn Bhuirgh	20804		
Abhainn Ghabhsainn bho Dheas	20805		

Water Body Name	Water Body ID	Water Body Type	Rationale for screening
Abhainn Gabhsann bho Thuath	20806		Fish Classification Scheme (FCS2) Scotland. The Offshore project will have no direct effects on river or loch water bodies, so there is no pathway for effects of the Offshore Project on other WFD quality elements.
Abhainn Bharabhais	20801		
Abhainn Mhor a Ghlinne Ruaidh	20786		
Abhainn Giosla d/s Loch Gruineabhat	20787		
Abhainn Giosla u/s Loch Gruineabhat	20788		
Abhainn Cleit Duastal	20789		
Abainn Ghriomarstaidh d/s Loch Faoghail Charrasan	20652		
Faoghail Charrasan	20834		
Abhainn an Easa Ghil	20655		
Uidhe nam Flagannan	20656		
Faoghail Kirraval	20833		
Faoghail Bheag	20653		
Abhainn Lanfadail u/s Loch Langabhat	20654		
Abhainn Mhor a Ghlinne Ruaidh	20786		
Abhainn Giosla d/s Loch Gruineabhat	20787		
Abhainn Dhudh	20792		
Abhainn Bhreascleit	20793		
Abhainn Charlabhaig	23375		
Abhainn Eirearigh u/s Loch Urghag	20799		
Loch Mòr Barvas outlet	20800		
Allt Casgro	20802		
Abhainn Dhail	20807		
Loch Gruineabhat	100053	Loch	
Loch Faoghail Charrasan	100052		
Loch Faoghail Chiorabhal	100062		
Loch an Fhir Mhaoil	100060		
Loch Airigh na h'Airde	100067		
Loch Langabhat	100071		
Loch Coire Geurad	100072		
Loch Urghag	100033		
Loch Ordais	200206		
Loch Mor Bharabhais	100030		

4.1.3 WATER BODY STATUS

4.1.3.1 A summary of the available (2023) classification status of the relevant coastal waterbodies is presented in **Figure 10.2b, Volume 2b**. A full description of the WFD status of the coastal water bodies overlapped by the Offshore Project is provided in **Annex 10.1.1: WFD Water Body Data, Volume 2c**. The locations of the WFD protected areas discussed below are shown in **Figure 10.2a, Volume 2b**.

Surface Water Body Status

Coastal water bodies

4.1.3.2 According to 2023 data provided by SEPA (2025), the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal WFD water body is not currently designated as heavily modified. The overall WFD status for the water body is 'High', with a 'High' ecological status, a 'High' water quality status, and an overall hydromorphology status of 'High'. A 'Pass" was reported for chemical status.

4.1.3.3 According to the 2023 SEPA data referenced above, the overall WFD status for the Loch Roag/*Loch Ròg* coastal WFD water body is 'High', with an overall 'Good' ecological status, 'Good' water quality status and 'High' hydromorphology status. A 'Pass" was reported for chemical status. The water body has not been designated as heavily modified or artificial.

4.1.3.4 According to the 2023 SEPA data referenced above, the overall WFD status for the Loch Carloway/Loch *Chàrlabhaig* coastal WFD water body is 'Good', with an overall 'Good' ecological status, 'Good' water quality status and 'High' hydromorphology status. A 'Pass" was reported for chemical status. The water body has not been designated as heavily modified or artificial.

4.1.3.5 **Annex 10.1.1, Volume 2c** presents the baseline characteristics and WFD quality elements associated with these coastal water bodies.

River and loch water bodies

4.1.3.6 The inland river and loch water bodies listed in **Table 4-1** are all at Good or High ecological status, with the exception of Abhainn Mhor a Ghlinne Ruaidh (Bad status) and Loch Gruineabhat, Abhainn Giosla d/s Loch Gruineabhat and Abhainn Giosla u/s Loch Gruineabhat (Poor status). The Poor and Bad status result from the presence of barriers to fish migration due to hydroelectricity infrastructure. Although it has not been confirmed whether all these water bodies are accessible to migratory fish, they have been retained in the assessment as a precautionary approach to ensure all potential pathways are considered.

4.1.3.7 **Annex 10.1.1, Volume 2c** only covers a baseline for the coastal waterbodies on which the Offshore Project activities will have a direct impact. Information on the status of each of the inland water bodies can be found online at SEPA's Water Environment Hub (SEPA, 2025).

WFD Protected Areas

4.1.3.8 WFD Protected Areas are established under Article 6 of the WFD and include areas defined in Annex IV. WFD Protected Areas whose areas lie partly or wholly within the identified water bodies are shown in **Figure 10.2a, Volume 2b**. The screening guidance applied is detailed in Section 3.2.2.

4.1.3.9 The WFD assessment considers if WFD protected areas are at risk from the proposed activity. These include:

- SACs;
- SPAs;
- Shellfish waters;
- Bathing waters;
- Nutrient sensitive areas – polluted or eutrophic;
- NVZs – polluted or sensitive.

4.1.3.10 The WFD Study Area is located within the vicinity of, but does not overlap with, any sites of conservation interest or designation, as shown in **Figure 10.2a, Volume 2b**. The nearest site designated is Loch Roag Lagoons SAC, approximately 6.8 km southwest of the WFD Study Area. As detailed in **Table 4-1**, Loch Roag Lagoons SAC has been screened in because they provide a potential migratory route for fish passing through coastal waters where the marine works will be undertaken.

4.1.3.11 The closest Shellfish Water protected area is located within Loch Roag/*Loch Ròg*, 12.5 km from the Offshore Project and therefore outside of the WFD Study Area. As it lies outside the defined WFD Study Area, it is screened out of this assessment.

4.1.3.12 There are no WFD designated Bathing Waters within the vicinity of the Offshore Project. The closest designated site is located over 80 km from the Offshore Project, at Achmelvich/*Achadh Mhealbhaich*, on the coast of mainland Scotland/*Alba*. Therefore, no WFD designated Bathing Waters have been screened in due to their distance outside of the WFD Study Area.

4.1.4 OFFSHORE PROJECT ACTIVITIES

4.1.4.1 The WFD screening stage also identifies the extent to which activities involved in the Offshore Project may affect WFD water bodies. Activities can be screened out from further consideration if they are ongoing activities and form part of the baseline, or if there is no mechanism by which the activity could affect the status of WFD quality elements status pathway to any WFD water body.

4.1.4.2 A summary of activities associated with the Offshore Project are presented in **Table 4-2,** along with a screening assessment (see **Chapter 3, Volume 1a** for further details on these activities) **Table 4-2** also identifies which types of waterbodies may be affected by each activity and the relevant WFD receptor. Activities screened in are taken forward to the Stage 2 Scoping Stage. Where an activity is screened out, no further assessment is required.

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Table 4-2: Screening of Offshore Project activities

Activity	Description	Relevant WFD Receptor Justification	Screening outcome	Potentially impacted waterbodies
Construction & Decommissioning				
Activity 1 – Installation and decommissioning of WTG and OSP (if required).	Construction of up to 60 WTGs and 1 OSP (if required) will include foundations (multi-leg jacket structures with pin piles or gravity base structures) and scour protection. Decommissioning through removal of WTG and OSP infrastructure (including wind turbine foundations and associated scour protection). This activity will be located between approximately 6 km offshore of the seaward boundary of WFD	**Biology – habitats:** Drilling of piles to support installation of WTG foundations and OSP (if required) will result in temporary mobilisation of sediment and any associated contaminants into the water column within the Study Area. Short term seabed habitat loss and/or disturbance from WTG and OSP (if required) foundation installation and decommissioning may lead to the temporary degradation or loss of benthic habitat. This will be offshore of the WFD coastal water body but within the sea area covered by the MSFD, **Biology – fish:** Underwater noise and vibration from installation of piles (percussive piling) to support WTG and OSP (if required) foundation installation (as well as decommissioning of this infrastructure) have the potential to impact migratory fish within the screened in water bodies. **Water Quality:** The construction and decommissioning activities for WTGs and 1 OSP (if required) will take place approximately 6-13 km offshore which may result in temporary mobilisation of sediment and any associated contaminants within the coastal water bodies screened into the assessment.	**In**	All coastal waterbodies screened into the assessment for habitats, fish, water quality and INNS. River and loch water bodies screened in with relation to migratory fish only. (See **Table 4-1**).

Activity	Description	Relevant WFD Receptor Justification	Screening outcome	Potentially impacted waterbodies
Construction & Decommissioning				
	coastal water bodies and will therefore interact with a WFD water body.	**INNS:** Installation of subsea infrastructure may act as an artificial substrate for colonisation for INNS. Furthermore, the import or transfer of construction materials such as scour protection could harbour organisms or propagules.		
Activity 2 - Installation and decommissioning of Offshore Cables	Offshore Cable installation will either be buried (e.g. jet trenching) or surface laid (include cable stabilisation or protection). The Offshore Cables would then be removed during decommissioning. This activity will interact with WFD coastal water	**Biology – habitats:** Structural changes to habitats may occur due to the removal of boulders from the proposed cable route; mechanical abrasion of seabed from cable movement and cable ploughing or jet trenching during construction and decommissioning. Temporary habitat disturbance may change, disturb or alter habitats. **Biology – fish:** Underwater noise and vibration generated during the Offshore Project activities (e.g. from cable laying), rock placement, trenching, vessel movements and water jetting) may cause mortality, recoverable injury, temporary impairment (referred to as temporary threshold shift (TTS)) or behavioural changes (including barrier effects) in fish species during construction and decommissioning.	**In**	All coastal waterbodies screened into the assessment in for habitats, fish, water quality and INNS. River and loch water bodies screened in with relation to migratory fish only. (See **Table 4-1**).

Activity	Description	Relevant WFD Receptor Justification	Screening outcome	Potentially impacted waterbodies
Construction & Decommissioning				
	bodies, which extend 5.5 km from the shore, where they are crossed by the Offshore Cables to Landfall.	**Water Quality:** Installation and decommissioning of Offshore Cables may result in temporary mobilisation of sediment and any associated contaminants within the coastal water bodies screened into the assessment. **INNS:** Installation of subsea infrastructure may act as an artificial substrate for colonisation for INNS. Furthermore, the import or transfer of construction materials such as cable stabilisation or protection could harbour organisms or propagules.		
Activity 3 - Construction of HDD exit pits and breakout from HDD drilling activities within the Landfall Exit Pit Area	Construction of up to 13 HDD Exit Pits and 13 bores drilled within the Exit Pit Area. This activity can release drilling fluid, muds and very low levels of bentonite into the water column. This activity will take place within with WFD coastal water bodies.	**Biology - habitats:** Short term seabed habitat loss and/or disturbance may lead to the temporary degradation or loss of sensitive fish habitats, including foraging, spawning, and nursery grounds. **Biology – fish:** Landfall construction works located within the HDD Exit Pit Area will generate underwater noise. **Water Quality:** The construction activities for HDD Exit Pits and HDD drill cutting release will take place in water depth below 16 m LAT within the Exit Pit Area, which may result in temporary mobilisation of sediment and any associated contaminants within the coastal water bodies screened into the assessment.	**In**	All coastal waterbodies screened into the assessment in for habitats, fish and water quality. River and loch water bodies screened in with relation to migratory fish only. (See **Table 4-1**).

