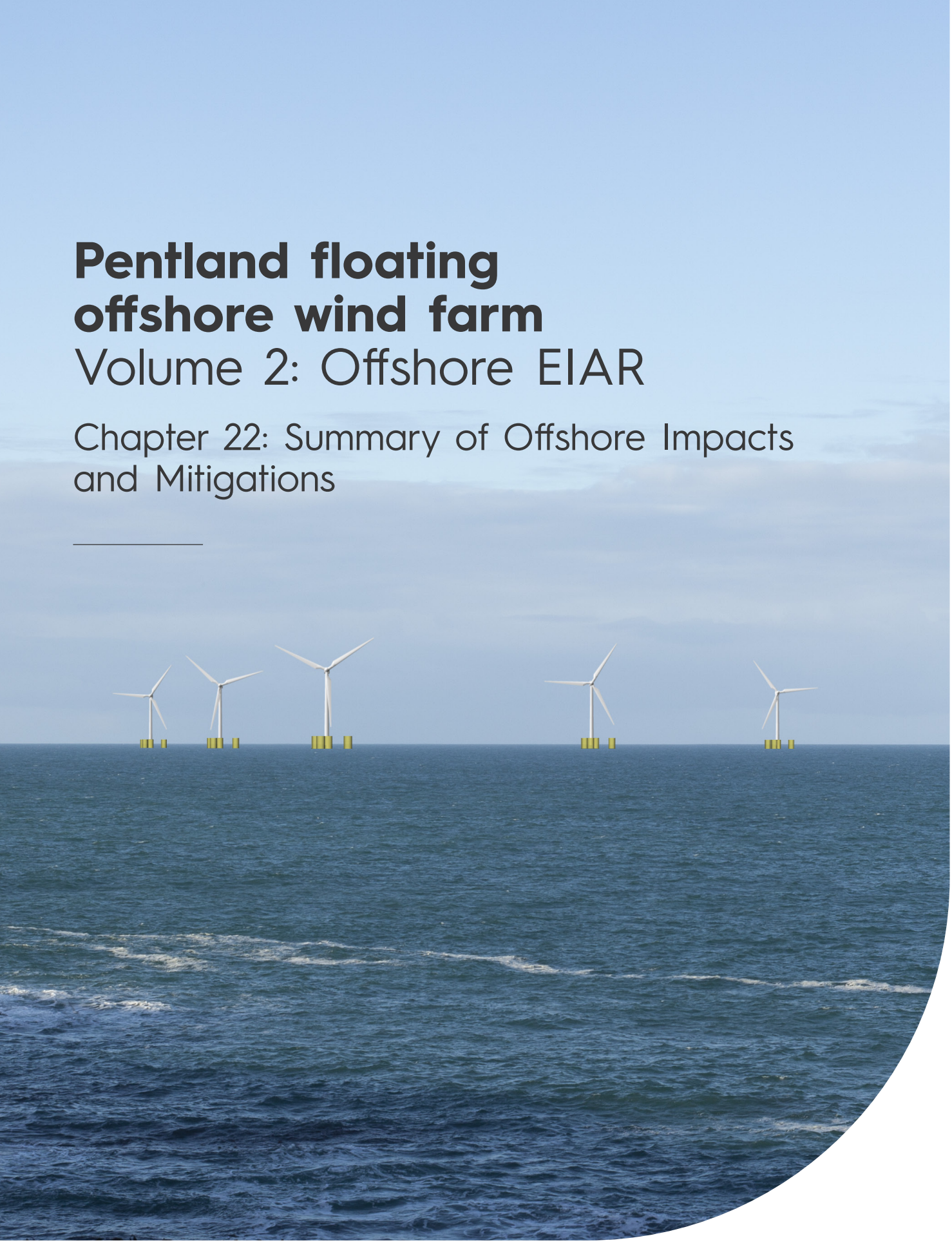
Pentland floating offshore wind farm

Volume 2: Offshore EIAR

Chapter 22: Summary of Offshore Impacts and Mitigations



PENTLAND FLOATING OFFSHORE WIND FARM

OFFSHORE EIAR (VOLUME 2): MAIN REPORT

CHAPTER 22: SUMMARY OF OFFSHORE IMPACTS AND MITIGATIONS

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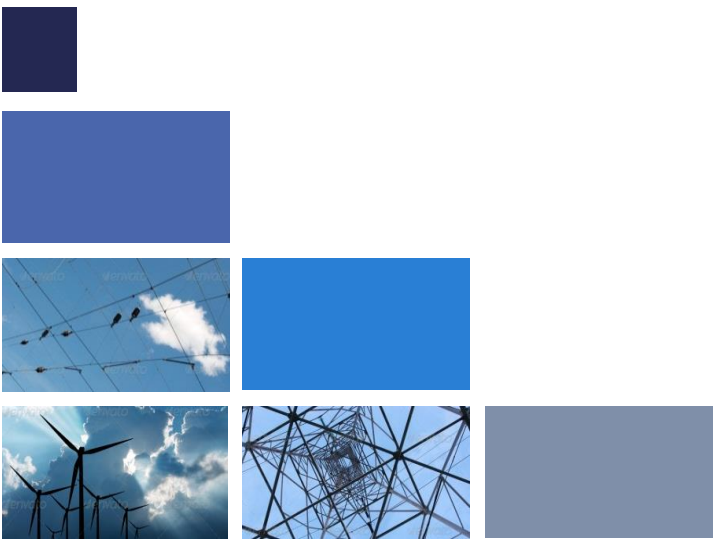

CONTENTS

LIST OF TABLES

GLOSSARY OF PROJECT TERMS

Key Terms	Definition
Dounreay Trì Floating Wind Demonstration Project (the 'Dounreay Trì Project')	The 2017 consented project that was previously owned by Dounreay Trì Limited (in administration) and acquired by Highland Wind Limited (HWL) in 2020. The Dounreay Trì Project consent was for two demonstrator floating Wind Turbine Generators (WTGs) with a marine licence that overlaps with the Offshore Development, as defined. The offshore components of the Dounreay Trì Project consent are no longer being implemented.
Highland Wind Limited	The Developer of the Project (defined below) and the Applicant for the associated consents and licences.
Landfall	The point where the Offshore Export Cable(s) from the PFOWF Array Area, as defined, will be brought ashore.
Offshore Export Cable(s)	The cable(s) that transmits electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OECC)	The area within which the Offshore Export Cable(s) will be located.
Offshore Site	The area encompassing the PFOWF Array Area and OECC, as defined.
Onshore Site	The area encompassing the PFOWF Onshore Transmission Infrastructure, as defined.
Pentland Floating Offshore Wind Farm (PFOWF) Array and Offshore Export Cable(s) (the 'Offshore Development')	All offshore components of the Project (WTGs, inter-array and Offshore Export Cable(s), floating substructures, and all other associated offshore infrastructure) required during operation of the Project, for which HWL are seeking consent. The Offshore Development is the focus of this Environmental Impact Assessment Report.
PFOWF Array	All WTGs, inter-array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the PFOWF Array Area, as defined, excluding the Offshore Export Cable(s).
PFOWF Array Area	The area where the WTGs will be located within the Offshore Site, as defined.
PFOWF Onshore Transmission Infrastructure (the 'Onshore Development')	All onshore components of the Project, including horizontal directional drilling, onshore cables (i.e. those above mean low water springs), transition joint bay, cable joint bays, substation, construction compound, and access (and all other associated infrastructure) across all project phases from development to decommissioning, for which HWL are seeking consent from The Highland Council.
PFOWF Project (the 'Project')	The combined Offshore Development and Onshore Development, as defined.

ACRONYMS AND ABBREVIATIONS

CAA	Civil Aviation Authority
CBRA	Cable Burial Risk Assessment
CES	Crown Estate Scotland's
COLREGS	International Regulations for the Prevention of Collision at Sea
DBA	Desk Based Assessment
DGC	Defence Geographic Centre
DSLP	Design, Specification, and Layout Plan
DSRL	Dounreay Site Restoration Ltd
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Electromagnetic Fields
FIR	Fisheries Industry Representative
FLO	Fisheries Liaison Officer
FMMS	Fisheries Management and Mitigation Strategy
GVA	Gross Value Added
HDD	Horizontal Directional Drilling
HWL	Highland Wind Limited
IEMA	Institute of Environmental Management and Assessment
INNS	Invasive Non-Native Species
LCCA	Local Coastal Character Area
LCT	Landscape Character Types
LCU	Landscape Character Unit
LMP	Lighting and Marking Plan
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MSL	Mean Sea Level
NLB	Northern Lighthouse Board
NOTAM	Notice to Airmen
NRTE	Naval Reactor Test Establishment
NSA	National Scenic Area
OECC	Offshore Export Cable Corridor
OREI	Offshore Renewable Energy Installation
PAD	Protocol for Archaeological Discoveries
PFOWF	Pentland Floating Offshore Wind Farm
SAR	Search and Rescue
SHE	Scottish Hydro Electric
SLA	Special Landscape Area
SLVIA	Seascape, Landscape and Visual Impact Assessment
SOLAS	International Regulations for the Safety of Life at Sea
SSSI	Sites of Special Scientific Interest
STEM	Science, Technology, Engineering and Mathematics
UK	United Kingdom
UK IAIP	United Kingdom Integrated Aeronautical Information Package
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
WLA	Wild Land Area
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator

22 SUMMARY OF OFFSHORE IMPACTS AND MITIGATION

22.1 Introduction

This Chapter of the Offshore Environmental Impact Assessment Report (EIAR) provides a summary of the potential impacts assessed and key conclusions of the EIA undertaken for the Offshore Development. Impacts are summarised for the Offshore Development when considered in isolation and cumulatively with other relevant projects.

The significance of an effect has been determined within each impact assessment chapter by correlating the magnitude of the impact and the sensitivity of the receptor whilst also utilising professional judgement and industry best practice guidance, science, and accepted approaches. A matrix approach has been used throughout for transparency and consistency; further detail is presented in Offshore EIAR (Volume 2): Chapter 6: EIA Methodology; Section 6.4.4. Any deviations from this approach by the technical specialists has been set out in the relevant technical chapters (Offshore EIAR (Volume 2): Chapters 7 to 21). For this Offshore EIAR, any effect with a significance of moderate or greater is generally considered 'significant' in EIA terms and additional mitigations may be required. Effects identified as minor or negligible are generally considered to be 'not significant'.

The potential impacts from the Offshore Development have been assessed using the worst-case parameters established within the Project Design Envelope, with the relevant worst-case parameters for each receptor presented within each receptor topic chapter. Embedded mitigation measures (i.e. those built into the project design and to which PFOWF is committed) that will reduce the potential impacts on specific receptors have also been taken into account during the assessments and are presented in each chapter (Offshore EIAR (Volume 2): Chapters 7 to 21); these are also summarised in this Chapter. Where further mitigation is not feasible, a residual significant effect may remain.

Based on the conclusions of the EIA, the Offshore Development is not expected to result in significant effects for the majority of environmental receptors assessed and where significant effects have been identified to potentially occur, additional mitigation measures are proposed to reduce effects to non-significant levels wherever possible. However, in some cases for seascape, landscape and visual (SLVIA) receptors significant residual effects remain. The likely residual effects are found to be relatively localised, extending approximately 13 km from the PFOWF Array Area and largely affecting an area of the coast and landscape that already has some development characteristics in the form of energy development and onshore wind farms. The localised nature of these effects means that the majority of the landscape and visual receptors assessed will either be unaffected, or will not undergo significant effects.

22.2 Marine Physical Processes

22.2.1 Embedded Mitigation Measures

Table 22.1 Embedded Mitigation Measures – Marine Physical Processes

Embedded Mitigations Measures	Description
Use of Horizontal Directional Drilling (HDD) as the landfall cable installation option	HDD negates the need to pin the export cable to the disused water intake which raised concerns about potential effects on coastal morphology and impacts on Sandside Bay Sites of Special Scientific Interest (SSSI).
Application of scour protection	The Project Design Envelope includes the installation of scour protection around the anchor installations within the Pentland Floating Offshore Wind Farm (PFOWF) Array Area. This will therefore negate the introduction of scour during the Offshore Development operation stage. The potential scale and requirement for scour protection will be informed by scour studies and the selected anchor solution.
Micrositing of Wind Turbine Generators (WTGs) and associated offshore infrastructure including cable routes	The final Project layout will be presented within the Design Specification and Layout Plan (DSLP) and Cable Plan (CaP), which will form conditions of the Section 36 and/or Marine Licence consent. As part of the pre-construction survey (which will be agreed upon with Marine Scotland) data will be analysed to ascertain the locations of the WTGs and cable routes, with the potential for micro-siting of the Project infrastructure.

22.2.2 Summary of Effects

Table 22.2 Summary of Effects on Marine Physical Processes

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction and Decommissioning					
Increase in suspended sediment concentration – PFOWF Array Area	Water column	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Increase in suspended sediment concentration – Offshore Export Cable Corridor (OECC)		Minor Effects	Not Significant		Not Significant
Loss/ alteration of physical seabed characteristics – PFOWF Array Area	Seabed	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Loss/ alteration of physical seabed characteristics – OECC		Minor Effects	Not Significant		Not Significant
Operation and Maintenance					
Changes to tide and wave regime – PFOWF Array Area	Water column	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Changes to tide and wave regime – OECC		Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Changes to sediment transport regime – PFOWF Array Area	Seabed	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Changes to sediment transport regime – OECC		Minor Effects	Not Significant		Not Significant
Introduction of scour – PFOWF Array Area Only	Seabed	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Impacts on fronts and stratification – PFOWF Array Area Only	Water column	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Cumulative					
Increase in suspended sediment concentration – PFOWF Array Area	Water column	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Increase in suspended sediment concentration – OECC		Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Loss / alteration of physical seabed characteristics – OECC only	Seabed	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Changes to tide and wave regime – PFOWF Array Area	Water column	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Changes to tide and wave regime – OECC		Negligible Effects	Not Significant		Not Significant
Changes to sediment transport regime – OECC only	Seabed	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant
Introduction of scour – PFOWF Array Area only	Seabed	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Impacts on fronts and stratification - PFOWF Array Area only	Water column	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 7: Marine Physical Processes; Section 7.5.6 as it was concluded that the effect was not significant.	Not Significant

22.3 Water and Sediment Quality

22.3.1 Embedded Mitigation Measures

Table 22.3 Embedded Mitigation Measures – Water and Sediment Quality

Embedded Mitigations Measures	Description
Nacelle, tower, and rotor design	The nacelle, tower, and rotor are designed and constructed in order to contain leaks thereby reducing the risk of spillage into the marine environment.
Adherence with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the 'BWM Convention')	Ballast water discharges from vessels will be managed under the BWM Convention which aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Measures will be adopted to ensure that the discharge of ballast water with the potential to impact water quality during all Offshore Development stages.
Adherence with the BWM Convention	Aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Measures will be adopted to ensure that the discharge of ballast water with the potential to impact water quality during all Offshore Development stages.
Removal of marine growth	The substructures will be designed to accommodate marine growth; however, to manage weight / drag induced fatigue, growth levels will be inspected regularly, and subsequent removal of this growth will be undertaken using water jetting tools if substantial accumulation is in evidence.

22.3.2 Summary of Effects

Table 22.4 Summary of Effects on Water and Sediment Quality

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction and Decommissioning					
Disturbance and release of contaminated sediments or radioactive particles in sediment – PFOWF Array Area	Seabed sediment and water column in the wider environment	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not Significant
Disturbance and release of contaminated sediments or radioactive particles in sediment – OECC	Seabed sediment and water column in the wider environment	Minor Effects	Not Significant		Not Significant
Changes in water and sediment quality due to accidental release of contaminants, radioactive particles - PFOWF Array Area	Coastal waterbodies	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not Significant
Changes in water and sediment quality due to accidental release of contaminants, radioactive particles - OECC	Coastal waterbodies	Minor Effects	Not Significant		Not Significant
Changes in water and sediment quality and status due to risk of Invasive Non-native Species (INNS) settlement and distribution – PFOWF Array Area	Coastal waterbodies	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Changes in water and sediment quality and status due to risk of INNS settlement and distribution – OECC	Coastal waterbodies	Minor Effects	Not Significant	8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not Significant
Operation and Maintenance					
Changes in water quality due to operational cleaning and painting – PFOWF Array Area only	Coastal waterbodies	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not Significant
Cumulative					
Disturbance and release of contaminated sediments or radioactive particles in sediment during construction and decommissioning	Seabed sediment and water column in the wider environment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not Significant
Changes in water and sediment quality due to accidental release of contaminants, radioactive particles during construction and decommissioning	Coastal waterbodies	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not Significant
Changes in water and sediment quality and status due to risk of INNS	Coastal waterbodies	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
settlement and distribution during construction and decommissioning				beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	
Changes in water quality due to operational cleaning and painting	Coastal waterbodies	Minor Effects	Not significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 8: Water and Sediment Quality; Section 8.5.5; Table 8.22 as it was concluded that the effect was not significant.	Not significant

22.4 Benthic Ecology

22.4.1 Embedded Mitigation Measures

Table 22.5 Embedded Mitigation Measures – Benthic Ecology

Embedded Mitigations Measures	Description
Nacelle, Tower, and Rotor Design	The nacelle, tower, and rotor are designed and constructed to contain leaks thereby reducing the risk of spillage into the marine environment.
Micrositing of WTGs and associated offshore infrastructure including cable routes	The final Project layout will be presented within the Cable Plan (CaP) and Design Specification and Layout Plan (DSLP), conditions of Section 36 and/or Marine Licence consents. These will include any micrositing of infrastructure to avoid sensitive habitats or features. Where possible, the offshore export cable route(s) should aim to avoid more sensitive habitats and where this is not possible, the route should take the shortest distance possible through the sensitive areas.
Target depth of lowering	Static cables will be trenched and buried to a target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. This will provide some separation between the cables and benthic ecology receptors, therefore reducing the effect of Electromagnetic Fields (EMF). The cable burial target depth will be informed by a Cable Burial Risk Assessment (CBRA) and implemented through the CaP produced post-consent.
Reducing habitat loss	Localised habitat loss during the installation phase is an unavoidable consequence of the Offshore Development. Best practices will be followed to ensure that potential habitat loss is reduced (e.g. micrositing and reducing the benthic footprint of the Offshore Development). The amount of rock armour, grout bags, and concrete mattresses used to protect the Offshore Export Cable(s), anchor, and mooring lines will be kept to a minimum where possible.
Removal of marine growth	The substructures will be designed to accommodate marine growth; however, to manage weight/drag-induced fatigue, growth levels will be inspected regularly, and subsequent removal of this growth will be undertaken using water jetting tools if substantial accumulation is in evidence.
Application of scour protection	Scout protection will be installed around the anchor installations within the PFOWF Array Area, where required, based on the detailed design of the final anchor option selected and supporting assessments. This will therefore negate the introduction of scour during the operation and maintenance phase.

22.4.2 Summary of Effects

Table 22.6 Summary of Effects on Benthic Ecology

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Damage from placement of infrastructure (cables, moorings, anchors) on the seabed	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef Habitats	Minor Effects	Not Significant		Not Significant
	Kelp beds - A3.115 - *Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock	Minor Effects	Not Significant		Not Significant
	Ocean quahog	Minor Effects	Not Significant		Not Significant
Suspension of sediments from the installation of subsea infrastructure	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef Habitats	Negligible Effects	Not Significant		Not Significant
	Kelp beds - A3.115 - *Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock	Negligible Effects	Not Significant		Not Significant
	Ocean quahog	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Disturbance of contaminated sediments	Benthic habitats (including ocean quahog and reef epifauna)	Negligible Effects	Not Significant	No mitigation or additional measures have been identified for this effect.	Not Significant
Introduction of marine INNS	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef Habitats	Negligible Effects	Not Significant		Not Significant
	Kelp beds - A3.115 - *Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock	Minor Effects	Not Significant		Not Significant
	Ocean quahog	Negligible Effects	Not Significant		Not Significant
Deposition of drill cuttings	Ocean quahog	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Offshore subtidal sands and gravels	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Operation and Maintenance					
Hydrodynamic changes leading to scour around subsea infrastructure (including mooring lines as result of movement with wave and tides)	Ocean quahog	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Offshore subtidal sands and gravels	Negligible Effects	Not Significant		Not Significant
Introduction of marine INNS	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef habitats	Negligible Effects	Not Significant		Not Significant
	Ocean quahog	Negligible Effects	Not Significant		Not Significant
	Kelp beds	Minor Effects	Not Significant		Not Significant
Colonisation of subsea infrastructure, scour protection, and support structures	Benthic Receptors	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Colonisation of cutting mounds	Benthic Receptors	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
Impact to benthic communities from any EMFs or thermal load arising from the cable during operation.	Benthic Receptors	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
Decommissioning					
Decommissioning effects on Benthic Ecology receptors are not expected to exceed those assessed for the construction phase.					
Cumulative – Construction					
Damage from placement of infrastructure (cables, moorings, anchors) on the seabed	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef Habitats				
	Kelp beds - A3.115 - *Laminaria hyperborea* with dense foliose				

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	red seaweeds on exposed infralittoral rock				
	Ocean quahog				
Installation of subsea infrastructure	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef Habitats				
	Kelp beds - A3.115 - *Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock				
	Ocean quahog				
Disturbance of contaminated sediments	Benthic habitats (including ocean quahog and reef epifauna)	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Introduction of marine INNS	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef Habitats				
	Kelp beds - A3.115 - *Laminaria hyperborea* with dense foliose red seaweeds on exposed infralittoral rock				
	Ocean quahog				
Deposition of drill cuttings	Ocean quahog	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Offshore subtidal sands and gravels				
Cumulative – Operation and Maintenance					
Hydrodynamic changes leading to scour around subsea infrastructure (including mooring lines as a result of movement with drillwaves and tides)	Ocean quahog	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Offshore subtidal sands and gravels				

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Introduction of marine INNS	Offshore subtidal sands and gravels	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
	Stoney and Bedrock Reef habitats				
	Ocean quahog				
	Kelp beds				
Colonisation of subsea infrastructure, scour protection, and support structures	Benthic Receptors	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
Colonisation of cutting mounds	Benthic Receptors	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Impact to benthic communities from any EMFs or thermal load arising from the cable during operation.	Benthic Receptors	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology; Section 9.5.5; Table 9.12, as it was concluded that the effect was not significant.	Not Significant
Cumulative – Decommissioning					
Cumulative decommissioning effects on Benthic Ecology receptors are not expected to exceed those assessed for the construction phase.					