Activity	Description	Relevant WFD Receptor Justification	Screening outcome	Potentially impacted waterbodies
Construction & Decommissioning				
Activity 4 – Vessel movements during construction, operation and maintenance and decommissioning	There will be increased vessel movements associated with: • Installation and decommissioning of WTG and OSP (if required); • Installation and decommissioning of Offshore Cables; • Construction of HDD exit pits and HDD Drilling activities; • Maintenance activities.	**Biology – fish:** Vessel movements associated with the construction, commissioning and O&M phases of the Offshore Project will produce sustained, non-impulsive noise that can contribute to the ambient underwater soundscape over extended periods. **Water Quality:** Increased vessel activity during construction, decommissioning and O&M phases introduces the risk of accidental release of pollutants **INNS:** Vessel movements (hull fouling and niche areas such as sea chests, propellers, anchors and bilge systems) and ballast water discharge from international or inter-regional vessels have the potential to introduce of INNS into the area.	**In**	All coastal waterbodies screened into the assessment in for fish, water quality and INNS. (See **Table 4-1**).
Operation and Maintenance				
Activity 5 - Presence and operation of subsea infrastructure	Presence and operation of offshore infrastructure including: • WTGs, including either multi-leg jacket foundations with pin piles or hybrid multi-leg	**Hydromorphology:** The presence of WTG and OSP (if required) foundations may result in changes to the hydrodynamic regime (i.e. blockage effects impacting water depths, current speeds, scour, waves and stratification). Alteration to the baseline sediment transport regime has the potential to alter erosion/accretion rates at the surrounding coastline.	**In**	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* screened in for Hydromorphology, habitat, water quality and INNS

Activity	Description	Relevant WFD Receptor Justification	Screening outcome	Potentially impacted waterbodies
Construction & Decommissioning				
	jacket with gravity base structures, and scour protection; • OSP (if required); • Offshore Cables (including cable stabilisation or protection); • HDD Exit Pits. This activity will interact with WFD coastal water bodies, which extend 5.5 km from the shore, where they are crossed by the Offshore Cables to Landfall. There is also a small overlap with the coastal waterbodies and the Array Area.	**Biology – habitat:** The placement of subsea infrastructure will result in the long-term loss of benthic habitat through the removal of soft-sediment areas and the introduction of hard substrate. These changes have the potential to affect the biological quality element (benthic invertebrates). **Water Quality** - The presence of WTG foundations may lead to localised changes in water quality, including alterations to current speeds, turbulence, mixing and local stratification. **INNS:** Subsea infrastructure may act as an artificial substrate for colonisation for INN.		
Activity 6 - Landfall operations seaward of MHWS mark	Operation of offshore infrastructure including operation of ducts and cables.	No pathway for impact to any relevant water quality elements during the O&M phase.	**Out**	NA

Activity	Description	Relevant WFD Receptor Justification	Screening outcome	Potentially impacted waterbodies
Construction & Decommissioning				
Activity 7 – Offshore maintenance activities during O&M	Offshore maintenance activities include major/minor component replacement and repairs, scheduled inspections and unscheduled maintenance of offshore infrastructure, with repairs and replacement required on an ad hoc basis during the O&M phase of the Offshore Project.	**Biology – habitats:** Short term seabed habitat loss/change and/or disturbance from maintenance activities, including cable repair and replacement and associated placement of jack-up vessels, can lead to degradation of benthic habitat. **Water Quality:** Maintenance activities may cause temporary physical disturbance to the seabed, leading to re-mobilisation of seabed sediments, and subsequent impacts on marine waters (both inshore and offshore). **INNS:** The import or transfer of materials, such as cable stabilisation or protection, for reburial/protection of exposed Offshore Cables which could harbour organisms or propagules.	**In**	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* screened in for habitat, water quality and INNS

4.2 STAGE 2: WATER FRAMEWORK DIRECTIVE SCOPING

4.2.1 OVERVIEW

4.2.1.1 The WFD scoping stage determines where further WFD assessment is required and, if so, the appropriate level of detail. This is achieved by identifying risks to the screened in WFD water bodies (see **Table 4-1**) arising from the screened in Offshore Project activities (see **Table 4-2**). Any risks scoped in are then taken forward to Stage 3 – WFD Impact Assessment (see Section 5).

4.2.1.2 The Offshore Project activities screened in for further assessment (see **Table 4-2**) are:

- **Activity 1** - Installation and decommissioning of WTG and OSP (if required);
- **Activity 2** - Installation and decommissioning of Offshore Cables;
- **Activity 3** - Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area;
- **Activity 4** – Vessel movements during construction, operation and maintenance and decommissioning;
- **Activity 5** - Presence and operation of subsea infrastructure;
- **Activity 7** – Offshore maintenance activities during O&M.

4.2.1.3 The MDS presented in the relevant technical chapters of the EIAR has been used to determine which risks associated with each screened in Offshore Project activity are scoped in or out.

4.2.1.4 The potential risks to receptors from the Offshore Project activities, based on the relevant water bodies and their water quality elements are presented for surface water bodies in **Table 4-4** to **Table 4-8.**

4.2.1.5 A summary baseline section for the Offshore Project Boundary is also provided for each WFD receptor (hydromorphology, biology, water quality, protected areas and INNS) and expanded on in **Annex 10.1.1, Volume 2c**. Full baseline sections are available within the EIA (specifically **Chapter 9, Volume 2a**; **Chapter 10, Volume 2a**; **Chapter 11, Volume 2a;** and **Chapter 12, Volume 2a**).

4.2.2 HYDROMORPHOLOGY

Baseline

Sediment Transport Pathways

4.2.2.1 As discussed in **Chapter 9, Volume 2a**, sediment transport is the movement of sediment driven by hydrodynamic forces or project related activities, with suspended particles being fully suspended in the water column requiring flow or activity driven forcing to keep the particles in suspension. Once the forcing mechanism slows or stops the lack of energy will result in the suspended load settling out and causing deposition on the seabed. Ultimately the potential for deposition is directly related to the concentration of Total Suspended Solids (TSS).

4.2.2.2 To characterise a baseline for site-specific sediment transport potential, a 31-day timeseries of water levels and flow characteristics (including speed and direction) was extracted from the hydrodynamic model (see **Appendix 9.2, Volume 2c**) for the period between 25 March and 25 April 2025, covering 2 spring-neap tidal cycles. This found that smaller silt and sand sediment is mobilised between 66% and 100% of the time compared to larger gravel sediment which is not mobilised.

4.2.2.3 **Table 4-3** details the calculated percentage of time sediment would be mobile at these sites during the spring-neap tidal cycle. Smaller silt and sand sediment is mobilised between 66% and 100% of the time compared to larger gravel sediment which is not mobilised. The wave statistics outlined in Section 9.6.2 in **Chapter 9, Volume 2a,** have been used to assess the wave induced sediment transport in **Appendix 9.2, Volume 2c**. **Table 4-3**, noting that larger waves experienced during extreme storm events would have the potential to further mobilise the seabed sediment.

Table 4-3 Percentage of time sediment would be mobile

Location	**Percentage of Time Sediment would be Mobile (%)**		
	Silt	**Sand**	**Gravel**
Southwest	100	66	0
Northeast	69	66	0
Middle OCAS	Not present	Not present	0
HDD	100	Not present	Not present

Stratification

4.2.2.4 The Offshore Project is located within the shallower depths along the sea shelf of the Hebrides. This region is situated within the surface ocean layer which is above the main thermocline. The majority of the main thermoclines are known to form in the deeper regions of the ocean where greater stratification occurs.

4.2.2.5 As discussed in **Chapter 9, Volume 2a**, the measured data across the Offshore Project Boundary shows very minor thermal stratification between the surface and bed layers, occurring between May and August. The magnitude of the temperature differential is less than 1°C for over 90% of the time. Therefore, the baseline strength of stratification within the Offshore Project boundary is deemed to be weak.

Scoping of impacts

4.2.2.6 The potential impact of the screened-in Offshore Project activity (**Activity 5** – Presence and operation of subsea infrastructure) against the status of the WFD hydromorphology receptor for the relevant surface (coastal) water bodies is assessed in **Table 4-4**. The temporary presence of equipment during construction and decommissioning is not considered, as there is no pathway for long-term change in hydromorphology during these project phases.

Table 4-4: WFD scoping of the Offshore Project activities against the WFD hydromorphology receptor

Consider if your activity may impact hydromorphology:	Risk to receptor (Yes/No)	Scoping outcome justification
Hydromorphology		
Could the Offshore Project activities impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status?	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body is at high hydromorphological status.	
	Yes	**Construction activities** The pathway for effects on hydromorphology relates to structures present in the water column permanently or at least for a long period. Construction activity will not cause such effects. Effects of structures present for a long time are addressed under the O&M phase below. Therefore, this impact has been **scoped out** during the construction phase. **O&M activities** The presence of WTG Foundations may result in changes to the hydrodynamic regime (i.e. blockage effects impacting water depths, current speeds, scour, waves and stratification). Alteration to the baseline sediment transport regime has the potential to alter erosion/accretion rates at the surrounding coastline. This could cause a deterioration in hydromorphology status and is therefore scoped into the assessment. The placement of subsea infrastructure will result in the long-term loss of benthic habitat through the removal of soft-sediment areas and the introduction of hard substrate. This represents a permanent hydromorphological alteration to seabed type and may influence local sediment transport and near-bed hydrodynamics. Therefore, impacts from the Offshore Project activities O&M on the hydromorphology of the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body been **scoped in**.
Could the Offshore Project activities significantly impact the hydromorphology of any other water body?	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body	
	No	The marine works are confined to the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body. As a result, there are no hydromorphological impact pathways on any other water body, and this impact has therefore been **scoped out.**

Consider if your activity may impact hydromorphology:	Risk to receptor (Yes/No)	Scoping outcome justification
Are the Offshore Project activities in a water body that is heavily modified for the same use as your activity?	No	None of the water bodies scoped into the assessment are heavily modified therefore this impact has been **scoped out**.

4.2.3 BIOLOGY

Baseline

Habitats

4.2.3.1 The assessment against the biological habitat receptor requires consideration against the presence of higher and lower sensitivity habitats (see **Table 3-2**). The Offshore Project could potentially impact on higher and lower sensitivity habitats including:

- Kelp forests (high sensitivity);
- Subtidal soft sediment in all coastal and transitional water bodies (low sensitivity);
- Subtidal rocky reef (infralittoral and circalittoral rock) (low sensitivity);
- Gravel and cobbles (intertidal and subtidal coarse sediment) (low sensitivity),

4.2.3.2 As discussed in Chapter 11, Volume 2a and shown Figure 11.5: EUNIS habitat/biotope mapping across the Offshore Project Boundary from 2024 surveys, Volume 2b, the seabed habitat is predominantly A4.214 'Faunal and algal crusts on exposed to moderately wave-exposed circalittoral rock', with notable areas of A5.14 'Circalittoral coarse sediment' and smaller occurrences of A4.2 Circalittoral rock, A5.2 Circalittoral sand, and the biotope A4.2146 '*Caryophyllia smithii* with faunal and algal crusts. These habitats are all considered lower-sensitivity habitat types in the context of WFD receptor pathways, lacking any features typically associated with PMFs or high-sensitivity protected habitats.

4.2.3.3 The site-specific survey at DDC stations within the Array Area identified a total of 3 European Nature Information System (EUNIS) Level 3 Broad Scale Habitats (BSHs), 4 EUNIS Level 4 habitat complexes, 1 EUNIS Level 5 biotope complex and 1 EUNIS Level 6 biotope in the seabed imagery.

4.2.3.4 The shallow (< 20 m) eastern area of the OCAS features a large expanse of bedrock and stony reef supporting kelp wherein the dominant EUNIS biotope identified in both site-specific DDC and ROV imagery was A3.214 '*Laminaria hyperborea* and foliose red seaweeds on moderately exposed infralittoral rock'. This area represents the PMF habitat 'Kelp beds'. This habitat is considered a higher sensitivity habitat (see **Table 3-2**), supporting elevated levels of biodiversity and is commonly found across the Scottish mainland and islands. The extent of the kelp beds can be seen in **Figure 11.5, Volume 2b**.

Fish

4.2.3.5 As discussed in **Chapter 12, Volume 2a,** Atlantic salmon are widely distributed in Scotland/*Alba*, with the Scottish population recognised as being of both national and international importance. Spawning occurs in rivers within the Outer Hebrides/*Na h-Eileanan Sia*, from October to late February (Webb and McLay, 1996). Juveniles typically remain within natal rivers between 1–4 years, before migrating down river as smolts. Smolts typically migrate downstream and enter coastal waters during the spring, most often during April and May (Thorstad *et al.,* 2012). Following entry into coastal waters, juvenile salmon are referred to as post smolts until the spring of the following year (Malcolm *et al.,* 2010).

4.2.3.6 Smolts from the River Grimersta migrate either north through East Loch Roag/*Loch Ròg an Ear* or west toward West Loch Roag/*Loch Ròg an Iar*. Tracking data show that the majority (81%) follow the East Loch Roag route toward the Array Area, while a smaller proportion take the western channel (see **Chapter 12, Volume 2a**). Smolts using the western route were not detected within the Array Area. Of those migrating via East Loch Roag/*Loch Ròg an Ear*, a subset entered the Array Area, generally passing through quickly, although a few individuals exhibited slower, non-direct movements and remained in the vicinity for extended periods.