22.5 Fish and Shellfish Ecology

22.5.1 Embedded Mitigation Measures

Table 22.7 Embedded Mitigation Measures – Fish and Shellfish Ecology

Embedded Mitigations Measures	Description
Adherence with the International Convention for the Prevention of Pollution from Ships (MARPOL)	All vessels will operate in adherence with Marine Pollution (MARPOL) requirements. Accordance with this will help to ensure that the potential for release of pollutants is minimised during operation and maintenance.
Micrositing of WTGs and associated offshore infrastructure including cable routes	The final Project layout will be presented within the CaP and DSLP, conditions of the Section 36 and/or Marine License consent As part of the pre-construction survey (which will be agreed with Marine Scotland) data will be analysed to ascertain the presences of any rare or important habitats. If pre-construction surveys were to identify any areas that are considered to be rare or important habitats, consultation with Marine Scotland will be required to ensure that planned installation would not have a significant adverse effect. Where possible, the Offshore Export Cable route(s) should aim to avoid more sensitive habitats and where this is not possible, the route should take the shortest distance possible through the sensitive areas.
Target depth of lowering	Static cables will be trenched and buried to a target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. This will provide some separation between the cables and fish and shellfish ecology receptors, therefore reducing the effect of EMF. The cable burial target depth will be informed by a CBRA and implemented through the CaP produced post-consent.
Reducing localised habitat loss	Localised habitat loss during the installation phase is an unavoidable consequence of the Offshore Development. Best practice will be followed to ensure that potential habitat loss is minimised throughout the proposed works e.g., micrositing and minimising benthic footprint of the Offshore Development. The amount of remedial protection used to protect the Offshore Export Cable(s), anchors and mooring lines will be kept to a minimum where possible.
Nacelle, Tower and Rotor Design	The nacelle, tower and rotor are designed and constructed in order to contain leaks thereby reducing the risk of spillage into the marine environment.
Removal of debris from floating lines and cables	Mooring lines and floating inter-array cables will be inspected with a risk-based frequency during the operational life-cycle of the Offshore Development, starting at a higher frequency and likely declining after a number of years, based on evidence gathered during inspections. Any inspected or detected debris on the floating lines and cables will be recovered based on a risk assessment which considers impact on environment, risk to asset integrity and cost of intervention.
Removal of marine growth	The substructures will be designed to accommodate marine growth; however, in order to manage weight/drag induced fatigue, growth levels will be inspected on a regular basis, and subsequent removal of this growth will be undertaken using water jetting tools if substantial accumulation is in evidence.

22.5.2 Summary of Effects

Table 22.8 Summary of Effects on Fish and Shellfish Ecology

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Disturbance or damage to sensitive species due to underwater noise generated from construction activities	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel	Minor Effects	Not Significant		Not Significant
	All other fish species	Minor Effects	Not Significant		Not Significant
	Shellfish	Minor Effects	Not Significant		Not Significant
Direct habitat loss due to disturbance of spawning and nursery grounds during the installation of cables and placement of anchors and mooring lines on seabed	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel	Minor Effects	Not Significant		Not Significant
	All other fish species	Minor Effects	Not Significant		Not Significant
	Shellfish	Minor Effects	Not Significant		Not Significant
Effects of increased sedimentation / smothering on fish and shellfish during construction activities	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel	Minor Effects	Not Significant		Not Significant
	All other fish species	Minor Effects	Not Significant		Not Significant
	Shellfish	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Temporary burial of seabed from drill cuttings	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel	Minor Effects	Not Significant		Not Significant
	All other fish species	Minor Effects	Not Significant		Not Significant
	Shellfish	Minor Effects	Not Significant		Not Significant
Potential accidental release of pollutants	All fish and shellfish species	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
Operation and Maintenance					
Habitat loss of spawning and nursery grounds due to presence of anchors and cables on the seabed	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel	Minor Effects	Not Significant		Not Significant
	All other fish species	Minor Effects	Not Significant		Not Significant
	Shellfish	Minor Effects	Not Significant		Not Significant
Effects of EMFs from subsea and inter-array cables on sensitive species	Elasmobranch fish	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Diadromous fish	Minor Effects	Not Significant		Not Significant
	Shellfish	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Fish aggregation around the floating structure and associated infrastructure	All fish and shellfish species	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
Decommissioning					
Decommissioning effects are not expected to exceed those assessed for the construction phase.					
Cumulative - Construction					
Disturbance or damage to sensitive species due to underwater noise generated from construction activities	Herring	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel				
	All other fish species				
	Shellfish				
Direct habitat loss due to disturbance of spawning and nursery grounds during the installation of cables and placement of anchors and mooring lines on seabed during the construction phase	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel				
	All other fish species				
	Shellfish				
	Herring	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Effects of increased sedimentation / smothering on fish and shellfish during construction activities	Sandeel			No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	
	All other fish species				
	Shellfish				
Temporary burial of seabed from drill cuttings during the construction phase	Herring	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Sandeel				
	All other fish species				
	Shellfish				
Potential accidental release of pollutants during the construction phase	All fish and shellfish species	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
Cumulative – Operation and Maintenance					
	Herring	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Habitat loss of spawning and nursery grounds due to presence of anchors and cables on the seabed during the operational phase	Sandeel			No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	
	All other fish species				
	Shellfish				
Effects of EMFs from subsea and inter-array cables on sensitive species during the operational phase	Elasmobranch fish	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 10: Fish and Shellfish Ecology; Section 10.5.5; Table 10.13 as it was concluded that the effect was not significant.	Not Significant
	Diadromous fish				
	Shellfish				
Cumulative - Decommissioning					
Cumulative effects are anticipated to be the same or less than those assessed for cumulative construction effects.					

22.6 Marine Mammals and Other Megafauna

22.6.1 Embedded Mitigation Measures

Table 22.9 Embedded Mitigation Measures – Marine Mammals and Other Megafauna

Embedded Mitigations Measures	Description
Removal of marine growth	The substructures will be designed to accommodate marine growth; however, to manage weight / drag-induced fatigue, growth levels will be inspected regularly, and subsequent removal of this growth will be undertaken, using water jetting tools, as required.
Removal of debris from floating lines and cables	The accumulation of marine debris on floating lines and cables has the potential to generate adverse interactions between mobile marine species and project infrastructure. Derelict fishing gears are of particular concern due to the entanglement risk they introduce to marine megafauna, including marine mammals and basking shark. Mooring lines and floating inter-array cables will be inspected during the operation and maintenance phase using a risk-based adaptive management approach. Mooring line and cable inspections are expected to occur at a higher frequency initially and then reduce in frequency over a number of years, with changes to inspection periods based on evidence of risk garnered from the inspections. Any inspected or detected debris on the floating lines and cables will be recovered, based on a risk assessment which considers the impact on the environment, risk to asset integrity, and cost of intervention.
Minimum Spacing between WTGs	The minimum spacing between each WTG (from the centre of each WTG structure) will be 800 m. This will reduce the likelihood of collision and entanglement to marine mammals.
Target depth of lowering	Static cables will be trenched and buried to a target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. This will provide some separation between the cables and basking sharks, therefore reducing the effect of EMF. The cable burial target depth will be informed by a CBRA and implemented through the CaP produced post-consent.

22.6.2 Summary of Effects

Table 22.10 Summary of Effects on Marine Mammals and Other Megafauna

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Noise-related impacts to marine mammals from all construction activities	Minke whales	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
	Bottlenose dolphins	Minor Effects	Not Significant		Not Significant
	Other dolphin species	Negligible Effects	Not Significant		Not Significant
	Harbour porpoise	Negligible Effects	Not Significant		Not Significant
	Harbour seals	Minor Effects	Not Significant		Not Significant
	Grey seals	Minor Effects	Not Significant		Not Significant
Noise-related impacts to basking sharks from low-frequency construction noise	Basking sharks	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Operation and Maintenance					
	Minke whales	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Noise-related impacts to marine mammals from operation and maintenance activities	Dolphin species	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
	Harbour porpoise	Negligible Effects	Not Significant		Not Significant
	Harbour seals	Negligible Effects	Not Significant		Not Significant
	Grey seals	Negligible Effects	Not Significant		Not Significant
Entanglement risk to marine mammals and basking shark	Minke whales	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
	Basking sharks	Minor Effects	Not Significant		Not Significant
	All other marine mammals	Minor Effects	Not Significant		Not Significant
Collision risk to marine mammals and basking shark	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Displacement or barrier effects	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Long-term habitat change – physical presence of mooring lines	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	
Long-term habitat change – introduction of hard substrate	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 and within Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology as it was concluded that the impact was not significant.	Not Significant
Long-term habitat change – emissions of EMFs	Basking sharks	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 and within Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology as it was concluded that the impact was not significant.	Not Significant
	Marine mammals	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 and within Offshore EIAR (Volume 2): Chapter 9: Benthic Ecology as it was concluded that the impact was not significant.	Not Significant
Decommissioning					
Long-term habitat change	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	
Cumulative - Construction					
Noise-related impacts to marine mammals	Harbour porpoise	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
	Bottlenose dolphins	Minor Effects	Not Significant		Not Significant
	White-beaked dolphins	Minor Effects	Not Significant		Not Significant
	Risso's dolphins	Minor Effects	Not Significant		Not Significant
	Common dolphin	Minor Effects	Not Significant		Not Significant
	Minke whales	Minor Effects	Not Significant		Not Significant
	Harbour and grey seals	Minor Effects	Not Significant		Not Significant
Noise-related impacts to basking sharks	Basking sharks	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Cumulative – Operation and Maintenance					
	Minke whales	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Risk of injury from entanglement	All other marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Risk of injury from collision	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Displacement or barrier effects	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Long-term habitat change	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	Not Significant
Cumulative – Decommissioning					
Long-term habitat change	Marine mammals and basking sharks	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 11: Marine Mammals and Other Megafauna; Section 11.5.5 as it was concluded that the impact was not significant.	

22.7 Marine Ornithology

22.7.1 Embedded Mitigation Measures

Table 22.11 Embedded Mitigation Measures – Marine Ornithology

Embedded Mitigations Measures	Description
Minimum Air Gap	Minimum air gap increased to 35 m which is a key measure to minimise collision risk to seabird species. Many seabirds fly close to the sea so that increasing the air gap between the lowest sweep of the turbine blades and the sea surface will reduce the potential for interactions between flying seabirds and the rotating turbine blades.
Revised PFOWF Array Area	Reducing the extent of the PFOWF Array Area helps to minimise displacement and barrier effects by presenting a smaller WTG area for birds to avoid or fly around.

22.7.2 Summary of Effects

Table 22.12 Summary of Effects on Marine Ornithology

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Potential impact of disturbance / displacement / exclusion due to construction noise or physical presence of vessels	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential for a barrier effect due to physical presence of vessels and construction equipment	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential change in habitat / prey availability during construction	Auks (guillemot, razorbill, puffin)	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Kittiwake	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Red-throated diver	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Other species scoped in for assessment	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential increase in suspended sediment affecting visibility during construction	Diving seabirds (guillemot, razorbill, puffin, gannet)	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Operation and Maintenance					
Potential collision risk with operational WTGs	Kittiwake	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Guillemot	Negligible Effects	Not Significant		Not Significant
	Razorbill	Negligible Effects	Not Significant		Not Significant
	Puffin	Negligible Effects	Not Significant		Not Significant
	Fulmar	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Gannet	Minor Effects	Not Significant		Not Significant
	Arctic tern	Negligible Effects	Not Significant		Not Significant
	Great black-backed gull	Minor Effects	Not Significant		Not Significant
	Great skua	Negligible Effects	Not Significant		Not Significant
	Herring gull	Negligible Effects	Not Significant		Not Significant
	Red-throated diver	Negligible Effects	Not Significant		Not Significant
Potential displacement due to physical presence of WTGs	Kittiwake	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Guillemot	Minor Effects	Not Significant		Not Significant
	Razorbill	Minor Effects	Not Significant		Not Significant
	Puffin	Minor Effects	Not Significant		Not Significant
	Fulmar	Negligible Effects	Not Significant		Not Significant
	Gannet	Minor Effects	Not Significant		Not Significant
	Arctic tern	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Great black-backed gull	Negligible Effects	Not Significant		Not Significant
	Great skua	Negligible Effects	Not Significant		Not Significant
	Herring gull	Negligible Effects	Not Significant		Not Significant
	Red-throated diver	Minor Effects	Not Significant		Not Significant
Potential for a barrier effect due to physical presence of WTGs	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential for entanglement with debris caught on mooring lines	Diving seabirds (guillemot, razorbill, puffin, gannet)	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential disturbance / exclusion due to marine noise and maintenance works	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential change in habitat/prey availability due to	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
physical presence of WTGs				2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	
Potential increase in suspended sediment from operations and maintenance work affecting visibility	Diving seabirds (guillemot, razorbill, puffin, gannet)	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Creation of a roosting habitat or foraging opportunities	All bird species scoped in for assessment	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Decommissioning					
Potential impact of disturbance / displacement / exclusion due to decommissioning noise or physical presence of vessels	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential for a barrier effect due to physical presence of vessels and decommissioning equipment	All bird species scoped in for assessment	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Potential change in habitat / prey availability during decommissioning	Auks (guillemot, razorbill, puffin)	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Kittiwake	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Red-throated diver	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Potential increase in suspended sediment affecting visibility during decommissioning	Diving birds (guillemot, razorbill, puffin, gannet)	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Cumulative					
All construction / installation impacts	All bird species scoped in for assessment	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
Operation: collision risk	Kittiwake	No risk of significant additional collision impacts arising from the Offshore Development		No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Fulmar	No risk of significant additional collision impacts arising from the Offshore Development			Not Significant
	Gannet	No risk of significant additional collision impacts arising from the Offshore Development			Not Significant
	Arctic tern	Minor Effects	Not Significant		Not Significant
	Great black-backed gull	No risk of significant additional collision impacts arising from the Offshore Development			Not Significant
	Herring gull	Minor Effects	Not Significant		Not Significant
	Great skua	Minor Effects	Not Significant		Not Significant
	Red-throated diver	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Wildfowl and waders	Minor Effects	Not Significant		Not Significant
Operation: displacement	Kittiwake	No risk of significant additional displacement impacts arising from the Offshore Development		No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
	Guillemot	No risk of significant additional displacement impacts arising from the Offshore Development			Not Significant
	Razorbill	No risk of significant additional displacement impacts arising from the Offshore Development			Not Significant
	Puffin	No risk of significant additional displacement impacts arising from the Offshore Development			Not Significant
	Fulmar	No risk of significant additional displacement impacts arising from the Offshore Development			Not Significant
	Gannet	No risk of significant additional displacement impacts arising from the Offshore Development			Not Significant
	Arctic tern	Minor effects	Not Significant		Not Significant
	Great skua	Minor effects	Not Significant		Not Significant
	Red-throated diver	Minor effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
All other operational impacts	All bird species scoped in for assessment	Minor effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant
All decommissioning impacts	All bird species scoped in for assessment	Minor effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 12: Marine Ornithology; Section 12.5.5 as it was concluded that these effects were not significant.	Not Significant

22.8 Commercial Fisheries

22.8.1 Embedded Mitigation Measures

Table 22.13 Embedded Mitigation Measures – Commercial Fisheries

Embedded Mitigations Measures	Description
Fisheries Liaison Officer (FLO) and Fisheries Industry Representative (FIR)	An FLO and FIR will be appointed to establish effective communications surrounding the Offshore Development with local fishermen and other sea users. The FLO will distribute information on the safe operations of fishing activities at the Offshore Site and will be a contact for fishermen and other sea users during the life-cycle of the Offshore Development. The FIR will liaise with the wider fishing industry. The specific roles and responsibilities will be defined within the Fisheries Management and Mitigation Strategy (FMMS).
Charting Requirements	Prior to construction, the final WTG positions and height will be provided to the United Kingdom Hydrographic Office (UKHO), Ministry of Defence (MoD), and Defence Geographic Centre (DGC) for aviation and nautical charting purposes.
Target depth of lowering	Static cables will be trenched and buried to a minimum target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. The cable burial target depth will be informed by a CBRA and implemented through the CaP produced post-consent.
The International Regulations for the Prevention of Collision at Sea (COLREGs) and the International Regulations for the Safety of Life at Sea (SOLAS)	All vessels will comply with the relevant COLREGS and SOLAS provisions to ensure navigational safety and minimise the risk of equipment snagging. This will include the display of appropriate lights and shapes, such as when vessels are restricted in their ability to manoeuvre.
Procedures for dropped objects and claim processes for loss/damage to fishing gear/vessels.	The FMMS will include protocols and procedures for dropped objects to minimise the risk of equipment snagging on large, dropped objects associated with the Offshore Development.
Notice to Mariners (NtMs), Kingfisher notifications, and other navigational warnings on the location, duration, and nature of works.	HWL will issue NtMs, Kingfisher notifications, and other navigational warnings, as required in a timely and efficient manner. This will ensure navigational safety and minimise the risk of equipment snagging through the appropriate propagation of notices to other sea users.
The use of guard vessels and Offshore Fisheries Liaison Officers, where required.	The appointment of guard vessels and Offshore Fisheries Liaison Officers during construction, major maintenance works and decommissioning works, where required, ensures effective communication with the fishing community during the Offshore Development activities and reduces the potential for interactions with fishing activities. Where possible, guard vessels will be sourced locally and, at a minimum, will be Scottish vessels.

22.8.2 Summary of Effects

Table 22.14 Summary of Effects on Commercial Fisheries

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction / Decommissioning					
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement of fishing activity into other areas	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Potential for fishing gear to become entangled with subsea structures, resulting in damage, loss of fishing gear, or ghost fishing	All Fleets	Tolerable with Mitigation (Not Significant)	Not Significant		Not Significant
Operation and Maintenance					
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users, due to the presence of floating platforms, associated moorings, and safety zone	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	Demersal trawlers - whitefish	Minor Effects	Not Significant		Not Significant
	Demersal trawlers - squid	Minor Effects	Not Significant		Not Significant
	Seine netters	Minor Effects	Not Significant		Not Significant
	Scallop dredgers	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Potential for fishing gear to become entangled with floating and subsea structures, resulting in damage, loss of fishing gear, or ghost fishing	All fleets	Tolerable with Mitigation (Not Significant)	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All other fleets	Negligible Effects	Not Significant		Not Significant
Cumulative					
Loss of access to fishing grounds due to the presence of vessels and safety zones during construction and decommissioning	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Displacement of fishing activity into other areas during construction and decommissioning	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Loss of access to fishing grounds due to the presence of floating platforms, associated moorings, and safety zone	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
Displacement to other fishing grounds resulting in increased pressure on resources or conflict with other sea users during operation and maintenance	Creelers	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant
	All Demersal Trawlers and Seine Netters	Minor Effects	Not Significant		Not Significant
	Scallop Dredges	Minor Effects	Not Significant		Not Significant
	Non-UK fishing fleets	Negligible Effects	Not Significant		Not Significant
	Creelers	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Obstruction of regular fishing vessel transit routes due to the presence of floating platforms and associated moorings	All other fleets	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 13: Commercial Fisheries: Section 13.5.5 as it was concluded that these effects were not significant.	Not Significant

22.9 Shipping and Navigation

22.9.1 Embedded Mitigation Measures

Table 22.15 Embedded Mitigation Measures – Shipping and Navigation

Embedded Mitigations Measures	Description
Marine Guidance Note (MGN) 654 compliance	The Offshore Development will comply with MGN 654 and its annexes as per its consent conditions to ensure that impacts on navigational safety and emergency response are considered, assessed, and mitigated. This includes post-consent completion of the Search and Rescue (SAR) Checklist which includes the production of an Emergency Response Cooperation Plan (ERCoP).
The use of guard vessels and Offshore Fisheries Liaison Officers, where required	The appointment of guard vessels and Offshore Fisheries Liaison Officers during construction, major maintenance works, and decommissioning works, where required, ensures effective communication with the fishing community during the Offshore Development activities and reduces the potential for interactions with fishing activities. Where possible, guard vessels will be sourced locally and, at a minimum, will be Scottish vessels.
Minimum Air Gap	MGN 654 requires that the minimum air gap will be at least 22 m above mean high water springs noting that for floating foundations the value is calculated above Mean Sea Level (MSL) noting that consideration of motion is also required. This clearance is to ensure clearance for SAR activities and avoid allision with vessels – in particular yacht masts. It is noted that the Design Envelope includes a minimum blade clearance of 35 m.
Target depth of lowering	Static cables will be trenched and buried to a minimum target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. The cable burial target depth will be informed by a Cable Burial Risk Assessment and implemented through the Cable Plan produced post-consent.
Buoyed construction area	As agreed in consultation with NLB, construction buoyage will be deployed to mark the PFOWF Array Area. Construction buoyage will be secured through the Lighting and Marking Plan (LMP).
Charting requirements	Prior to construction, the final WTG positions and height will be provided to the UKHO, MoD, and DGC for aviation and nautical charting purposes. All structures of more than 91.4 m in height will be charted on aeronautical charts and reported to the DGC, which maintains the UK's database of tall structures (Digital Vertical Obstruction File) at least 10 weeks prior to construction. Further to this, Highland Wind Limited (HWL) will sign up for the Kingfisher Information Service – Offshore Renewable & Cable Awareness project. This is a joint initiative between the European Subsea Cables Association and the Kingfisher Information Service of Seafish. The Offshore Development infrastructure, including cables mooring lines, anchoring points, as well as WTGs and floating foundations, will be plotted and provided to other sea users to be uploaded on their plotters.