4.2.3.7 Sea trout is recognised as a species of principal importance and is a PMF in Scotland/*Alba* listed on the Scottish biodiversity list. Given the nearshore location of the Offshore Project and its proximity to estuarine habitats, it is likely that sea trout may pass through or utilise habitats within the Offshore Project Boundary.

4.2.3.8 As discussed in **Chapter 12, Volume 2a,** sea trout tend to remain in coastal and estuarine environments rather than dispersing widely across the marine environment (Middlemas *et al.,* 2009; Thorstad *et al.,* 2004). Post-smolts move from rivers to sea lochs primarily between April and early June and subsequently move to the open sea in late June and July (Pemberton, 1976), where they tend to remain within close proximity (within 3.5 km) of the shore.

4.2.3.9 Based on rod-catch data for sea trout within the Loch Roag/*Loch Ròg* salmon fishery district area (Table 4-13 in **Appendix 12.1, Volume 2c**;) the highest catches were recorded in the Caslabhat and Tamanabhaigh stock assessment area, with a mean annual catch of 597 between 2017 and 2023, falling to 213 in 2023 (Marine Scotland, 2024). The second-highest rod catches were recorded in the Langavat SAC/River Grimersta, with an annual average of 277 between 2017 and 2023 and 212 in 2023.

4.2.3.10 The European eel is considered to be critically endangered globally and are highly migratory with the western Scotland/*Alba* likely to be a key region of first landfall for a significant proportion of the returning eel population. Given the variability in migratory patterns exhibited by European eels it is considered likely that European eels may pass through the Offshore Project Boundary during migration, both as adults and as 'landing' glass eels.

4.2.3.11 The inland river and loch water bodies listed in **Table 4-1** may be potentially affected by the Offshore Project through migration of diadromous fish species, including Atlantic salmon, sea trout and European eel. Any adverse effect on such species that occurred while they were at sea passing through the ZoI of the Offshore Project would have the potential to affect populations of migratory fish species in relevant river and loch water bodies, where fish are a WFD biological quality element used in assessing ecological status. Note that fish populations are not a quality element used in assessing ecological status in WFD coastal water bodies.

Phytoplankton

4.2.3.12 The coastal water off Lewis are not subject to significant nutrient inputs, therefore excess phytoplankton growth indicating eutrophication does not occur, with maximum chlorophyll-a concentrations during the algal growing season usually remaining below of 5 µg/l.

Scoping of Impacts

4.2.3.13 The potential impact of the following screened in Offshore Project activities against the biological receptors (habitats and fish) for the relevant coastal water bodies is assessed in **Table 4-5**. The activities scoped in at Stage 2 have been used to inform the responses to the receptor-specific screening questions set out in this table, which are derived from the Clearing the Waters for All guidance for WFD assessments.

- **Activity 1**: Installation and decommissioning of WTG and OSP (if required) (habitats and fish);
- **Activity 2**: Installation and decommissioning of Offshore Cables (habitats and fish);
- **Activity 3**: Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area (habitats and fish);
- **Activity 4**: Vessel movements during construction, operation and maintenance and decommissioning (fish only);
- **Activity 5**: Presence and operation of subsea infrastructure (habitats only);
- **Activity 7**: Offshore maintenance activities during O&M. (habitats only).

4.2.3.14 Phytoplankton, as a biological quality element used by SEPA to classify coastal water bodies under the WFD, has been considered from screening through to scoping; however, as the relevant coastal water body is at High Status for phytoplankton and there is no nutrient or eutrophication pathway associated with the Offshore Project, this receptor is scoped out of Stage 3 assessment due to the absence of a nutrient or eutrophication pathway but included in **Table 4-5** for completeness.

Table 4-5: WFD scoping of the Offshore Project activities against WFD biological receptors

Consider if the footprint of the activity may impact the biological receptors:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Biology – Habitats		
Is the footprint of the Offshore Project 0.5 km^2 or larger?	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water body.	
	Yes	**Construction and decommissioning activities** The total temporary area of disturbance from construction activities within the OCAS, in which the water body overlaps, (including seabed preparation, cable installation and cable protection) equates to 4,754,875 m^2 (4.75 km^2). The construction of 13 HDD Exit Pits in the Exit Pit Area. The dimensions of each exit will be 75 m long, 5 m wide, and 3.5 m deep, with a total area of disturbance of 4,875 m^2 (0.004875 km^2). This equates to a temporary offshore footprint (combining the OCAS and HDD footprint) of 4.75 km^2. A similar temporary footprint would be expected during decommissioning, as activities would involve the recovery of accessible cable sections, the potential removal or partial removal of cable protection, and potential re-excavation or backfilling along the cable corridor. **O&M activities** The total presence of infrastructure in the OCAS, including Offshore Cables and cable protection equates to a footprint of 954,875m^2 (0.9548 km^2). The maximum area for the HDD Exit Pits equates to a total of 4,875 m^2 (0.0049 km^2) for 13 HDD Exit Pits. Therefore, the permanent footprint of the offshore project within the coastal water body is 0.9597 km^2, which is >0.5km^2 Impacts from the footprint of the Offshore Project during construction, O&M and decommissioning on habitats have therefore been **scoped in.**
Is the footprint of the Offshore Project 1% or more of the	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water body.	
	No	**O&M activities** The permanent footprint of the Offshore Project (0.9597 km^2,) within the Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water

Consider if the footprint of the activity may impact the biological receptors:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
water body's area?		body represents 0.24% of the water body's area of 402.76 km^2. Therefore this impact has been **scoped out.**
Is the footprint of the Offshore Project within 500 m of any higher sensitivity habitat?	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water body.	
	Yes	**Construction, decommissioning and O&M activities** The shallow (< 20 m) eastern area of the OCAS features a large expanse of bedrock and stony reef supporting kelp. Kelp beds have been assessed by Marine Life Information Network (MarLIN) as having a medium sensitivity to habitat disturbance in the form of abrasion/disturbance of the seabed (Stamp *et al.*, 2023b), and under WFD guidance are considered a higher sensitivity habitat. Impacts from the footprint of the Offshore Project during construction, O&M and decommissioning on higher sensitivity habitats has therefore been **scoped in.**
Is the footprint of the Offshore Project 1% or more of any lower sensitivity habitat?	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water body.	
	No	**O&M activities** As detailed above, the permanent footprint of the Offshore Project within the Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water body represents 0.24% of the water body's area. Therefore, the footprint of the Offshore Project is <1% of any lower sensitivity habitat within the coastal water body. Impacts from the footprint of the Offshore Project on lower sensitivity habitats has therefore been **scoped out.**
Biology fish		
Are the Offshore Project activities in an estuary and could they affect fish in and outside the estuary, could it delay or prevent fish entering it and could it affect fish migrating through the estuary?	Loch and river water bodies screened in (see **Table 4-1**)	
	No	**Construction, decommissioning and O&M activities** No part of the temporary and permanent footprint of the Offshore Project in the marine environment is within an estuary and there are no transitional water bodies within the vicinity of the Offshore Project. Therefore, no effects on migrating fish are predicted. Therefore, impacts from the Offshore Project activities on fish within or migrating through an estuary has been **scoped out.**

Consider if the footprint of the activity may impact the biological receptors:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Could the Offshore Project 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)?	Loch and river water bodies scoped in (see **Table 4-1**)	
	Yes	**Construction and decommissioning activities** Impulsive underwater noise and vibration will be generated during the construction phase, primarily from percussive piling associated with installation of WTG foundations. Within the WFD coastal water body, the key potential pressure is continuous underwater noise generated by general construction activities, including cable laying, grinding, rock placement, trenching, vessel movements and water jetting. **O&M activities** Continuous underwater noise generated by the movement of O&M vessels, assuming maximum number of vessels on site any one time would be 10 over the Offshore Project lifetime of up to 35 years. Total maximum O&M vessels movements (return trips) is up to 32,104 over the 35 year operational lifetime. Impacts from the Offshore Project activities during construction and O&M on fish behaviour has therefore been **scoped in.**
Could the Offshore Project cause entrainment or impingement of fish?	Loch and river water bodies scoped in (see **Table 4-1**)	
	No	**Construction, decommissioning and O&M activities** The Offshore Project does not involve water abstraction, so there is no potential for impingement of fish. Impacts from the Offshore Project activities on entrainment or impingement of fish has therefore been **scoped out.**
Biology: Phytoplankton		
Are the Offshore Project activities in a water body with a phytoplankton status of moderate, poor, or bad?	Gallan Head/ *Àird Uig* to the Butt of Lewis/ *Rubha Robhanais* coastal water body	
	No	All coastal water bodies considered have 'High' status for phytoplankton. Therefore, this impact is **scoped out.**

4.2.4 WATER QUALITY

Baseline

Total Suspended Sediment and Turbidity

4.2.4.1 As discussed in **Chapter 10, Volume 2b**, total suspended sediment data for the northeast of the Isle of Lewis/*Eilean Leòdhais,* located within the Offshore Project Boundary show low TSS concentrations with average concentrations of <1 mg/l (average between 1998-2015) (Cefas, 2016b). In winter, which typically results in higher TSS and turbidity events due to storm events causing increase in natural seabed disturbance events, TSS and turbidity remain low with concentrations of TSS <5 mg/l and turbidity ≤3 NTU (Ghohin, 2011; Silva, 2016.

Dissolved Oxygen

4.2.4.2 Shelf sea surface waters are generally found to be oxygen rich, with concentrations averaging 6-8 mg/l (Lozier *et al.,* 1995), corresponding to 90-106% saturation, affected by seasonal variation in temperature and algal growth which influences oxygen solubility (Marine Directorate, 2014).

Salinity and Temperature

4.2.4.3 Time series data (1960-2010) of temperature and salinity data collected from the west coast of the Outer Hebrides/*Na h-Eileanan an Iar* have been utilised (Marine Directorate, 2014). The northeast Atlantic waters around the Western Isles are characterised by yearly average sea surface temperatures ranging between 6-15°C, and an average sea surface salinity of ~35 salinity units (season dependent) (Lozier *et al.,* 1995; JNCC, 1997; OSPAR, 2000; Marine Directorate, 2016).

Nutrients and Contaminants

4.2.4.4 Nutrient and contaminants concentrations in the sea off the west coast of the Isle of Lewis/*Eilean Leòdhais* are low, due to the limited land-based anthropogenic influence with low urbanisation and limited industrial and farming development. The location of the island on the margin of the North Atlantic, is also beneficial to water quality, as the high energy environment facilitates the dispersion and dilution of any nutrient enrichment.

Scoping of Impacts

4.2.4.5 The potential impact of the following screened in Offshore Project activities against the WFD water quality receptor for the relevant surface (coastal) water bodies is assessed in **Table 4-6**:

- **Activity 1** - Installation and decommissioning of WTG and OSP (if required);
- **Activity 2** - Installation and decommissioning of Offshore Cables;
- **Activity 3** - Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area;
- **Activity 4** - Vessel movements during construction, operation and maintenance and decommissioning;

- **Activity 5** - Presence and operation of subsea infrastructure;
- **Activity 7** - Offshore maintenance activities during O&M.

Table 4-6: WFD scoping of the Offshore Project activities against the WFD water quality receptor

Consider if the activity may impact water quality:	**Risk to Receptor (Yes/No)**	**Scoping Outcome Justification**
Could the Offshore Project activities affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)?	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body	
	Yes	**Construction and decommissioning activities** The Offshore Project will not involve any discharges affecting temperature, salinity, oxygen levels, nutrients or microbial patterns. Temporary plumes of sediments (during construction or decommissioning) or released drilling fluids will not persist or have a high oxygen demand, so there will be no effects on dissolved oxygen concentrations. Presence of plumes will be intermittent and effects of individual plumes on water clarity will not persist longer than a spring neap tidal cycle (see **Chapter 9, Volume 2a** and **Appendix 9,2, Volume 2c**) . However, the overall programme of works will last for several years. During construction, excavation of the HDD Exit Pits and drilling breakout can disturb sediment, which may release fine particles into the surrounding water column and temporarily increase turbidity and suspended sediment concentrations. This activity can also release drilling fluid, muds and very low levels of bentonite into the water column. **O&M activities** The Offshore Project will not involve any discharges affecting temperature, salinity, oxygen levels, nutrients or microbial patterns or water clarity for longer than a spring neap tidal cycle. The presence of WTG foundations may lead to localised changes in water quality, including alterations to current speeds, turbulence, mixing and local stratification. These changes have the potential to influence suspended sediment concentrations and turbidity patterns in the immediate vicinity of the offshore infrastructure.