Embedded Mitigations Measures	Description
Notice to Mariners, Kingfisher notifications, and other navigational warnings on the location, duration, and nature of works	HWL will issue NtMs, Kingfisher notifications, and other navigational warnings, as required and in a timely and efficient manner. This will ensure navigational safety and minimise the risk of equipment snagging through the appropriate propagation of notices to other sea users.
Post-consent application for safety zones	Five-hundred-metre safety zones will be applied for during construction, major maintenance, and decommissioning works. These will be centred on the Offshore Renewable Energy Installation (OREI) being worked on at the time. In addition, a 500-m safe passing distance will also be requested around the Offshore Development vessels (e.g. during cable-laying). Operational safety zones are under consideration by the Offshore Development. If statutory operational safety zones are planned, further consultation will be held with stakeholders before making an application, which will be supported by risk-based justification.

22.9.2 Summary of Effects

Table 22.16 Summary of Effects on Shipping and Navigation

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Construction						
Vessel displacement due to construction activities; leading to increased collision risk for third-party vessels and/or reduction in port access	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Vessel-to-vessel collision risk between a third-party vessel and an Offshore Development vessel due to the presence of the Offshore Development vessels	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Vessel to structure allision risk due to the presence of new structures associated with the Offshore Development	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Fishing gear interaction with subsea infrastructure	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Reduction in under keel clearance due to subsea cables / cable protection leading to an increased grounding risk	All vessels	Negligible	Minor	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Operation and Maintenance						
Vessel displacement due to the presence of new structures leading to increased collision risk for third-party vessels and/or reduction in port access	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Vessel-to-vessel collision risk between a third-party vessel and an Offshore Development vessel due to the presence of the Offshore Development vessels	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Commercial vessel to structure allision risk due to the presence of new structures associated with the Offshore Development	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Fishing vessel to structure allision risk due to the presence of new structures associated with the Offshore Development	All vessels	Remote	Moderate	Tolerable with Mitigation (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Tolerable with mitigation and therefore not significant in EIA terms.
Recreational vessel to structure allision risk due to the presence of new structures associated with the Offshore Development	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Anchor interaction with subsea infrastructure	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Fishing gear interaction with subsea infrastructure	All vessels	Remote	Moderate	Tolerable with Mitigation (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Tolerable with mitigation and therefore not significant in EIA terms.
Transiting vessel interaction with subsea infrastructure	All vessels	Remote	Moderate	Tolerable with Mitigation (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Tolerable with mitigation and therefore not significant in EIA terms.
Reduction in under keel clearance due to subsea cables / cable protection leading to an increased grounding risk	All vessels	Negligible	Minor	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Loss of WTG station	All vessels	Negligible	Serious	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Reduction of emergency response capability due to increased incident rates and/or reduced access for SAR responders	All vessels	Extremely Unlikely	Minor	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Decommissioning						
Vessel displacement due to decommissioning activities; leading to increased collision risk for third-party vessels and/or reduction in port access	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Vessel-to-vessel collision risk between a third-party vessel and an Offshore Development vessel due to the presence of the Offshore Development vessels	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Vessel to structure allision risk due to the presence of new structures associated with the Offshore Development	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Fishing gear interaction with subsea infrastructure	All vessels	Extremely Unlikely	Moderate	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

Predicted Effect	User	Frequency	Consequence	Assessment of Significance	Mitigation Identified	Significance of Residual Effect
Reduction in under keel clearance due to subsea cables / cable protection leading to an increased grounding risk	All vessels	Negligible	Minor	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Cumulative (All Phases)						
Vessel displacement due to the presence of project vessels associated with the Scottish Hydro Electric (SHE) Transmission Orkney-Caithness Project	All vessels	Extremely Unlikely	Minor	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.
Reduction in under keel clearance due to subsea cables / cable protection associated with the SHE Transmission Orkney-Caithness Project	All vessels	Extremely Unlikely	Minor	Broadly Acceptable (Not Significant)	No additional mitigation measures have been identified for this effect above and beyond the embedded Offshore Development mitigation listed in Offshore EIAR (Volume 2): Chapter 14: Shipping and Navigation; Section 14.5.5 as it was concluded that the effect was not significant.	Broadly acceptable and therefore not significant in EIA terms.

22.10 Aviation and Radar

22.10.1 Embedded Mitigation Measures

Table 22.17 Embedded Mitigation Measures – Aviation and Radar

Embedded Mitigations Measures	Description
All structures of more than 91.4 m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre, which maintains the UK's database of tall structures (Digital Vertical Obstruction File) at least ten weeks prior to construction.	Consultation with the Civil Aviation Authority (CAA), Maritime and Coastguard Agency (MCA), MoD and Northern Lighthouse Board (NLB) prior to agreement of the LMP and the DSLP. Both the LMP and the DSLP will be conditions of the S.36 Consent and Marine Licence. Measures will be adopted to ensure that the potential risk of aircraft collision with the Offshore Development's infrastructure is minimised.
Any temporary obstacles associated with wind farms which are of more than 91.4 m in height are to be alerted to aircrews by means of the Notice to Airmen (NOTAM) system.	Consultation with the CAA will be required to ensure that temporary obstacles of more than 91.4 m are identified to aircrews by Notice to Airmen (NOTAM). Notification of temporary obstacles will be a condition of the S.36 Consent and Marine Licence. Measures will be adopted to ensure that the potential risk of aircraft collision with the Offshore Development's infrastructure is minimised.
CAA will be informed of the locations, heights and lighting status of the WTGs including estimated and actual dates of construction and the maximum heights of any construction equipment to be used, prior to the start of construction.	Consultation with the CAA will be required. Inclusion of locations, heights, and lighting status of the WTGs on aviation charts and in the United Kingdom Integrated Aeronautical Information Package (UK IAIP) will be a condition of the Section 36 (S.36) Consent and Marine Licence. Measures will be adopted to ensure that the potential risk of aircraft collision with the Offshore Development's infrastructure is minimised.

22.10.2 Summary of Effects

Table 22.18 Summary of Effects on Aviation and Radar

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Potential impact on Wick Airport Instrumental Flight Procedures (IFP) due to the presence of obstacles (WTGs).	Wick Airport IFPs	Negligible Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 15: Aviation and Radar; Table 15.11 as it was concluded that the effect was not significant.	Not Significant
Potential impact on low flying (including SAR) helicopter operations due to the presence of obstacles (WTGs).	Low Flying and UK SAR helicopter operations	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 15: Aviation and Radar; Table 15.11 as it was concluded that the effect was not significant.	Not Significant
Operation and Maintenance					
Potential impact on Wick Airport IFPs due to the presence of obstacles (WTGs).	Wick Airport IFPs	Negligible Effects	Not significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 15: Aviation and Radar; Table 15.11 as it was concluded that the effect was not significant.	Not Significant
Potential impact on low flying (including SAR) helicopter operations due	Low Flying and UK SAR helicopter operations	Minor Effects	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 15: Aviation and Radar;	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
to the presence of obstacles (WTGs).				Table 15.11 as it was concluded that the effect was not significant.	
Decommissioning					
No adverse effects were identified in this phase. Any impacts will be the same, or less, than those identified during the construction phase.					
Cumulative					
No cumulative impact was identified.					

22.11 Seascape, Landscape and Visual Amenity

22.11.1 Embedded Mitigation Measures

Table 22.19 Embedded Mitigation Measures – Seascape, Landscape and Visual Amenity

Embedded Mitigations Measures
There is very limited opportunity to mitigate seascape, landscape and visual effects outwith standard mitigation measures undertaken in the iterative design process. The likely visual effects of different layout scenarios have been investigated in the absence of mitigation measures as part of the review of the worst case scenario layout for the Offshore Development. The iterative design process for the Offshore Development has led to the PFOWF Array Area being halved in size from 20 km^2 to 10 km^2 with the extent of the PFOWF Array Area facing the north Caithness coast being reduced. This has had the effect of notably reducing the horizontal extent of the offshore WTGs with the layout being contained within a much more compact area. Whilst the minimum number of WTGs remains at five, the maximum number of WTGs has reduced from 10 to seven. Furthermore, the size of the PFOWF Array Area has reduced such that it would be located further from shore at its closest point: a minimum of 7.5 km from the north Caithness coast, whilst previously it would have been located approximately 6 km. In respect of some landscape and visual receptors, these changes will reduce to some extent the effects of the Offshore Development. The final design and layout will also be required to take into account other stakeholder requirements such as navigation, commercial fisheries and search and rescue (SAR); and other technical and environmental factors within the PFOWF Array Area.

22.11.2 Summary of Effects

Table 22.20 Summary of Effects on Seascape, Landscape and Visual Amenity

Receptors	Sensitivity	Magnitude of Change	Significance of Effect
Operation and Maintenance			
Landscape Character Types (LCT) / Units			
Farmed Lowland Plain LCT	Medium	Medium-low / Low / No change	Not significant (moderate / minor) No effect
Sandy Beaches and Dune LCT: Sandside Bay Landscape Character Unit (LCU) / Melvich Bay LCU	Medium-high / Medium	Medium	Significant (moderate)
High Cliffs and Sheltered Bays LCT: Melvich to Sandside LCU / Strathy Point to Melvich LCU	Medium-high	Medium-high	Significant (major/moderate)
Sweeping Moorland and Flows LCT	Medium-high / Medium / Medium-low	Medium-high / Medium Low	Significant (major/moderate and moderate) – out to approximately 13 km Not significant (minor) – all remaining parts
Coastal Crofts and Small Farms LCT: Strathy LCU / Melvich and Portskerra LCU	Medium-high	Medium-high	Significant (major/moderate)
Local Coastal Character Areas (LCCA)			
LCCA 47a Crosskirk Bay to White Geos	Medium	Medium-low	Not significant (moderate/minor)
LCCA 47b White Geos to Sandside	Medium	Medium	Significant (moderate)
LCCA 47c Sandside Head to Leac Chailein	Medium-high	Medium-high	Significant (major/moderate)
LCA 47d Leac Chailein to Rhubha Bhra	Medium-high	Medium-high	Significant (major/moderate)

Receptors	Sensitivity	Magnitude of Change	Significance of Effect
Operation and Maintenance			
LCCA 46a Holborn Head to Long Rock	Medium	Medium	Not significant (moderate)
LCCA 46b Long Rock to Crosskirk Bay	Medium	Medium	Not significant (moderate)
LCCA 45a Donald Gear's Geo to Point Ness	Medium-high	Medium-low	Not significant (moderate)
LCCA 44f Easter Head to Donald Gear's Geo	Medium-high	Medium-low	Not significant (moderate)
Rubha Bhra to Strathy Bay	Medium-high	Medium-high	Significant (major/moderate)
Strathy Bay to Strathy Point	Medium-high	Medium-high	Significant (major/moderate)
Landscape Designations			
Kyle of Tongue National Scenic Area (NSA)	High	Low	Not significant (moderate and moderate/minor)
Hoy and West Mainland NSA	High	Low	Not significant (moderate/minor)
Farr Bay, Strathy and Portskerra Special Landscape Area (SLA)	Medium-high	Medium-high / medium Medium-low / low	Significant (moderate/minor) – coastal parts out to approximately 13 km Not significant (moderate and moderate/minor) – all remaining parts
Dunnet Head SLA	Medium-high	Medium-low / low	Not significant (moderate and moderate/minor)
Wild Land Areas			
East Halladale Flows Wild Lands Area (WLA)	Medium-high	Low	Not significant (moderate/minor)
Hoy WLA	Medium-high	Low	Not significant (moderate/minor)
Representative Viewpoints			