Consider if the activity may impact water quality:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
		Impacts from the Offshore Project activities during construction, O&M and decommissioning on water quality will occur over several years; this has therefore been **scoped in.**
Are the Offshore Project activities in a water body with a history of harmful algae?	Gallan Head/*Àird Uig* to the Butt of *Lewis/Rubha Robhanais* coastal water body	
	No	This coastal water body has a 'High' status for phytoplankton indicating low nutrient concentrations and minimal anthropogenic pressure. These conditions significantly reduce the likelihood of harmful algal blooms associated with eutrophication. While short-lived seasonal blooms may occur naturally, they are not considered detrimental and do not compromise ecological status. Therefore, this impact is **scoped out.**
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if the chemicals are on the Environmental Quality Standards Directive (EQSD) list.	Gallan Head/ *Àird Uig* to the Butt of Lewis/ *Rubha Robhanais* coastal water body Loch Roag/*Loch Ròg* coastal water body; Loch Carloway/*Loch Chàrlabhaig* coastal water body.	
	No	**Construction and decommissioning activities** The marine works within this coastal water body will not use or release chemicals on the EQSD list during construction or decommissioning. During construction, there is potential for release of small quantities of drilling mud into the coastal water body, within the Landfall Exit Pit Area during HDD breakout when installing the cable ducts, but this will comprise only water, bentonite and polymer additives, not chemicals on the EQSD list. **O&M activities** The marine works within this coastal water body will not use or release chemicals on the EQSD list. Elevated SSCs during the O&M phase are expected to be short-term, intermittent, and spatially limited. Deposition is predicted to be highly localised and naturally reversible through tidal processes. Although reburial works may occur more frequently than during construction (up to 6 events over the project lifetime), each is expected to be of short duration.

Consider if the activity may impact water quality:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
		This impact for construction, O&M and decommissioning activities is therefore **scoped out.**
If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if it disturbs sediment with contaminants above Centre for Environment, Fisheries and Aquaculture Science (Cefas) Action Level 1.	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais;* Loch Roag/*Loch Ròg* coastal water body; Loch Carloway/*Loch Chàrlabhaig* coastal water body.	
	No	**Construction, decommissioning and O&M activities** Sediment contaminant concentrations within the Offshore Cable corridor where it crosses the WFD coastal water body meet the Cefas Action Level 1 standards (see **Chapter 10**, **Volume 2a).** Therefore, this impact is **scoped out.**
If your activity has a mixing zone (like a discharge pipeline or outfall) consider if the chemicals released are on the EQSD list.	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais;* Loch Roag/*Loch Ròg* coastal water body; Loch Carloway/*Loch Chàrlabhaig* coastal water body.	
	No	The Offshore Project does not involve a discharge pipeline or outfall releasing chemicals; therefore this impact is **scoped out.**

4.2.5 PROTECTED AREAS

Baseline

4.2.5.1 The WFD assessment considers if WFD protected areas are at risk from the proposed activity. The nearest site designated is Loch Roag Lagoons SAC, approximately 6.8 km southwest of the WFD Study Area. This is a complex of silted lagoons. Tob Valasay, 1 of the lagoons, contain a diverse range of subtidal habitats. A range of communities is present including beds of eelgrass *Zostera* spp. and tasselweed *Ruppia* spp., turfs of marine algae and stands of large brown algae.

Scoping of Impacts

4.2.5.2 The potential impact of the following screened in Offshore Project activities against the protected areas is assessed in **Table 4-7**:

- **Activity 1** - Installation and decommissioning of WTG and OSP (if required);
- **Activity 2** - Installation and decommissioning of Offshore Cables;
- **Activity 3** - Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area;
- **Activity 4** – Vessel movements during construction, operation and maintenance and decommissioning;
- **Activity 5** - Presence and operation of subsea infrastructure;
- **Activity 7** – Offshore maintenance activities during O&M.

Table 4-7: WFD scoping of the Offshore Project activities against Protected Areas

Consider if the footprint of the activity may impact the biological receptors:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
Protected Areas		
	Loch Roag Lagoons SAC	
Is the Offshore Project activities within 2 km of any WFD protected area?	No	The nearest WFD protected area is Loch Roag Lagoons SAC, located approximately 6.8 km southwest of the WFD Study Area. Migratory fish are not an interest feature of the SAC and are not a WFD classification element for coastal water bodies. Therefore, impacts from the Offshore Project activities on protected areas has been **scoped out.** The Loch Roag/*Loch Ròg* water body (ID: 200205) remains part of the WFD water body assessment (under **Table 4-5**) due to the potential impact pathway on biology and its role as an access route to river and loch water bodies for migratory fish. This ensures that potential ecological pathways via the water body are captured, even though no impacts on designated Protected Areas are anticipated.

4.2.6 INNS

Baseline

4.2.6.1 Across the Offshore Project Boundary, 2 INNS were identified from the site-specific surveys. The polychaete, *Goniadella gracilis,* was observed from the grab samples (see **Appendix 11.1, Volume 2c)**. This species is a native of South Africa and the northeast coast of the USA with the first record in the U.K. from Liverpool Bay in the summer of 1970. It is believed to have entered the U.K. via anchoring trans-Atlantic ships. In addition, the red alga *Bonnemaisonia hamifera* which was recorded at Station ST023 from the e-DNA site-specific surveys (See **Annex 12.1.2: Annex 2: eDNA Report, Volume 2c**).

4.2.6.2 According to desk study records, INNS recorded in the West Highlands and Outer Hebrides/*Na h-Eileanan an Iar* include common cordgrass *Spartina anglica,* the Pacific oyster *Magallana gigas*, the Japanese skeleton shrimp *Caprella mutica* and the Japanese wireweed *Sargassum muticum* (Collin *et al*., 2015; Cook *et al*., 2014; Kakkonen, *et al*., 2019; Nall *et al*., 2015; Smith *et al*., 2014).

Scoping of Impacts

4.2.6.3 The potential impact of the following screened in Offshore Project activities against INNS for the relevant surface water bodies is assessed in **Table 4-8.**

- **Activity 1** - Installation and decommissioning of WTG and OSP (if required);
- **Activity 2** - Installation and decommissioning of Offshore Cables;
- **Activity 4** – Vessel movements during construction, operation and maintenance and decommissioning;
- **Activity 5** - Presence and operation of subsea infrastructure;
- **Activity 7** – Offshore maintenance activities during O&M.

Table 4-8: WFD scoping of the Offshore Project activities against INNS

Consider if the footprint of the activity may impact the biological receptors:	**Risk to Receptor (Yes/No)**	**Scoping Outcome Justification**
INNS		
	Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais;* Loch Roag/*Loch Ròg* coastal water body; Loch Carloway/*Loch Chàrlabhaig* coastal water body.	
Could the Offshore Project activities introduce or spread INNS?	Yes	**Construction and decommissioning activities** The introduction of INNS is recognised as a potential risk during construction and decommissioning of the Offshore Project. Vectors for INNS introduction include: • Vessel movements during construction and decommissioning (hull fouling and niche areas such as sea chests, propellers, anchors, and bilge systems); • Ballast water discharge from international or inter-regional vessels during construction and decommissioning; • Construction equipment and subsea infrastructure, which may act as artificial substrates for colonisation; • Import or transfer of construction materials such as rock armour bags, rock berms or concrete units that could harbour attached organisms or propagules. **O&M activities** Man-made structures placed on the seabed can be colonised by a variety of marine species, potentially functioning as artificial reefs. While these structures may provide habitat, they could also facilitate the spread of non-native species if such species are already present; however, they do not inherently act as a vector for INNS. Most structures will be located within the Array Area and are therefore outside the scope of this WFD assessment. Cable protection, if required, may occur within the Gallan Head/*Àird Uig* to Butt of Lewis/*Rubha Robhanais* coastal water body.

Consider if the footprint of the activity may impact the biological receptors:	Risk to Receptor (Yes/No)	Scoping Outcome Justification
		Impacts from the Offshore Project activities during construction, O&M and decommissioning on the spread of INNS have therefore been **scoped in.**

4.2.6.4

4.2.7 SCOPING SUMMARY

4.2.7.1 A summary of the scoping assessment presented in **Table 4-4** to **Table 4-8** is provided in **Table 4-9**. This table outlines which WFD receptors, water bodies and activities have been scoped in and will be taken forward to Stage 3 – WFD impact assessment (see Section 5).

Table 4-9: Summary of WFD receptors scoped in for Stage 3 – WFD impact assessment

WFD Receptor	Water body	Offshore Project Activities	Justification
Hydromorphology	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body	**Activity 5** - Presence and operation of subsea infrastructure	Offshore Project activities could impact on the hydromorphology of a water body at high status.
Biology – Habitats	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body	**Activity 1** – Installation and decommissioning of WTG and OSP (if required). **Activity 2** - Installation and decommissioning of Offshore Cables **Activity 3** - Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area **Activity 5** - Presence and operation of subsea infrastructure **Activity 7** – Offshore maintenance activities during O&M	The permanent footprint of the Offshore Project is greater than 0.5 km^2 and the Offshore Project is also within 500 m of a higher sensitivity habitat.
Biology – Fish	Loch and river water bodies screened in (see Table 4-1)	**Activity 1** – Installation and decommissioning of WTG and OSP (if required). **Activity 2** - Installation and decommissioning of Offshore Cables **Activity 3** - Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area **Activity 4** – Vessel movements during construction, operation and maintenance and decommissioning	The Offshore Project could impact on normal fish behaviour, affecting migration to or spawning in connected river and loch water bodies, where fish are a WFD quality element

WFD Receptor	Water body	Offshore Project Activities	Justification
4.2.7.2 Water quality	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body	**Activity 1** – Installation and decommissioning of WTG and OSP (if required). **Activity 2** - Installation and decommissioning of Offshore Cables **Activity 3** - Construction of HDD Exit Pits and breakout from HDD drilling activities within the Landfall Exit Pit Area **Activity 4** – Vessel movements during construction, operation and maintenance and decommissioning **Activity 5** - Presence and operation of subsea infrastructure **Activity 7** – Offshore maintenance activities during O&M	The Offshore Project activities could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days).
INNS	Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body	**Activity 1** – Installation and decommissioning of WTG and OSP (if required). **Activity 2** - Installation and decommissioning of Offshore Cables **Activity 4** – Vessel movements during construction, operation and maintenance and decommissioning **Activity 5** - Presence and operation of subsea infrastructure **Activity 7** – Offshore maintenance activities during O&M	The Offshore Project activities could introduce spread of INNS.

5 STAGE 3: ASSESSMENT OF EFFECTS

5.1 OVERVIEW

5.1.1.1 Based on the outcomes of the Stage 2 – WFD scoping stage (see Section 3.2.3), the risks to receptors from the Offshore Project activities and the relevant waterbodies identified for progressing to Stage 3 are presented within this section. This assessment will consider the environmental measures in place to protect each water body and will evaluate the proposed activities against WFD status objectives.

5.1.1.2 Decommissioning activities have also been considered in the WFD assessment. However, these activities are predicted to be equivalent to or lower than that of the construction phase. Therefore, the construction phase represents a conservative worst-case scenario for the purposes of assessing potential WFD effects and subsequent conclusions on the WFD status. On this basis, decommissioning activities are not described separately in following sections of the impact assessment, as their potential impacts are already encompassed within the construction phase assessment.

5.1.1.3 As the majority of the Array Area lies outside the WFD boundary and within waters governed by the Marine Strategy Framework Directive (MSFD), an MSFD assessment is required to address aspects such as biodiversity, underwater noise, and marine litter that fall outside the scope of WFD (see Section 3.2.4 for further details). The MSFD assessment is presented in Section 5.7 and **Table 5-1**.

5.1.1.4 In addition to evaluating the potential impacts of the Offshore Project during construction, operation and maintenance (O&M) and decommissioning on WFD compliance. Within Section 5.8, this assessment also considers the additive interactions between the Offshore Project and OTW Project to understand if there is the potential for any change to the assessment outcomes as a result of both elements of the Project.