Receptors	Sensitivity	Magnitude of Change	Significance of Effect
Operation and Maintenance			
1 Beinn Ratha	Medium-high	Medium-high	Significant (major/moderate)
2 Strathy Point Car Park	Medium-high	Medium-high	Significant (major/moderate)
3 Portskerra/Melvich	Medium-high	Medium-high	Significant (major/moderate)
4 Drum Holliston Car Park	Medium-high	Medium-high	Significant (major/moderate)
5 Sandside Headland	Medium	Medium-high	Significant (moderate)
6 St Mary's Chapel, Forss	Medium-high	Medium-low	Not significant (moderate)
7 Dunnet Head	Medium-high	Medium-low	Not significant (moderate)
8 Scrabster – Stromness Ferry	Medium-high	Medium-low	Not significant (moderate)
9 Old Man of Hoy	High	Low	Not significant (moderate/minor)
10 A836 East of Forss	Medium-high Medium	Medium-low	Not significant (moderate)
11 Ben Griam Beg	Medium-high	Low	Not significant (moderate/minor)
12 Ben Loyal	High	Low	Not significant (moderate/minor)
13 A' Mhoine	High	Low	Not significant (moderate/minor)
14 Ben Dorrery	Medium	Medium-low	Not significant (moderate/minor)
15 Ward Hill, Hoy	Medium-high	Low	Not significant (moderate/minor)
16 Tor Ness, Hoy	Medium-high	Low	Not significant (moderate/minor)

Receptors	Sensitivity	Magnitude of Change	Significance of Effect
Operation and Maintenance			
Principal Visual Receptors			
A836 Eastbound	Medium -high / medium / medium-low	Medium-high / medium Medium-low / low	Significant (major/moderate and moderate) – Strathy to Reay Not significant (moderate, moderate/minor and minor) – all remaining parts
A836 Westbound	Medium -high / medium / medium-low	Medium-high / medium Medium-low / low	Significant (major/moderate and moderate) – Hill of Scrabster to Forss and Reay to Melvich Not significant (moderate, moderate/minor and minor) – all remaining parts
Construction and Decommissioning			
The construction phase will be based around the installation of the WTGs which will have a comparable effect to the effect that will occur during the operational phase. Similarly, the effects during the decommissioning phase, when the WTGs will be uninstalled, will be no greater than the effects assessed in respect of the operational phase.			

Table 22.21 Summary of Cumulative Effects for Seascape, Landscape and Visual Amenity

Receptors	Sensitivity	Scenario 1 Magnitude of Change / Significance of Effect	Scenario 2 Magnitude of Change / Significance of Effect	Scenario 3 Magnitude of Change / Significance of Effect
Cumulative - Operation and Maintenance				
Landscape Character Types / Units				
Farmed Lowland Plain LCT	Medium	Medium-low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)
Sandy Beaches and Dune LCT	Medium-high / Medium	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Medium Significant (moderate)
Cliffs and Sheltered Cliffs and Bay LCT	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Medium Significant (moderate)
Sweeping Moorland and Flows LCT	Medium-high / Medium / Medium-low	Medium / Medium-low / Low Significant (moderate) out to 13 km Not significant in remaining parts	Medium / Medium-low / Low Significant (moderate) out to approximately 10 km Not significant in remaining parts	Medium Significant (moderate) out to approximately 10 km
Coastal Crofts and Small Farms LCT	Medium-high	Limited potential for significant cumulative effects	Medium Significant (moderate)	Medium Significant (moderate)
Local Coastal Character Areas				
LCCA 47a Crosskirk Bay to White Geos	Medium	Medium-low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)

Receptors	Sensitivity	Scenario 1 Magnitude of Change / Significance of Effect	Scenario 2 Magnitude of Change / Significance of Effect	Scenario 3 Magnitude of Change / Significance of Effect
LCCA 47b White Geos to Sandside	Medium	Medium-low Not significant (moderate/minor)	Limited potential for significant cumulative effects	Medium Not significant (moderate)
LCCA 47c Sandside Head to Leac Chailein	Medium-high	Limited potential for significant cumulative effects	Medium Significant (moderate)	Medium Significant (moderate)
LCA 47d Leac Chailein to Rhubha Bhra	Medium-high	Limited potential for significant cumulative effects	Medium Significant (moderate)	Medium Significant (moderate)
LCCA 46a Holborn Head to Long Rock	Medium	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Medium-low Not significant (moderate/minor)
LCCA 46b Long Rock to Crosskirk Bay	Medium	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Medium-low Not significant (moderate/minor)
LCCA 45a Donald Gear's Geo to Point Ness	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low Not significant (moderate/minor)
LCCA 44f Easter Head to Donald Gear's Geo	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Medium-low Not significant (moderate/minor)
Rubha Bhra to Strathy Bay	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Medium Significant (moderate)
Strathy Bay to Strathy Point	Medium-high	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)	Medium Significant (moderate)

Receptors	Sensitivity	Scenario 1 Magnitude of Change / Significance of Effect	Scenario 2 Magnitude of Change / Significance of Effect	Scenario 3 Magnitude of Change / Significance of Effect
Landscape Designations				
Kyle of Tongue NSA	High	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)
Hoy and West Mainland NSA	High	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)
Farr Bay, Strathy and Portskerra SLA	Medium-high	Low Not significant	Medium Significant (moderate) – coastal parts out to approximately 13 km Medium-low / low Not significant (moderate/minor) – all remaining parts	Medium Significant (moderate) – coastal parts out to approximately 13 km Medium-low / low Not significant (moderate/minor) – all remaining parts
Dunnet Head SLA	Medium-high	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)
East Halladale Flows WLA	Medium-high	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)
Hoy WLA	Medium-high	Low	Low	Low Not significant (moderate/minor)

Receptors	Sensitivity	Scenario 1 Magnitude of Change / Significance of Effect	Scenario 2 Magnitude of Change / Significance of Effect	Scenario 3 Magnitude of Change / Significance of Effect
		Not significant (moderate/minor)	Not significant (moderate/minor)	
Representative Viewpoints				
1 Beinn Ratha	Medium-high	Medium Significant (moderate)	Medium Significant (moderate)	Medium Significant (moderate)
2 Strathy Point Car Park	Medium-high	Low Not significant (moderate/minor)	Medium-low Not significant (moderate)	Medium Significant (moderate)
3 Portskerra/Melvich	Medium-high	Limited potential for significant cumulative effects	Medium Significant (moderate)	Medium Significant (moderate)
4 Drum Holliston Car Park	Medium-high	Medium Significant (moderate)	Medium Significant (moderate)	Medium Significant (moderate)
5 Sandside Headland	Medium	Medium Significant (moderate)	Medium Significant (moderate)	Medium Significant (moderate)
6 St Mary's Chapel, Forss	Medium-high	Limited potential for significant cumulative effects	Medium-low Not significant (moderate)	Medium-low Not significant (moderate)
7 Dunnet Head	Medium-high	Low Not significant (moderate/minor)	Low Not significant (moderate/minor)	Medium-low Not significant (moderate)
8 Scrabster – Stromness Ferry	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low

Receptors	Sensitivity	Scenario 1 Magnitude of Change / Significance of Effect	Scenario 2 Magnitude of Change / Significance of Effect	Scenario 3 Magnitude of Change / Significance of Effect
				Not significant (moderate/minor)
9 Old Man of Hoy	High	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low Not significant (moderate/minor)
10 A836 East of Forss	Medium-high Medium	Medium-low Not significant (moderate)	Medium-low Not significant (moderate)	Medium-low Not significant (moderate)
11 Ben Griam Beg	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects
12 Ben Loyal	High	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects
13 A' Mhoine	High	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low Not significant (moderate/minor)
14 Ben Dorrery	Medium	Medium-low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)	Medium-low Not significant (moderate/minor)
15 Ward Hill, Hoy	High	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low Not significant (moderate/minor)
16 Tor Ness, Hoy	Medium-high	Limited potential for significant cumulative effects	Limited potential for significant cumulative effects	Low Not significant (moderate/minor)
Principal Visual Receptors				
A836 eastbound	Medium-high / medium/ medium-low	Medium	Medium	Medium

Receptors	Sensitivity	Scenario 1 Magnitude of Change / Significance of Effect	Scenario 2 Magnitude of Change / Significance of Effect	Scenario 3 Magnitude of Change / Significance of Effect
		Significant – Drum Hollistan to Isauld Medium-low / low Not significant – all remaining sections	Significant –Melvich to Isauld Medium-low / low Not significant – all remaining sections	Significant –Melvich to Isauld Medium-low / low Not significant – all remaining sections
A836 westbound	Medium-high / medium/ medium-low	Medium Significant – Forss to Drum Hollistan Medium-low / low Not significant – all remaining sections	Medium Significant – Forss to Drum Hollistan Medium-low / low Not significant – all remaining sections	Medium Significant – Forss to Drum Hollistan Medium-low / low Not significant – all remaining sections
Cumulative – Construction and Decommissioning				
The residual cumulative effects arising as a result of the construction and decommissioning of the Offshore Development are assessed as being of the same magnitude and significance on all coastal, landscape and visual receptors as those arising due to their operation and maintenance cumulative effects.				

22.12 Marine Archaeology and Cultural Heritage

22.12.1 Embedded Mitigation Measures

Table 22.22 Embedded Mitigation Measures – Marine Archaeology and Cultural Heritage

Embedded Mitigations Measures	Description
Micrositing and Avoidance	Seabed preparation, device locations, cable routing and installation activities will avoid any identified seabed heritage assets and anthropogenic geophysical anomalies by a minimum of 30 m as a result of conducting an historic environment Desk Based Assessment (DBA) using data sources identified above and archaeological review of site-specific commissioned marine geophysical surveys. Final device locations and cable routes will be outlined in the DSLP and the Cable Plan respectively, which will be a condition of the Section 36 and Marine Licence consents.
Cable Protection	Cable protection to reduce seabed scouring will be used if deemed a requirement following a risk-based analysis in order to prevent the potential exposure or disturbance of marine historic environment assets that may lie unidentified below the surface of the seabed. Requirements will be outlined within the Cable Plan, which will be required under the Section 36 and Marine Licence consent conditions.
Reduction in array area and number of WTGs	The likely effects of different layout scenarios on the setting of onshore historic assets have been investigated as part of the review of the worst case scenario layout for the Offshore Development. This process has led to the reduction of the PFOWF Array Area from 20 km^2 to 10 km^2, reducing the horizontal extent of the offshore WTGs. The maximum number of WTGs has been reduced from 10 to seven, and they are now located a minimum of 7.5 km from the north Caithness coast, whilst previously they were located approximately 6 km.