5.2 HYDROMORPHOLOGY

5.2.1.1 As identified in **Table 4-4**, the placement of subsea infrastructure will result in the long-term loss of benthic habitat through the removal of soft sediment areas and the introduction of hard substrate in the limited areas where soft sediment occurs. This represents a permanent hydromorphological alteration to seabed type and may influence local sediment transport and near bed hydrodynamics of the Gallan Head/*Àird Uig* to the Butt of Lewis/Rubha Robhanais coastal water body. However, the presence of the Offshore Cables buried in the seabed will not affect current speeds in the water column. The WTGs and their foundations will all be offshore, outside of the outer boundary of the coastal water body (which extends 3 nm/5.5 km from the coast) and, as

the principal tidal currents run parallel to the shore, there is no pathway for these structures to have a significant effect on hydromorphological status of this water body.

5.2.1.2 From the results of hydrodynamic modelling undertaken, **Chapter 9, Volume 2c** concluded that, subject to implementation of the embedded Offshore Project mitigation measures detailed in the chapter, the magnitude of impact of the blockage effect to the hydrodynamics (water levels and current speeds), seabed (scour), waves, and stratification of any cable protection present within the coastal water body is Negligible. The modelling shows that changes in current speeds, water levels, wave conditions and stratification are very small and remain well within the range of natural variability reported for the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body. These changes are too limited in extent and magnitude to alter the hydromorphological conditions. On this basis, the predicted effects fall below the level at which any deterioration of a WFD receptor could occur, supporting the conclusion of a 'Negligible' magnitude of impact.

5.3 BIOLOGY - HABITATS

5.3.1.1 As identified in **Table 4-5**, the footprint of the Offshore Project is >0.5 km^2 within the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body. Temporary habitat loss and/or disturbance will occur during the construction phase of the Offshore Project (2028/2029 - 2032/2033) from activities such as, seabed preparation, installation of cables, cable protection and construction of HDD Exit Pits and HDD drilling activities.

5.3.1.2 These construction activities may result in structural changes to habitats and generate temporary increases in SSC and associated deposition within the OCAS. These increases are directly related to seabed disturbance from installation works, however, due to the prevailing metocean conditions, sediment that is deposited is expected to be remobilised rapidly by tidal currents and wave action. As a result, the duration will be temporary, and the extent of construction-related sediment deposition will be limited. The influence of natural hydrodynamic processes on sediment transport in the area is described in detail in **Chapter 9, Volume 2a**. Therefore, the effects of a temporary increase in sediment deposition from mobilised sediment on benthic habitats are not significant in EIA terms (**Chapter 11, Volume 2a**).

5.3.1.3 Temporary habitat disturbance may change, disturb or alter habitats, which may subsequently affect the associated benthic habitat community. As the south-west corner of the Array Area and the OCAS lie within the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body, this impact has the potential to affect this coastal water body.

5.3.1.4 Permanent seabed habitat loss will occur as a result of presence of infrastructure during the operation phase within the OCAS including associated scour protection, and cable protection along sections of the Offshore Cable routes, as well as from the construction of the HDD Exit Pits. **Chapter 11, Volume 2a** assesses the impact of long-term habitat loss and details that habitats at

risk are all considered lower-sensitivity habitat types (see **Table 3-2**) in the context of WFD receptor pathways, lacking any features typically associated with PMFs or high-sensitivity protected habitats. Consequently, the habitats present do not elevate the sensitivity of the receiving environment within the WFD water body.

5.3.1.5 The majority of habitats affected by the Offshore Project footprint, the change would represent a shift from natural hard substrate to artificial hard substrate (e.g. concrete or rock scour protection), rather than complete removal. The areas subject to permanent change will occur over a wide spatial extent, however the changes will be discrete and highly localised along narrow, linear stretches of the cable route. Considering its limited spatial extent partial reversibility, intermittent frequency, and long-term duration, it is not anticipated that habitat loss would cause a deterioration in biological status. This is because changes to baseline conditions are considered within the range of natural variability and due to partial loss and/or recoverable alteration to the extent, composition or character or a habitat/community, or population of a species, with recovery expected within less than 5 years, following the completion of construction activities.

5.3.1.6 O&M activities are also expected to result in increases in SSCs and localised sediment deposition during cable repair, replacement and reburial operations. The resettlement of suspended material (deposition) may result in the smothering of benthic species and could alter the surface characteristics of the seabed in small, isolated patches along the cable route. These maintenance activities are expected to be undertaken using the same methods as those used during installation, with jet trenching representing the worst-case scenario in terms of sediment disturbance and resulting increases in SSCs and associated deposition.

5.3.1.7 As discussed in **Chapter 11, Volume 2b**, any increases in SSC or associated deposition during O&M are expected to be similar to, or lower than, those described for the construction phase. Additionally, as detailed in **Chapter 9, Volume 2b,** seabed deposition from cable installation is generally limited to less than 1 cm at a maximum distance of up to approximately 5 km within the Array Area and up to 250 m within the OCAS, with maximum deposition of approximately 10 cm occurring in the immediate vicinity of the construction activity (<400 m in the Array Area and <100 m in the OCAS). Therefore, it is not anticipated that deposition will result in significant habitat loss across the Offshore Project Boundary or within the WFD Study Area.

5.3.1.8 As identified in Section 4.2, the shallow (< 20 m) eastern area of the OCAS features a large expanse of bedrock and stony reef supporting kelp, a higher sensitivity habitat. As described in **Chapter 11, Volume 2a**, kelp beds (notably those formed by *Laminaria hyperborea* and other canopy kelps) are characterised by MarLIN (e.g. Stamp *et al*., 2023b) as having high sensitivity to habitat loss, particularly when hard substrate is replaced by soft sediment. This is because kelp forests require stable rocky substrata for holdfast attachment, strong water movement or wave exposure, and sufficient light penetration; a change in substrate type or sediment deposition regime undermines essential life-functions including attachment, growth, reproduction, and canopy formation.

5.3.1.9 In Scotland/*Alba*, kelp beds are designated PMFs by NatureScot, and are considered higher sensitivity habitats under the WFD guidance (see **Table 3-2**)). The Scottish Government places high policy weight on their protection both for biodiversity and for ecosystem services such as carbon sequestration, coastal protection, nursery habitats for commercial species, and nutrient cycling. Recent studies underscore that sediment loading, soft sediment encroachment, or burial reduce light availability, physically smother juvenile sporophytes, reduce recruitment, and destabilise holdfasts. In addition, hard substrate loss is not readily reversible. Recovery of kelp forests after substrate loss can take a number of years to recover given slow growth rates, limited dispersal of spores, and dependency on substrate condition.

5.3.1.10 The use of HDD beneath the intertidal zone will mean the majority of kelp beds within the Offshore Project Boundary will be avoided, as kelp predominantly attach to subtidal boulders and in more rocky areas. While kelp beds occur extensively along the Scottish coastline and are not confined to the Offshore Project Boundary, routing Offshore Cables beneath the intertidal zone using HDD significantly reduces direct interaction with this habitat.

5.3.1.11 Maintenance activities such as repairs to scour protection and checking and repair of cables has the potential to result in long-term habitat disturbance across the lifetime of the Offshore Project. This could take the form of seabed abrasion from the movement of rock protection, seabed abrasion from moving and relaying cable and the replacement of armour following repairs. The OCAS is characterised by infralittoral and circalittoral rock, which comprises the majority of the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body. This habitat is present along the coastline of multiple areas around the UK and is not restricted to the Offshore Project Boundary. Species recorded within this habitat are adapted to living on bedrock and other hard substrate. The area of habitat affected is small and disturbance is considered reversible with recovery expected within 5 years.

5.3.1.12 Additionally, embedded mitigation described in **Chapter 11, Volume 2a**, including the use of best practice for seabed excavations, an **Outline Offshore Environmental Management Plan (OOEMP), Volume 3** will further reduce the impact to kelp.

5.3.1.13 A full description and assessment of the benthic and intertidal habitats across the Offshore Project is provided in **Chapter 11, Volume 2a**. The chapter concluded that there would be no adverse significant residual effects on benthic receptors from the habitat disturbance caused by the proposed activities in the offshore environment.

5.3.1.14 The impact on biology (habitats) of the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body is predicted to be of local spatial extent (i.e., restricted to discrete areas within the Offshore Project Boundary, short-term in duration (limited to the duration of construction activities), intermittent, and highly reversible (with conditions expected to return to baseline after 5 years). Therefore, no deterioration in the biological status of the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body is predicted.

5.4 BIOLOGY - FISH

5.4.1.1 A full and detailed assessment of relevant activities during the construction and O&M phases of the Offshore Project on fish is provided in **Chapter 12, Volume 2a**. Fish receptors are considered within the river and loch water bodies scoped into the assessment (see **Table 4-1**), or nearby areas that have the potential to be affected by underwater noise and vibration during construction of the Offshore Project.

5.4.1.2 Underwater sound can cause a range of biological effects in fish, from immediate physical injury to more subtle behavioural or ecological consequences. These effects are commonly grouped into 5 categories:

- Mortality or severe injury that reduces fitness and survival;
- Recoverable injuries such as minor bleeding or hair cell damage;
- TTS, a reversible reduction in hearing sensitivity that can impair detection of predators, prey, or mates;
- Masking, where noise interferes with the ability to perceive biologically important sounds;
- Behavioural changes, including avoidance of key habitats or altered migration patterns.

5.4.1.3 Sound exposure guidelines for fish have been developed to reflect the varying hearing ability of species based on their auditory anatomy and mechanisms of sound detection. The Sound Exposure Guidelines for Fish and Sea Turtles (Popper *et al.,* 2014), expanded by Popper *et al.,* 2019), are considered the most relevant guidelines. These guidelines group fish into categories based on hearing ability and mechanisms of sound detection. Details of the hearing abilities of fish species which occur within marine waters across the Offshore Project are presented in **Chapter 12: Volume 2a; Table 12-26**). It should be noted that most of the species are marine fish, which fall outside the scope of this assessment, as fish are not assessed within marine waters under the WFD.

5.4.1.4 Diadromous fish with the potential to traverse the WFD Study Area to nearby rivers include Atlantic salmon, sea trout and European eel. Atlantic salmon and sea trout are categorised as Group 2 species as they have swim bladder not involved in hearing and a narrow hearing bandwidth. European eel are assigned to Group 3 and have a swim bladder involved in hearing. They are considered more sensitive to underwater noise and can detect both sound pressure and particle motion.

5.4.1.5 These diadromous species undertake significant migrations through transitional and coastal waters, making them susceptible to project-related pressures such as underwater noise. Atlantic salmon are listed on the Scottish Biodiversity List (SBL), while European eel is listed as critically endangered. Sea trout, although not a Habitats Directive feature, is an important diadromous species with high fisheries value and similar sensitivities to salmon.

5.4.1.6 Atlantic salmon and sea trout exhibit relatively low auditory sensitivity compared to the more sensitive fish with a swim bladder involved in hearing, detect a narrower range of frequencies and

primarily perceive particle motion rather than pressure waves. European eel have moderate hearing sensitivity (hearing Group 3). They can respond to sound pressure but only after it is converted to particle motion by the swim bladder. Conversion of sound pressure to particle motion is inefficient due to the long distance between the swim bladder and the auditory organs.

5.4.1.7 Fish are generally highly mobile species and will, in some cases, be expected to move away from loud noise sources. Species that depend on specific substrates for spawning (e.g. Atlantic salmon and sea trout) are generally less sensitive to noise during routine biological activities, however, in close proximity to high-intensity sources (such as piling), their ability to adapt is limited. Most affected species exhibit some degree of mobility and are likely to recolonise disturbed areas quickly from adjacent habitats, while the broader population can compensate for any localised losses.

5.4.1.8 Impulsive underwater noise and vibration will be generated during the construction phase of the Offshore Project. The most significant contributor is percussive piling associated with the installation of WTG and OSP foundations, foundations which generates high-intensity impulsive sound. As discussed in **Chapter 12, Volume 2a**, embedded mitigation for piling noise is expected to include, as a minimum, soft start and ramp-up sequences to control underwater noise emissions. Secondary mitigation (see **Appendix 12.3, Volume 2c**), including sequencing piling to limit noise impacts during sensitive migration periods, and incorporating quiet periods into the programme will be incorporated into the CEMP. Programming piling at locations which lie closest to the southern end of the Turbine Area, after the end of May will enable outward migrating smolts following a direct migratory route from the mouth of Loch Roag/*Loch Ròg* to avoid the TTS impact zone.