22.12.2 Summary of Effects

Table 22.23 Summary of Effects on Marine Archaeology and Cultural Heritage

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Loss of or damage to unknown marine and intertidal historic environment assets	Unlocated wreckage and other unknown assets	Minor Effects	Not Significant	No additional mitigation measures beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5; Table 17.12.	Not Significant
Loss of or damage to submerged prehistoric landscapes	Submerged prehistoric sites & paleoenvironmental deposits	Minor Effects	Not Significant	No additional mitigation measures beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5; Table 17.12.	Not Significant
Operation and Maintenance					
Loss of or damage to unknown marine and intertidal historic environment assets	Unlocated shipwrecks, aircraft and other unknown assets	Minor Effects	Not Significant	No additional mitigation measures beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5; Table 17.12.	Not Significant
Loss of or damage to submerged prehistoric landscapes	Submerged prehistoric sites & paleoenvironmental deposits	Minor Effects	Not Significant	No additional mitigation measures beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5; Table 17.12.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Adverse changes to the setting of onshore historic environment assets	Sandside Harbour, 1 and 2 Sandside and Fishing Store	Negligible Effects	Not Significant	No mitigation measures are currently proposed for potentially significant effects on setting, above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5 because there are no High magnitude effects on setting that result in a total or major alteration to the baseline setting.	Not Significant
	Cnoc Urray	Minor Effects	Not Significant		Not Significant
	Cnoc Freiceadain	Minor Effects	Not Significant		Not Significant
	Reay Church	Minor Effects	Not Significant		Not Significant
	Sandside House, gardens with carved stones and farm buildings	Minor Effects	Not Significant		Not Significant
	Creag Bhreac Mhor stone rows	Minor Effects	Not Significant		Not Significant
	Crosskirk, St Mary's Chapel and Broch	Minor Effects	Not Significant		Not Significant
	Dunnet Head Lighthouse and Keepers' Houses	Minor Effects	Not Significant		Not Significant
	Bighouse Lodge, Garden Walls and Gate Piers	Minor Effects	Not Significant		Not Significant
	Ben Griam Beg Hillfort	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Bridge of Broubster standing stones	Minor Effects	Not Significant		Not Significant
	Cnoc na Ciste Chambered Cairn, Sordale Hill	Minor Effects	Not Significant		Not Significant
Decommissioning					
No adverse direct or indirect effects on the marine historic environment during decommissioning have been identified.					
Cumulative - Construction					
Loss of or damage to unknown marine and intertidal historic environment assets	Unlocated wreckage and other unknown assets	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5 (instatement of Written Scheme of Investigation (WSI) & Protocols for Archaeological Discovery (PAD)).	Not Significant
Loss of or damage to submerged prehistoric landscapes	Submerged prehistoric sites & paleoenvironmental deposits	Minor Effects	Not Significant	No additional mitigation measures have been identified for this impact above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5 (instatement of WSI & PAD).	Not Significant
Cumulative - Operation and Maintenance					
Loss of or damage to unknown marine and	Unlocated shipwrecks, aircraft	Minor Effects	Not Significant	No additional mitigation measures beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
intertidal historic environment assets	and other unknown assets			and Cultural Setting; Section 17.5.5; Table 17.12.	
Loss of or damage to submerged prehistoric landscapes	Submerged prehistoric sites & paleoenvironmental deposits	Minor Effects	Not Significant	No additional mitigation measures beyond the embedded mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5; Table 17.12.	Not Significant
Adverse changes to the setting of onshore historic environment assets	Sandside Harbour, 1 and 2 Sandside and Fishing Store	Negligible Effects	Not Significant	No mitigation measures are currently proposed for potentially significant effects on setting, above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 17: Marine Archaeology and Cultural Setting; Section 17.5.5 because there are no High magnitude effects on setting that result in a total or major alteration to the baseline setting.	Not Significant
	Cnoc Urray	Minor Effects	Not Significant		Not Significant
	Cnoc Freiceadain	Minor Effects	Not Significant		Not Significant
	Reay Church	Minor Effects	Not Significant		Not Significant
	Sandside House, gardens with carved stones and farm buildings	Minor Effects	Not Significant		Not Significant
	Creag Bhreac Mhor stone rows	Minor Effects	Not Significant		Not Significant
	Crosskirk, St Mary's Chapel and Broch	Minor Effects	Not Significant		Not Significant
	Dunnet Head Lighthouse and Keepers' Houses	Minor Effects	Not Significant		Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Bighouse Lodge, Garden Walls and Gate Piers	Minor Effects	Not Significant		Not Significant
	Ben Griam Beg Hillfort	Minor Effects	Not Significant		Not Significant
	Bridge of Broubster standing stones	Minor Effects	Not Significant		Not Significant
	Cnoc na Ciste Chambered Cairn, Sordale Hill	Minor Effects	Not Significant		Not Significant
Cumulative - Decommissioning					
The removal of WTGs would reverse any setting impacts. Therefore, no adverse effects on the setting of onshore historic assets during decommissioning have been identified.					

22.13 Other Users of the Marine Environment

22.13.1 Embedded Mitigation Measures

Table 22.24 Embedded Mitigation Measures - Other Users of the Marine Environment

Embedded Mitigations Measures	Description
Charting Requirements	Prior to construction, the final WTG positions and height will be provided to the United Kingdom Hydrographic Office, MoD, and Defence Geographic Centre for aviation and nautical charting purposes. Structures greater than 91.4 m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre, which maintains the UK's database of tall structures (Digital Vertical Obstruction File), at least 10 weeks prior to construction.
Promulgation of information as per consent requirements and standard industry practice.	As per required consent conditions, the details of the Offshore Development will be promulgated in advance of and during construction via channels such as NtM and Kingfisher to ensure shipping and navigation users are informed about ongoing and upcoming works.
MoD and Dounreay Site Notification	Due to the proximity of the Dounreay Nuclear Facility and Vulcan Naval Reactor Test Establishment (NRTE), prior to construction, HWL will notify the Dounreay Nuclear Facility and MoD of any offshore works being undertaken and the duration of activities for the Offshore Development for compliance with the security measures for these nuclear sites.
Minimum Spacing between WTGs	The minimum spacing between each WTG (from the centre of each WTG structure) will be 800 m.
Marine Guidance Note (MGN) 654 compliance	The Offshore Development will comply with MGN 654 and its annexes to ensure that impacts on navigational safety and emergency responses are considered, assessed, and mitigated. This includes post-consent completion of the Search and Rescue Checklist, which includes the completion of an Emergency Response Cooperation Plan.
Post-consent application for safety zones	Five-hundred-meter safety zones will be applied for during construction, major maintenance, and decommissioning works. These will be centred on the Offshore Renewable Energy Installation being worked on at the time. In addition, a 500-m advisory safety zone will also be requested around project vessels (e.g. during cable-laying). Operational safety zones are under consideration in terms of their status (advisory or statutory) and extent. If statutory operational safety zones are planned, further consultation will be held with stakeholders before making an application, which will be supported by risk-based justification.
International Regulations for the Prevention of Collision at Sea (COLREGs) and the International Regulations for the Safety of Life at Sea (SOLAS).	All vessels will comply with the relevant COLREGs and SOLAS previsions, including the display of appropriate lights and shapes such as when vessels are restricted in their ability to manoeuvre.
Crossing and Proximity agreements	Crossing and proximity agreements will be sought, if required, with SHE Transmission. These agreements will include the ability of SHE Transmission to access the SHE Transmission Orkney-Caithness Project during construction if required. If such works are required to occur simultaneously, consultation with SHE Transmission will be undertaken.

22.13.2 Summary of Effects

Table 22.25 Summary of Effects on Other Users of the Marine Environment

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction					
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Disruption to Dounreay Site Restoration Ltd (DSRL) remedial and monitoring activities	DSRL remedial and monitoring activities	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Operation and Maintenance					
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	
Obstruction of DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Adverse impact on telecommunication systems	Telecommunication systems	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Decommissioning					
Disturbance of subsea cables	SHE Transmission Orkney-Caithness Project	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant

Predicted Effect	Receptor	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Disruption to DSRL remedial and monitoring activities	DSRL remedial and monitoring activities	Minor Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Interference to the operations of Space Hub Sutherland	Space Hub Sutherland	Negligible Effects	Not Significant	No additional mitigation measures have been identified for these effects above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 18: Other Sea Users of Marine Environment; Section 18.5.5 as it was concluded that these effects were not significant.	Not Significant
Cumulative					
No cumulative effects on Other Users of the Marine Environment are expected to arise. The effects from the Offshore Development alone are assessed as not significant and other developments would be expected to have measures in place to reduce disruption to Other Users of the Marine Environment.					

22.14 Socio-economics, Recreation, and Tourism

22.14.1 Embedded Mitigation and Engagement Measures

Table 22.26 Embedded Mitigation and Engagement Measures – Socio-economics, Recreation and Tourism

Embedded Mitigations Measures	Description
Crown Estate Scotland Commitments	As part of Crown Estate Scotland's (CES's) programme of activity to maximise the value of Supply Chain Development Statement arrangements and support the development of the supply chain, the Project has provided supply chain information to CES. These arrangements mean the Project has disclosed the level and location of supply chain expenditure anticipated by the Project. Reporting and monitoring on these form part of the commitment and will be provided annually to the CES. In the future a summary of the information will also be made publicly available. In providing these details it allows for supply chain objectives and project ambition to maximise the opportunity for the offshore wind sector in Scotland.
Supply Chain Engagement	Initiatives have been created to alert potential regional and local suppliers to the type, scale, and timing of services that are likely to be needed to develop and install the Project. An example of this is a series of 'meet the buyer' events scheduled for the second half of 2022. Such engagement seeks to ensure that economic benefits associated with the Project are realised regionally and locally. 'Meet the buyer' events are expected to help achieve this by providing would-be local suppliers information in advance of the launch of formal tendering processes on aspects such as procurement procedures; types of services required; service specifications; and other information that can help local suppliers to develop competitive bids to supply content to the Project.
Scrabster Harbour Memorandum of Understanding	A memorandum of understanding has been signed with Scrabster Harbour covering the provision of support services during both construction and operational phases. Scrabster Harbour has already provided support services throughout the early development stages of the Project, including vessel mobilisation and demobilisation for geophysical and geotechnical surveys, as well as the commissioning and deployment of wind measuring equipment. The memorandum of understanding seeks to ensure that economic benefits associated with the Project are realised locally.
Secondary School Engagement	Initiatives have been created to support education and training for students from local secondary schools (Thurso and Farr) on Science, Technology, Engineering, and Math (STEM) subjects. The intention is to encourage local school leavers to consider a career in the offshore renewables industry. The initiatives seek to ensure the potential future local workforce is adequately skilled and engaged.
Community Benefits Fund	A funded mechanism supporting local skills and training is expected to be included as a key element of the community benefits fund currently being developed for the Project by HWL working with Foundation Scotland and local stakeholders. The fund seeks to ensure the local workforce is adequately skilled and trained.