5.4.1.9 There is also a potential impact pathway to diadromous fish from continuous noise generated by construction activities (associated with cable installation and HDD operations in the Exit Pit Area) (and during operation (from vessel movements during O&M activities). These continuous noise sources are intermittent and confined to a very small spatial footprint (typically <50 m from the source). Given this limited extent, the temporary and localised nature of the works, and the embedded timing and construction controls applied (see **Chapter 12, Volume 2a**), no deterioration in WFD biological receptors is anticipated at the water body scale.

5.4.1.10 In consultation with NatureScot (see **Appendix 12.2, Volume 2c**) it was agreed that adult salmon are likely to occupy the nearshore coastal zone as they search for their natal rivers and therefore this represents a key pathway. Given that the Turbine Area is located approximately 6,000 m from the shore, and the maximum distance in which recovery injury (203 dB SELcum) may occur is 1,200 m there would remain a corridor approximately 3,800 m in width outside the recoverable injury impact zone. Adult salmon approaching the River Grimersta via Loch Roag/*Loch Ròg* from the south and west are less likely to pass through the ensonified zone for TTS since no percussive piling is planned at the southern end of the Array Area, and lower pile energies will be used in these zones (2,500 kJ and 3,500 kJ).

5.4.1.11 The assessment presented in **Chapter 12, Volume 2a** concluded no significant residual effects upon fish receptors while they are within a coastal water body, including any migratory species from underwater noise through the construction, O&M and decommissioning phases.

5.4.1.12 The assessment of fish receptors under the WFD primarily relates to transitional (estuarine), river and loch water bodies rather than coastal water bodies. There are no transitional water bodies within the vicinity of the Offshore Project. However, diadromous species are of relevance here, as effects that occur whilst they are within the coastal water body may affect populations in river and loch water bodies to and from which they are migrating. Based on the assessment, no deterioration in the ecological status of the river and loch water bodies scoped into the assessment (see **Table 4-1**) is anticipated in relation to fish species. Therefore it is not expected that the Offshore Project activities will result in a deterioration of the fish receptor of any of the river or loch water bodies listed in **Table 4-1**. The Offshore Project is considered compliant with WFD regulatory requirements in relation to these water bodies, as it will neither cause a decline in ecological status nor hinder the achievement of 'Good' status.

5.5 WATER QUALITY

5.5.1.1 As identified in **Table 4-6**, the Offshore Project activities have the potential to impact the water quality receptors within the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body. Excavation of the HDD Exit Pits and drilling breakout can disturb sediment, which may release fine particles into the surrounding water column and temporarily increase turbidity and suspended sediment concentrations. The sediment transport modelling (**Appendix 9.2, Volume 2c**) assessed the release of drilling fluid from a single HDD Exit Pit, although up to 13 HDD Exit Pits will be drilled based upon the maximum design scenario. Based on prevailing sediment transport conditions, both suspended and deposited sediments are expected to return to background levels within 2 days. Given the staggered nature of HDD installation, no cumulative increase in SSC or seabed deposition is anticipated from successive installations. Further details are provided in **Chapter 9, Volume 2a**.

5.5.1.2 The scale of the impact from seabed preparation, cable burial, pile drilling and HDD was assessed in **Chapter 9, Volume 2a** and concluded that whilst suspended sediment concentrations will extend beyond the natural variation experienced in background conditions, suspended sediments in the water column are anticipated to return to baseline conditions within days of the disturbance due to dispersion and dilution. Therefore, any impact will be temporary and localised.

5.5.1.3 The presence of WTG foundations may lead to localised changes in water quality, including alterations to current speeds, turbulence, mixing and local stratification. These changes have the potential to influence suspended sediment concentrations and turbidity patterns in the immediate vicinity of the offshore infrastructure.

5.5.1.4 A literature review was carried out to qualitatively assess the magnitude of impact on stratification. Several studies have been conducted to look at the potential impacts of OWFs on water stratification both based on site observations and modelling. A summary of these studies is provided in this section, with the full review available in **Chapter 9, Volume 2a**.

5.5.1.5 Monopile foundations can generate additional turbulence in the water column. Schultze *et al.,* (2020) found that monopile wakes create strong turbulence within the first 50–100 m downstream, dissipating by ~300 m. This enhances vertical mixing, contributing roughly 10% of the turbulence generated by natural bottom boundary layers and potentially influencing the balance between mixing and stratification. However, the study concludes that mixing effects from offshore wind farms are broadly comparable to natural stratification processes in the North Sea, though larger-scale developments may intensify these effects.

5.5.1.6 Carpenter *et al*., 2016 states that foundations were shown to generate turbulent wakes as tidal currents move past, leading to mixing of the stratified water column. This is particularly impactful in regions with large numbers of OWFs such as the German Bight region of the North Sea. The study identifies 2 critical time scales when looking at the stratification of the water column. These time scales are:

- How long it takes to fully mix the stratification;
- The duration for which a water parcel experiences enhanced wind farm mixing.

5.5.1.7 These time scales affect the amount of stratification that occurs and for how long the impacts last. The study goes on to conclude that the present capacity in the North Sea suggests that OWFs have a limited effect on large-scale stratification.

5.5.1.8 Carpenter *et al*. (2016) also hypothesised that drag forces from scour protection around foundations may further exacerbate turbulent mixing beyond the influence of foundations alone. In relation to the depth at which scour protection will be installed (i.e. the water depths within the OCAS), the influence of rock on the seabed is unlikely to contribute significantly to increased mixing. Therefore, the primary influence on stratification in this context will be the presence of the WTGs and OSP foundations.

5.5.1.9 Based on the minimal baseline stratification across the Offshore Project Boundary and the findings of the literature review of the impact of OWFs on thermal stratification, the operational phase of the Project is not expected to have a significant impact on stratification. Any turbulence-related mixing effects would be highly localised, short-lived, and remain well within the range of natural variability.

5.5.1.10 Repair, replacement or reburial of Offshore Cables during maintenance and remedial work, that may be needed over the operational lifetime of the Offshore Project has the potential to cause temporary physical disturbance to the seabed, leading to re-mobilisation of seabed sediments, and subsequent impacts on marine water quality.

5.5.1.11 The disturbance areas for reburial and repair of Offshore Cables are likely to be confined in comparison to construction activities. It is acknowledged that reburial and repair works could occur on multiple occasions, which may result in a greater frequency of localised sediment disturbance events compared to the construction phase. However, each event will be over a smaller spatial and temporal scale than the construction phase of the Offshore Project, thus reducing the magnitude of impact.

5.5.1.12 Whilst no modelling has been undertaken to quantify the impacts of sediment resuspension during maintenance activities, the spatial footprint of these works would be considerably smaller than that of construction, and the duration and intensity of disturbance would also be substantially lower. On this basis, any sediment plumes generated during maintenance or remedial activities are expected to be limited in extent and short-lived.

5.5.1.13 Consequently, no deterioration in the water quality elements of the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body during construction, O&M or decommissioning is anticipated.

5.6 INNS

5.6.1.1 As identified in **Table 4-8**, the Offshore Project activities have the potential to impact the spread of INNS within the Gallan Head/*Àird Uig* to the Butt of Lewis/*Rubha Robhanais* coastal water body, in which the Offshore Project intersects.

5.6.1.2 An assessment of the increased risk of introducing or spreading INNS due to the presence of infrastructure and vessel movements associated with the Offshore Project is provided in **Chapter 11, Volume 2a.** As detailed in the Chapter, vectors for INNS introduction include:

- Vessel movements (hull fouling and niche areas such as sea chests, propellers, anchors, and bilge systems);
- Ballast water discharge from international or inter-regional vessels;
- Construction equipment and subsea infrastructure, which may act as artificial substrates for colonisation;
- Import or transfer of construction materials such as rock armour bags, rock berms or concrete units that could harbour attached organisms or propagules.

5.6.1.3 O&M activities within the Offshore Project Boundary have the potential to introduce INNS species through increased vessel traffic (introduction from vessel hulls, release of bilge and ballast water). There is also the potential for introduction of INNS through the installation of rock protection for scour and cable protection repairs during the Offshore Project's lifetime (up to 35 years). Such structures can create new hard substrates that act as refugia for INNS already present, offering habitats that may facilitate persistence and spread. Over time, these changes can alter population dynamics and competitive interactions within benthic communities, potentially enabling

opportunistic or invasive species to outcompete native fauna and modify community composition. Once established, eradication of INNS is difficult to achieve, therefore the introduction of INNS is likely to result in an irreversible impact.

5.6.1.4 To reduce this potential spread of INNS during O&M of the Offshore Project, the Applicant is committed to producing and adhering to an INNS Management Plan which details mitigation and monitoring measures that the Offshore Project will implement to prevent and reduce impacts from the introduction of INNS. To prevent the likelihood of introductions all Offshore Project Vessels shall adhere to the International Maritime Organisation (IMO) best practice guidance including Biofouling Guidelines and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (IMO, 2021 & 2023). To aid in the early detection of potential INNS biosecurity surveillance, monitoring and reporting procedures are outlined, early detection will increase the likelihood of successful containment and the potential for full eradication. Implementation of the mitigation and monitoring measures as described in the **Offshore Invasive Non-Native Species Management Plan**, **Volume 3**, the risk of introduction and colonisation by INNS will be reduced.

5.6.1.5 Although the establishment of non-indigenous species could result in irreversible effects if uncontrolled, the application of industry-standard biosecurity and vessel management measures reduces the likelihood of introduction to a level where no deterioration in the status of the waterbodies scoped into the assessment (see **Table 4-1**) under the WFD is anticipated as a result of INNS.

5.7 MARINE STRATEGY FRAMEWORK DIRECTIVE

5.7.1.1 **Table 5-1** outlines the descriptors relevant to the MSFD and how the Offshore Project may impact compliance with each.

Table 5-1: Impacts of the Offshore Project on the MSFD Descriptors

MSFD Descriptor	Impacts on compliance from the Offshore Project
Descriptor 1: Marine biodiversity	Descriptor 1 requires that "biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions." Effects on benthic invertebrates (**Chapter 11, Volume 2a**), fish (**Chapter 12, Volume 2a),** and marine mammals (**Chapter 13, Volume 2a**) have been assessed in the EIA. The localised and temporary nature of impacts, the absence of significant residual effects and the implementation of embedded and additional mitigation measures will ensure that the Offshore Project does not hinder the UK's ability to achieve/maintain Good Environmental Status for biodiversity.

MSFD Descriptor	Impacts on compliance from the Offshore Project
Descriptor 2: Non-indigenous species	Construction activities associated with the Offshore Project present a potential vector for the introduction of non-indigenous species, which may subsequently colonise project infrastructure. However, taking into account the embedded mitigation measures such as adherence to biosecurity protocols and implementation of the **Offshore Invasive Non-Native Species Management Plan, Volume 3**, the risk of introduction and establishment of non-indigenous species is considered to be low. As such, the Offshore Project is not anticipated to result in a significant increase in the risk of non-indigenous species introduction or spread, nor is it expected to compromise the achievement or maintenance of Good Environmental Status under MSFD Descriptor 2. A detailed assessment of these risks and mitigation measures is provided in **Chapter 11, Volume 2a.**
Descriptor 5: Eutrophication	The Offshore Project presents potential pathways for nutrient enrichment through the release of inorganic and organic materials, primarily from sewage and domestic waste associated with vessel transit and operational activities. These discharges could contribute to localised increases in nutrient concentrations within the water column and sediments, potentially influencing eutrophication dynamics. However, the implementation of embedded mitigation measures, including strict adherence to the OOEMP and compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex IV and its implementing legislation (The Merchant Shipping (Prevention of Pollution by Sewage from Ships) Regulations 2020) will ensure that the risk of pollution events is minimised. Consequently, the Offshore Project is not expected to result in nutrient enrichment at a scale or intensity that would compromise the achievement or maintenance of Good Environmental Status under MSFD Descriptor 5. A detailed assessment of these potential effects is provided in **Chapter 10, Volume 2a.**
Descriptor 6: Seabed integrity	The Offshore Project has the potential to cause localised physical disturbance to the seabed through construction activities such as seabed preparation, cable installation, and foundation deployment and during operation and maintenance activities, such as cable repair, replacement and reburial. These activities may temporarily alter sediment structure and seabed morphology, potentially affect benthic habitats and associated biological communities. However, the implementation of embedded mitigation measures (M002, M006, M050, M054), in conjunction with adherence to the CEMP, is designed to minimise the extent and duration of seabed disturbance.

MSFD Descriptor	Impacts on compliance from the Offshore Project
	These measures include careful micro-siting, use of low-impact installation techniques and sediment control protocols. Given the spatially limited and temporary nature of the predicted impacts, and the effectiveness of the proposed mitigation, the Offshore Project is not expected to result in significant adverse effects on the structure and functioning of benthic ecosystems. Therefore, the Offshore Project is not anticipated to compromise the achievement or maintenance of Good Environmental Status under MSFD Descriptor 6. A detailed assessment of these interactions is provided in **Chapter 9, Volume 2a.**
Descriptor 7: Hydrographical conditions	MSFD descriptor 7 requires that "permanent alterations of hydrographical conditions do not adversely affect marine ecosystems". Construction, O&M and decommissioning activities will cause seabed disturbance and sediment mobilisation. The Offshore Project does not propose significant permanent structures that would alter large scale hydrographical processes beyond the immediate footprint of the development. Hydrographical changes are expected to be localised and temporary, with no permanent or widespread changes that would compromise the ecological status of marine habitats. Therefore, there will be no impacts on compliance with the MSFD descriptor 7.
Descriptor 8: Contaminants	Mobilisation of sediment into the water column will result in any contaminants present in the sediment also being mobilised. As discussed in **Chapter 10, Volume 2a,** in-situ sediment quality data are scarce; however, sediment samples obtained show sediment quality across the Offshore Project Boundary is high, due to excellent water quality and the limited land-based anthropogenic influence (low urbanisation, limited industrial and farming developments). **Chapter 10, Volume 2a** concludes that contaminant concentrations in the water column resulting from sediment mobilisation during construction will not breach EQS values. Increased vessel activity also introduces a risk of contamination from spills/run off of pollutants. The implementation of embedded mitigation measures, including strict adherence to the OOEMP and compliance with MARPOL Annex I and its implementing legislation (The Merchant Shipping (Prevention of Oil Pollution) Regulations 2019) will ensure that the risk of pollution events is minimised. Therefore, it is not anticipated that contaminants will impact upon compliance with the MSFD. Refer to **Chapter 10, Volume 2a** for the detailed assessment of impacts.
Descriptor 10: Marine litter	The Offshore Project presents a potential risk of introducing solid waste, litter, and debris into the marine environment through accidental or improper disposal from vessels during construction and operational

MSFD Descriptor	Impacts on compliance from the Offshore Project
	activities. Such inputs could result in contamination of the seabed and water column, with potential indirect effects on marine organisms through ingestion or entanglement. However, the implementation of embedded mitigation measures specifically measures M004, M019, M050 as outlined in the **Outline Offshore EMP, Volume 3**, alongside strict adherence to international maritime regulations such as MARPOL Annex V and its implementing legislation (The Merchant Shipping (Prevention of Pollution by Garbage from Ships) Regulations 2020) will significantly reduce the likelihood of such releases. Given these controls, the Offshore Project is not expected to result in a significant increase in marine litter or associated ecological risks. Therefore, the Offshore Project is not anticipated to compromise the achievement or maintenance of Good Environmental Status under MSFD Descriptor 10. Further detail is provided in **Chapter 10, Volume 2a**.
Descriptor 11: Energy, including underwater noise	MSFD Descriptor 11 addresses the introduction of energy including underwater noise and requires that such energy does not adversely affect the marine environment. The Offshore Project will generate both impulsive (e.g., percussive piling) and continuous (e.g., vessel operations) underwater noise throughout its lifecycle. For fish, the EIAR identifies and evaluates these noise sources and concludes that with the implementation of embedded mitigation measures (see **Appendix 3.1, Volume 1c**) including the use of noise abatement technologies, soft start and ramp-up sequences, the percussive Piling Exclusion Area, and division of the Percussive Piling Area being split into 3 zones (2,500 kJ Max; 3,500 kJ Max; 5,000 kJ Max) to limit the maximum hammer energy and control the underwater noise emissions, results in reduced potential impacts. In addition, secondary mitigation measures (see **Appendix 12.3, Volume 2c**) will be implemented to supplement the embedded mitigation. These include sequencing of percussive piling works to avoid TTS impacts within important season migration corridors for adult salmon and post-smolts; and maintaining quiet periods in the percussive piling programme. With these measures in place, the residual effect is assessed as Not Significant in EIA terms (see **Chapter 12, Volume 2a**). For marine mammals, the EIAR concludes that with the implementation of embedded mitigation measures, including the development of an OEMP and adherence to a Marine Mammal Mitigation Plan (MMMP) the residual effect is assessed as Not Significant in EIA terms (see **Chapter 13, Volume 2a**).

MSFD Descriptor	Impacts on compliance from the Offshore Project
	As a result, the EIA conclusions support the conclusion that the introduction of energy from the Offshore Project is not expected to hinder the achievement or maintenance of Good Environmental Status under MSFD Descriptor 11.

5.7.1.2 Based on the above assessment, it is not anticipated that the Offshore Project will hinder the achievement of Good Environmental Status under any of the 11 MSFD descriptors detailed in **Table 5-1.**

5.8 CONSIDERATION OF ONSHORE TRANSMISSION WORKS PROJECT

5.8.1.1 This WFD assessment considers the impacts on designated WFD water bodies affected by the Offshore Project. For the OTW Project, it is not anticipated that there will be any impacts on WFD water bodies. As it is assumed that:

- HDD will be used beneath any surface water bodies, avoiding direct interaction with watercourses, banks or channels;
- temporary construction activities associated with the onshore cable route and haul roads will be set back from WFD water bodies and will be undertaken with standard pollution prevention measures in place.

5.8.1.2 As a result, no changes to hydromorphology, water quality or ecological status elements are expected, and the onshore components of the Project should not give rise to any deterioration under the WFD. A separate assessment will be required to assess potential impacts on onshore water bodies associated with the OTW Project (e.g. the onshore cable route and associated watercourse crossings).

6 CONCLUSIONS

6.1.1.1 A WFD assessment has been undertaken for the Offshore Project. The assessment is based on guidance developed by the EA and is undertaken in a staged approach to ensure that those components of the Offshore Project and the associated activities are assessed against the WFD receptors that contribute to overall WFD status.

6.1.1.2 This WFD assessment has evaluated the potential impacts of the Offshore Project during construction, O&M and decommissioning phases, on the WFD water bodies screened into the assessment. The assessment also considered any protected areas linked to the surface water bodies, with the Loch Roag Lagoons SAC identified but scoped out in Section 4.2 due to a lack of impact pathway.

6.1.1.3 The activities associated with the Offshore Project are likely to result in limited temporary and localised construction impacts, such as sediment mobilisation, pollution risk, alteration to habitats, disturbance to the seabed and more widespread impacts from underwater noise. However, construction impacts would be mitigated further through implementation of best-practice measures set out in **Outline Offshore Environmental Management Plan, Volume 3**, which would be prepared by the appointed Contractor at the detailed design phase. As the construction phase assessment concluded that no deterioration in WFD status of any of the WFD waterbodies scoped into the assessment would arise, the same conclusion applies to decommissioning.

6.1.1.4 The assessment presented in **Chapter 12, Volume 2a** concluded no significant residual effects upon migratory fish while they are within a coastal water body from underwater noise through the construction, O&M and decommissioning phases. Therefore there will be no effects due to the Offshore Project on the status of the fish quality element in any of the river and loch water bodies listed in **Table 4-1**.

6.1.1.5 Decommissioning activities are not expected to result in any WFD relevant impacts or changes to the status of any WFD water bodies. It is not anticipated that operational activities will result in impacts to the screened in water bodies, given the size of the water bodies and the localised nature of the operations.

6.1.1.6 Given the nature of the works and embedded mitigation, no hydromorphological, biological, or water quality impacts on any of the waterbodies scoped into the assessment (see **Table 4-9)** are anticipated at the water body scale. As demonstrated in the impact assessment (see Section 5), all predicted impacts associated with construction, operation and decommissioning are small scale, highly localised and remain well below the thresholds at which deterioration of ecological, hydromorphological or water-quality elements would occur. On this basis, the Offshore Project is not expected to cause deterioration from High Status, nor to compromise any water body's ability to maintain High Status in future cycles. Any impacts are expected to be negligible at water body scale.

6.1.1.7 No impacts are envisaged from INNS related to the Offshore Project.

6.1.1.8 It is predicted that the Offshore Project will neither result in deterioration of, nor prevent the achievement of, WFD objectives set for the screened in water bodies. With proposed mitigations in place, the Offshore Project is assessed to be WFD compliant. On this basis, an Article 4.7 assessment is not required for the Offshore Project.

7 GLOSSARY OF TERMS AND ABBREVIATIONS

7.1.1.1 A list of key terms and acronyms used in this appendix are provided in **Table 7-1** and **Table 7-2**.

Table 7-1 Acronyms and abbreviations

Term	Definition
A/HMWB	Artificial or Heavily Modified Water Body
AL2	Action Level 2
ATT	Admiralty Total Tide
BAC	Background Assessment Concentration
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CnES	Comhairle nan Eilean Siar
CTD	Conductivity, Temperature, Depth
DBT	Dibutyltin
DDC	Drop-Down Camera
DrWPAs	Drinking Water Protected Areas
eDNA	Environmental Deoxyribonucleic Acid
ERL	Effects Range Low
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EQR	Ecological Quality Ratio
EQSD	Environmental Quality Standards Directive (2008/105/EC)
EU	European Union
EUNIS	European Nature Information System
GEP	Good Ecological Potential
GES	Good Ecological Status
GWD	Groundwater Directive
GWDTE	Groundwater-Dependent Terrestrial Ecosystems
HAT	Highest Astronomical Tide
HDD	Horizontal direct drilling
HMWB	Heavily modified water body
Hs	Significant Wave Height
IMO	International Maritime Organisation
INNS	Invasive non-native species
LAT	Lowest Astronomical Tide
LoD	Limit of Detection
MarLIN	Marine Life Information Network
MARPOL	International Convention for the Prevention of Pollution from Ships
MD-LOT	Marine Department – Licencing Operations Team
MDS	Maximum Design Scenario
MHWN	Mean High Water Neaps
MHWS	Mean High Water Springs
MLWN	Mean Low Water Neaps

Term	Definition
MLWS	Mean Low Water Springs
MMO	Marine Management Organization
MSFD	Marine Strategy Framework Directive (2008/56/EC)
MSL	Mean Sea Level
Ni	Nickel
NSA	Nutrient Sensitive Area
NMPi	National Marine Plan interactive
OCAS	Offshore Cable Area of Search
OCP	Organochlorine Pesticides
OOEMP	Outline Offshore Environmental Management Plan
OSP	Offshore Substation Platform
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OWF	Offshore Wind Farm
O&M	Operation and maintenance
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PDE	Project Design Envelope
PEL	Probable Effect Level
PMF	Priority Marine Feature
QE	Quality Elements
RBMP	River Basin Management Plan
RLB	Red Line Boundary
ROV	Remotely Operated Vehicle
SBL	Scottish Biodiversity List
SSC	Suspended Sediment Concentrations
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area
SWI	SW Interaction
TBT	Tributyltin
TEL	Threshold Effect Level
THC	Total Hydrocarbon Content
TJB	Transition Joint Bay
Tp	Wave Period
TSS	Total Suspended Solids
TTS	Temporary Threshold Shift
UAV	Unmanned Aerial Vehicle
UKHO	UK Hydrographic Office
WEWS	Water Environment and Water Services (Scotland) Act 2003
WFD	Water Framework Directive (2000/60/EC)
WTG	Wind turbine generator
ZoI	Zone of Influence