22.14.2 Summary of Effects

Table 22.27 Summary of Effects on Socio-economics, Recreation, and Tourism

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Construction and Decommissioning					
Employment effects	Caithness	Moderate effects (beneficial)	Significant	Effects are expected to be positive, and no mitigation is required.	Significant
	Highland	Major effects (beneficial)	Significant	Effects are expected to be positive, and no mitigation is required.	Significant
	Scotland	Minor effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
	UK	Negligible effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
Gross Value Added (GVA) effects	Caithness	Minor effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
	Highland	Minor effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
	Scotland	Negligible effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
	UK	Negligible effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
	Caithness	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Demand for Housing and Other Services	Highland	Minor effects (adverse)	Not Significant	embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Minor effects (adverse)	Not Significant		Not Significant
	UK	Minor effects (adverse)	Not Significant		Not Significant
Tourism	Caithness	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Highland	Minor effects (adverse)	Not Significant		Not Significant
	Scotland	Negligible effects (adverse)	Not Significant		Not Significant
	UK	Negligible effects (adverse)	Not Significant		Not Significant
Operation and Maintenance					
Employment effects	Caithness	Major effects (beneficial)	Significant	Effects are expected to be positive and no additional mitigation measures are required.	Significant
	Highland	Minor effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Scotland	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
GVA effects	Caithness	Moderate effects (beneficial)	Significant	Effects are expected to be positive and no additional mitigation measures are required.	Significant
	Highland	Minor effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				(Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	
Demand for Housing and Other Services	Caithness	Moderate effects (adverse)	Significant	Additional mitigation to be secured through the development and implementation of a Project Accommodation Strategy.	Not Significant
	Highland	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
Tourism	Caithness	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation,	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	
	Highland	Negligible effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Negligible effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
Cumulative – Construction and Decommissioning					
Employment effects	Caithness	Moderate effects (beneficial)	Significant	Effects are expected to be positive, and no mitigation is required.	Significant
	Highland	Major effects (beneficial)	Significant	Effects are expected to be positive, and no mitigation is required.	Significant
	Scotland	Minor effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	UK	Negligible effects (beneficial)	Not Significant	Effects are expected to be positive, and no mitigation is required.	Not Significant
GVA effects	Caithness	Moderate effects (beneficial)	Significant	Effects are expected to be positive and no additional mitigation measures are required.	Significant
	Highland	Minor effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
Demand for Housing and Local Services	Caithness	Moderate effects (adverse)	Significant	Additional mitigation to be secured through the development and implementation of a Project Accommodation Strategy.	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Highland	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
Tourism	Caithness	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Highland	Negligible effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation,	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	
	Scotland	Negligible effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
Cumulative – Operation and Maintenance					
Employment effects	Caithness	Major effects (beneficial)	Significant	Effects are expected to be positive and no additional mitigation measures are required.	Significant
	Highland	Minor effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation,	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
				and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	
	UK	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
GVA effects	Caithness	Moderate effects (beneficial)	Significant	Effects are expected to be positive and no additional mitigation measures are required.	Significant
	Highland	Minor effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Negligible effects (beneficial)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
Demand for Housing and Local Services	Caithness	Moderate effects (adverse)	Significant	Additional mitigation to be secured through the development and implementation of a Project Accommodation Strategy.	Not Significant
	Highland	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
Tourism	Caithness	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant

Predicted Effect	Study Area	Assessment Consequence	Significance	Mitigation Identified	Significance of Residual Effect
	Highland	Negligible effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	Scotland	Negligible effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant
	UK	Minor effects (adverse)	Not Significant	No additional mitigation measures have been identified for this effect above and beyond the embedded project mitigation listed in Offshore EIAR (Volume 2): Chapter 19: Socio-economics, Recreation, and Tourism; Section 19.5.5 as it was concluded that the effect was not significant	Not Significant

22.15 Climate Change and Carbon

22.15.1 Embedded Mitigation Measures[1]

Table 22.28 Embedded Mitigation Measures – Climate Change and Carbon (Climate Resilience)

Embedded Mitigations Measures	Description
Target Depth of Lowering	Static cables will be trenched and buried to a target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. The cable burial target depth will be informed by a Cable Burial Risk Assessment (CBRA) and implemented through the Cable Plan (CaP) produced post-consent.
Removal of marine growth	The substructures will be designed to accommodate marine growth; however, to manage weight / drag induced fatigue, growth levels will be inspected regularly, and subsequent removal of this growth will be undertaken using water jetting tools if substantial accumulation is in evidence.

Table 22.29 Embedded Mitigation Measures – Climate Change and Carbon (In-combination Climate Assessment)

Embedded Mitigations Measures	Description
Adherence with the International Convention for the Prevention of Pollution from Ships (MARPOL)	All vessels will adhere to MARPOL requirements. Accordance with this will help to ensure that the potential for release of pollutants is minimised during operations.
Adherence with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the "BWM Convention')	Ballast water discharges from vessels will be managed under the BWM Convention which aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Measures will be adopted to ensure that the risk of Invasive Non-Native Species introduction during construction, operation and maintenance, and decommissioning is minimised.
Micrositing of WTGs and associated offshore infrastructure, including cable routes	The final Offshore Development layout will be presented within the Cable Plan and Design Specification and Layout Plan and conditions of the Section 36 Consent and/or Marine Licence. The final placement of infrastructure will be informed through micrositing based on available site survey data to ensure avoidance of sensitive habitats and structures where possible. Where this is not possible, the route will take the shortest distance possible through the sensitive areas to reduce environmental effects.
Removal of debris from floating lines and cables	The accumulation of marine debris on floating lines and cables has the potential to generate adverse interactions between mobile marine species and Offshore Development infrastructure. Derelict fishing gears are of particular concern due to the entanglement risk they introduce to marine megafauna, including marine mammals, sharks, and turtles. Mooring lines and floating inter-array cables will be inspected with a risk-based frequency during the operational life-cycle of the Offshore Development. Starting at a higher frequency and likely declining after several years.

[1] There were no specific embedded mitigation measures identified from the blue carbon and carbon assessments.

Embedded Mitigations Measures	Description
	Any inspected or detected debris on the floating lines and cables will be recovered based on a risk assessment taking impact on the environment, risk to asset integrity and cost into account.
Removal of marine growth	The substructures will be designed to accommodate marine growth; however, in order to manage weight/ drag induced fatigue, growth levels will be inspected on a regular basis, and subsequent removal of this growth will be undertaken using water jetting tools if substantial accumulation is in evidence.
Minimum Air Gap	The minimum air gap increased to 35 m, which is a key measure to minimise collision risk to seabird species.
Use of HDD as the landfall cable installation option	HDD negates the need to pin the export cable to the disused water intake which raised concerns about potential effects on coastal morphology and impacts on Sandside Bay SSSI.
Scour protection	The Design Envelope is to install scour protection around the anchor installations within the PFOWF Array Area. This will therefore negate the introduction of scour during the Offshore Development's operation and maintenance phase.
Minimum spacing between WTGs	The minimum spacing between each WTG (from the centre of each WTG structure) will be 800 m. This will reduce the likelihood of collision and entanglement with marine mammals.
Target depth of lowering	Static cables will be trenched and buried to a target depth of 0.6 m. Where this cannot be achieved, remedial cable protection will be applied. This will provide some separation between the cables and benthic ecology receptors, fish and shellfish ecology receptors, and basking sharks, therefore reducing the effect of EMF. The cable burial target depth will be informed by a CBRA and implemented through the CaP produced post-consent.

22.15.2 Summary of Effects

Table 22.30 Summary of Effects on Climate Change and Carbon

Assessment	Summary	Significance	Mitigation Identified	Significance of Residual Effect
Climate Resilience Review	The Offshore Development infrastructure was assessed as having a minor risk level for resilience against projected changes from: > Increased frequency of high wind events; > Increased mean maximum wave heights; > Increased air and sea temperature; and > Sea level rise and coastal erosion.	No significant effects identified.	There is no requirement for additional mitigation over and above the embedded and specific mitigation measures proposed in Offshore EIAR (Volume 2): Chapters 7 to 21.	No significant effects identified.
In-combination Climate Impact Assessment	The consequence of the in-combination climate impact for the receptors considered within the EIAR was assessed as minor for all receptors.	No significant effects identified.	There is no requirement for additional mitigation over and above the embedded and specific mitigation measures proposed in Offshore EIAR (Volume 2): Chapters 7 to 21.	No significant effects identified.
Blue Carbon Assessment	The activities associated with the Offshore Development are unlikely to impact the carbon sequestration potential of the immediate seabed and associated habitats, based on the localised spatial change and low frequency of disturbance / loss expected to occur through the life-cycle of the Offshore Development. As such effects are assessed as minor.	No significant effects identified.	There is no requirement for additional mitigation over and above the embedded and specific mitigation measures proposed in Offshore EIAR (Volume 2): Chapters 7 to 21.	No significant effects identified.

Assessment	Summary	Significance	Mitigation Identified	Significance of Residual Effect
Carbon Assessment	The carbon assessment demonstrates that the Offshore Development under either scenario, will make a positive contribution to the UK Carbon Budgets, avoiding emissions that would have been associated with more carbon-intensive forms of electricity generation. As such effects are assessed as minor	No significant effects identified.	There is no requirement for additional mitigation over and above the embedded and specific mitigation measures proposed in Offshore EIAR (Volume 2): Chapters 7 to 21.	No significant effects identified.

22.16 Risk of Major Accidents and/or Disasters

22.16.1 Embedded Mitigation Measures

Table 22.31 Embedded Mitigation Measures - Major Accidents and Disasters

Title	Description
Minimum Spacing between WTGs	The minimum spacing between each WTG (from the centre of each WTG structure) will be 800 m.
Fisheries Liaison Officer (FLO)	A FLO will be appointed to establish effective communications surrounding the Offshore Development with local fishermen and other sea users. The FLO will distribute information on the safe operations of fishing activities at the site and will be a contact for fishermen and other sea users during the lifetime of the Offshore Development.
Notice to Mariners (NtMs), Kingfisher notifications and other navigational warnings on the location, duration and nature of works.	HWL will issue NtMs, Kingfisher notifications and other navigational warnings, as required and in a timely and efficient manner. This ensures navigational safety and minimises the risk of equipment snagging through the appropriate propagation of notices to other sea users.
Nacelle, Tower and Rotor Design	The nacelle, tower and rotor are designed and constructed in order to contain leaks thereby reducing the risk of spillage into the marine environment.
Marine Guidance Note (MGN) 654 compliance	The Offshore Development will comply with MGN 654 and its annexes as per its consent conditions to ensure that impacts on navigational safety and emergency response are considered, assessed and mitigated where necessary. This includes post-consent completion of the Search and Rescue Checklist, which includes the completion of an ERCoP.
The use of guard vessels and Offshore Fisheries Liaison Officers (OFLOs), where required.	The appointment of guard vessels and OFLOs during construction, major maintenance works and decommissioning works, where required ensures effective communication with the fishing community during the Offshore Development activities and reduces the potential for interactions with fishing activities.
Unexploded Ordnance (UXO)	UXO will be identified through pre-construction surveys. UXO will be avoided where possible. However, if further mitigation such as clearance or detonation is required, this would be subject to separate assessment and applications.

22.16.2 Summary of Effects

From the risk assessment undertaken in Offshore EIAR (Volume 2): Chapter 21 Major Accidents and Disasters, there are no significant residual effects anticipated arising from the Offshore Development, or for which the Offshore Development is vulnerable. As such no residual risk assessment is required as per the Institute of Environmental Management and Assessment (IEMA) Guidance.