Table 7-2 Glossary

Term	Meaning
Array Area	The offshore area within which the offshore wind turbine generators (WTGs), associated foundations, Offshore Cables, and Offshore Substation Platform (OSP) (if required), will be located. This area encompasses the Turbine Area that will contain all above water surface infrastructure (WTGs / OSP) and an additional area within which further below water infrastructure (foundations and cables) may also be located.
Array Cables	The offshore electrical and communication cables that connect infrastructure located within the Array Area, for: Scenario 1: Array Cables will used to connect Wind Turbine Generators (WTGs) to each other, and to connect WTGs to the OSP. Scenario 2: Array Cables will used to connect WTGs to each other.
Biological Quality Elements	Biological Quality Elements are the living components of a water body used under the Water Framework Directive (WFD) to assess ecological status. They reflect how aquatic ecosystems respond to pressures such as pollution, hydromorphological change, and nutrient enrichment.
Coastal water body	A surface water body comprising marine waters extending out to 3 nautical miles from the Scottish territorial baseline, classified by SEPA for ecological, water quality, hydromorphological and chemical status.
Diadromous Species	Fish that spend part of their life in both freshwater and sea water and migrate between the two.
Embedded or 'Designed-in' Mitigation	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the preferred design for the Project. This can include standard practice in accordance with or without guidance. Embedded Mitigation is considered as part of the impact assessment, before effect significance is identified.
Environmental Impact Assessment (EIA)	The process of evaluating the likely significant environmental effects of a proposed project or development over and above the existing circumstances (or 'baseline').
Environmental Impact Assessment Report (EIAR)	The Environmental Impact Assessment Report (EIAR) prepared to assess the likely significant effects of the Project on the environment.
Export Cable	The offshore electrical and communication cables located in the Array Area and Offshore Cables Area of Search that connect the Offshore Substation Platform (OSP) (if required) to Landfall for Scenario 1.
Future Baseline	Refers to the situation in future years without the Offshore Project.
Groundwater body	A distinct volume of groundwater within an aquifer, defined by geological and hydrological boundaries. Groundwater bodies are assessed for quantitative and chemical status under the Groundwater Directive.
Heavily modified water body (HWMWB)	With reference to the WFD, a body of surface water which as a result of physical alterations by human activity (for example for flood defence or navigation) is substantially changed in character, such that

Term	Meaning
	it cannot meet 'Good ecological status'. Where such water bodies are designated as HMWB, the target is to meet 'Good ecological potential'.
Horizontal Directional Drill (HDD) Exit Pit	Represents one exit pit that will be located within the Landfall Exit Pit Area.
Horizontal Directional Drilling (HDD)	A trenchless crossing engineering technique using a drill steered underground without the requirement for open trenches. This method is able to carry out the underground installation of pipes and cables with minimal surface disruption.
Hydromorphological (Quality Elements)	The physical characteristics of a water body that support its biological communities. Hydromorphology describes the hydrological regime (e.g., quantity and dynamics of water flow, connection to groundwater), morphological conditions (e.g., river depth and width variation, bed substrate, structure of riparian zone), and overall continuity of the watercourse. Where hydromorphology has been significantly altered by human activities (e.g., navigation, flood defence), the water body may be designated as an Artificial or Heavily Modified Water Body (A/HMWB), with the corresponding objective of achieving Good Ecological Potential (GEP) rather than Good Ecological Status.
Impact	Change that is caused by an action; for example, foundation installation (action) during construction which results in habitat loss (impact).
Impact Pathway	The EIA for the Offshore Project utilises the 'source-pathway-receptor' model to identify relevant receptors, where applicable. This model highlights potential impacts of the Offshore Project on environmental receptors, establishing a clear link between impact sources and receptor. The impact pathway is the route through which the potential impacts (as a result of an effect of an activity) could reach a receptor.
Jack-up vessel	A jack-up vessel is a barge with legs that can be raised and lowered to install offshore wind farm components and foundations.
Landfall	This consists of works from offshore Horizontal Directional Drill (HDD) exit pits (located below MLWS) to onshore at the Transition Joint Bays (TJB) (located above MHWS). The infrastructure and installation methods associated with the Landfall involves both onshore and offshore components.
Landfall Exit Pit Area	The offshore area in which all HDD Exit Pits will be located within.
Landfall Substation	The optional onshore substation located on the west side of the Isle of Lewis/Eilean Leòdhais. Includes the platform, buildings and associated components which allows the voltage to be increased to meet onward transmission requirements.
Likely Significant Effects	With respect to the Electricity Works (EIA (Scotland) Regulations 2017 and The Marine Works (EIA) Regulations 2017, a significant effect that

Term	Meaning
	may reasonably be predicted as a consequence of a plan or project, on the receiving environment.
Loch water body	A surface water body corresponding to a loch. Loch water bodies are classified by SEPA for ecological and chemical status and may also be assessed for hydromorphological condition. Inland loch water bodies may range from High to Poor status depending on pressures such as barriers to fish migration.
Maximum Design Scenario	The scenario within the Project Design Envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor. See Chapter 3: Project Description, Volume 1a for detailed description.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
National Marine Plan (NMP)	The National Marine Plan (NMP) is Scotland's statutory framework for the sustainable development and management of Scotland's seas, prepared under the Marine (Scotland) Act 2010.
Nutrient Sensitive Area	An area designated as vulnerable to nutrient enrichment (typically nitrogen and phosphorus), where elevated nutrient inputs can contribute to eutrophication.
Offshore	Pertaining to seaward of Mean High Water Springs (MHWS)
Offshore Application	The application for a marine license under the Marine (Scotland) Act 2010 (between 0 and 12nm) and a Section 36 consent under the Electricity Act 1989.
Offshore Cable Area of Search (OCAS)	The area within which the offshore cable infrastructure between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Cables	Electrical and communication cables located within the Array Area and Offshore Cable Area of Search. The Offshore Cables consist of Array Cables, Array Cables to Landfall and Export Cables.
Offshore landfall Area	The area seaward of Mean High Water Springs (MHWS) within the Offshore Cable Area of Search (OCAS) that includes works associated with the Horizontal Directional Drill (HDD) installation, including HDD exit pit(s) (located below MLWS) and offshore cable connection to the onshore (TJB) (located above MHWS).
Offshore Project	The offshore components of Spiorad na Mara offshore wind fam (the Project) located seaward of Mean High Water Springs (MHWS).
Offshore Project Boundary	The 'red line boundary' encompassing the Offshore Project.
Offshore Substation Platform (OSP)	The optional offshore substation located within the Turbine Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements.
Offshore Wind Farm (OWF)	A group of WTGs located offshore.
Onshore	Pertaining to landward of MLWS.

Term	Meaning
Onshore Substation (ONS)	A compound housing electrical equipment enabling connection to the grid. The onshore substation also contains equipment to help maintain stable grid voltage. Arnish/*Àirinis,* an ONS, known as the 'Grid Substation', which is east of Creed Industrial Park, will be situated close to the Scottish and Southern Electricity Networks (SSEN) converter & substation, the 'Lewis Hub.' Here, the electricity will be converted to high-voltage direct current (HVDC) before being transmitted across the Minch/A' Mhaoil to mainland Scotland/*Alba*.
Onshore Transmission Works (OTW)/Onshore Project	The onshore components of the Spiorad na Mara offshore wind farm (the Project) located landward of Mean Low Water Springs (MLWS). The Applicant will seek consent for the OTW Project through a separate application and so does not form part of this application.
Onshore Transmission Works Boundary/Onshore Project Boundary	The 'red line boundary' encompassing all temporary and permanent works associated with the OTW/Onshore Project.
Organochlorine Pesticides	A group of persistent, bioaccumulative synthetic pesticides composed of chlorinated hydrocarbons.
Outline Environmental Management Plan	An outline plan for ensuring implementation of appropriate environmental measures during the construction phase for the offshore components of the project. This will be finalised post-consent as a detailed plan, with involvement of contractors, as a condition of the marine licence.
Percussive piling	A method of installing piles and pile casings into the seabed using an impact hammer. This form of piling can be solely used if ground conditions are suitable. If pile depth cannot be achieved through percussive piling alone, a pile-drill-pile technique can be used to reach desired depths. The percussive piling technique can be used for the installation of the Wind Turbine Generators (WTGs) and the Offshore Substation Platform (OSP) (if required) located within the Percussive Piling Area.
Percussive Piling Area	The area within the Turbine Area where both percussive piling, and drill and grout or vibratory piling construction methods can be used for the installation of the wind turbine generators (WTGs) and the Offshore Substation Platform (OSP) (if required) fixed foundations.
Percussive Piling Exclusion Area	An area in the southwest of the Turbine Area where there will be no percussive piling. Other methods including drill and grout methods can be used in this area.
Permanent Threshold Shift (PTS)	Permanent hearing damage; auditory injury.
Physico-chemical (Quality Elements)	The chemical and physical water quality conditions that support the healthy functioning of aquatic ecosystems and influence the biological quality elements.

Term	Meaning
Polychlorinated Biphenyls	Synthetic chlorinated organic compounds formerly used in electrical equipment and as industrial additives. PCBs persist in the environment and bioaccumulate.
Polycyclic Aromatic Hydrocarbons	A class of organic compounds containing multiple fused aromatic rings, formed during incomplete combustion of organic matter.
Priority Marine Feature	A habitat or species identified by Scottish Government and NatureScot as being of conservation importance in Scotland's seas. PMFs guide marine planning, licensing and environmental assessment to ensure adequate protection of vulnerable marine ecosystems.
Priority substance	Chemicals identified under the Water Framework Directive (WFD) as posing a significant risk to or via the aquatic environment.
Project	The Spiorad na Mara offshore wind farm development. This term described the whole development, including all offshore and onshore components.
Project boundary	The 'red line boundary' encompassing all offshore and onshore components of the Project.
Project Design Envelope (PDE)	A description of the range of possible components that make up the Project design options under consideration when the exact engineering parameters are not yet known.
Project-Lifetime effects	Assessment of the scope for combined effects that occur throughout more than one phase of the project (i.e. construction, operation and maintenance, decommissioning), to interact to potentially create and effect of greater significance than if assessed just within individual/isolated project phases.
Receptor	Any physical, biological or anthropogenic element of the environment that may be affected or impacted by the Project. Receptors can include natural features such as the seabed and wildlife habitats as well as man-made features like fishing vessels and cultural heritage sites.
River water body	A surface water body consisting of a stretch of river or stream defined for WFD assessment. River water bodies are evaluated for hydromorphology, water quality, and ecological status.
Scoping Opinion	A report presenting the written opinion of the Scottish Ministers, with input from Comhairle nan Eilean Siar (CnES) for the OTW, as to the scope and level of detail of information to be provided in the Environmental Impact Assessment (EIA) for the Project.
Scoping Report	A document submitted by a developer that outlines the potential environmental issues and effects of a proposed project to determine which topics, methods, and level of detail should be included in the full Environmental Impact Assessment (EIA).
Scotland River Basin Management Plan	The plan for delivery of WFD objectives for the Scotland River Basin District, which covers all of Scotland/*Alba*, except for areas lying within two cross-border river basin districts (Northumbria and Solway Tweed river basin districts).

Term	Meaning
Sediment dispersion	The dilution and settling of sediment as it travels from a source.
Sediment disturbance	Disturbing/displacing sediment (contaminated or uncontaminated).
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance of the environment effect, defined by criteria specific to the environmental aspect.
Significant effect	It is a requirement of the EIA Regulations 2017 to determine the likely significant effects of the development on the environment, which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible' (The Concise Oxford Dictionary). Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
Spawning	The act of releasing or depositing eggs (fish).
Spawning bed	A discrete patch of seabed where eggs are deposited.
Spawning ground	A larger geographic area than a spawning bed, encompassing one or more spawning beds and all the adjoining potential spawning habitat.
Stock assessment	An assessment of the biological stock of a species and its status in relation to defined reference points for biomass and fishing mortality.
Surface water body	A water body comprising rivers, lochs/lakes, estuaries (transitional waters), or coastal waters. These are assessed for ecological, hydromorphological and chemical status under the WFD.
Suspended sediment concentration	The mass concentration (mass/volume) of sediment in suspension.
Temporary Threshold Shift (TTS)	Reversible and temporary hearing loss.
Threshold effect level (TEL)	A sediment quality guideline representing the contaminant concentration below which adverse biological effects on sensitive organisms are expected to be rare.
Tidal ellipse	The path followed by a water particle in one complete tidal cycle.
Transitional water body	A surface water body in the transitional zone between freshwater and coastal waters, typically estuaries or tidal reaches of rivers. These are influenced by both riverine and marine processes and are assessed for ecological and chemical status under the WFD.

Term	Meaning
Tributyltin	An organotin compound historically used in antifouling paints. TBT is highly toxic to marine life and banned under international conventions.
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. wind turbine generators (WTG) or Offshore Substation Platform (OSP) (if required). This area has been developed and refined through stakeholder consultation and environmental assessment.
Water body	A discrete and significant element of the water environment identified for assessment under the Water Framework Directive. Water bodies are classified by type (e.g. river, coastal, transitional, groundwater) and assessed against environmental objectives.
Wave period	The time (in seconds) between the passage of two successive wave crests at a fixed point.
WFD Protected Area	Area added to the WFD protected area register required by Article 6 of the WFD.
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment.

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