



Offshore Wind Power Limited

West of Orkney Windfarm Onshore EIA Report

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18 OFFSHORE EIA SUMMARY

18.1 Introduction

This chapter summarises the potential effects of the offshore Project to enable a complete understanding of the Project as a whole and to ensure this information is clearly communicated to The Highland Council (THC) and stakeholders. The Offshore Environmental Impact Assessment (EIA) Report was submitted to the Scottish Ministers (via Marine Directorate - Licensing Operations Team (MD-LOT)) in September 2023, in support of applications for Section 36 Consent, Section 36A Declaration (under the Electricity Act 1989) and Marine Licences (under the Marine and Coastal Access Act 2009 and the Marine (Scotland) Act 2010).

Electronic copies of the Offshore EIA Report are available to download on the Marine Directorate¹ and West of Orkney Windfarm² websites.

18.2 Offshore Project overview

18.2.1 Key components

The offshore Project area, shown in Figure 18-1, includes the array area and the offshore Export Cable Corridor (ECC). The array area reflects the Option Agreement Area (OAA) awarded to Offshore Wind Power Limited (OWPL) through the ScotWind Leasing Round within the N1 Plan Option (PO) area and is located approximately 23 kilometres (km) from the north coast of Scotland and 28 km from the west coast of Hoy, Orkney. The offshore Project is composed of the following:

- Up to 125 Wind Turbine Generators (WTGs) with fixed-bottom foundations (monopile, piled jacket or suction bucket jacket);
- Up to five High Voltage Alternating Current (HVAC) Offshore substation platforms (OSPs);
- Up to 500 km of inter-array cables between the WTGs and OSPs;
- Up to 150 km of interconnector cables between the OSPs; and
- Up to five offshore export cables from the OSPs to landfalls at Greeny Geo and/or Crosskirk at Caithness, with a total length of up to 320 km (average of 64 km per offshore export cable).

¹ <https://marine.gov.scot/marine-projects>.

² <https://www.westoforkney.com/>.

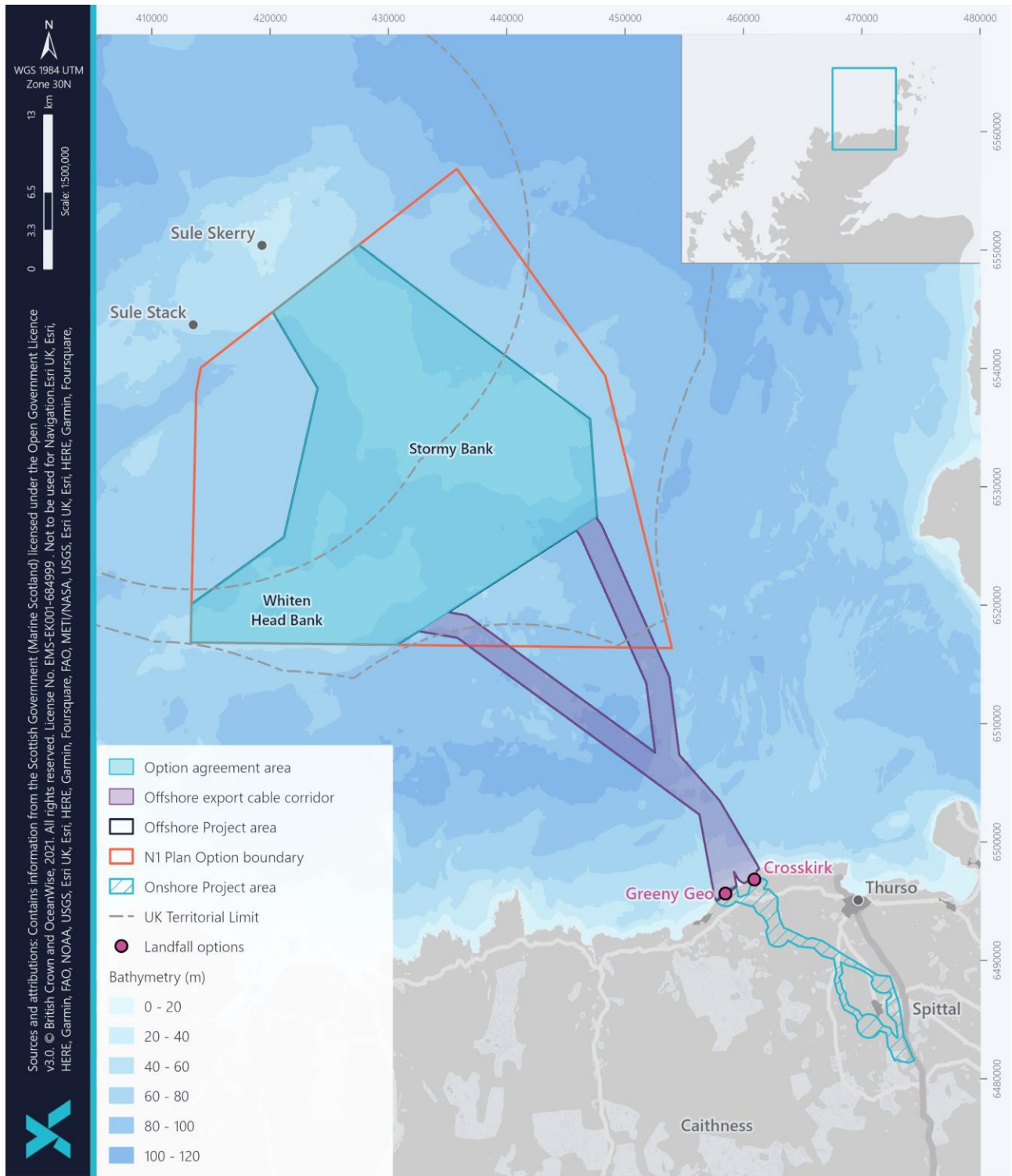


Figure 18-1 Offshore Project overview



18.2.2 Construction

It is anticipated that the construction of the offshore Project will take up to four years ahead of which there will be the need for pre-construction activities. Construction works would preferably occur during the months April to September (inclusive) and typically be undertaken 24 hours a day, seven days a week offshore, dependent upon weather conditions. The general series of activities is outlined in Table 18-1.

Table 18-1 Outline of offshore construction activities

ACTIVITY	DESCRIPTION
Pre-construction surveys and site investigations	Pre-construction surveys and site investigations will be undertaken, including geophysical surveys which may include Multi-Beam Echo Sounder (MBES), Side-Scan Sonar (SSS) and magnetometer. The requirement for these surveys and site investigations will be determined following the engineering design phase and post-consent conditions.
Site and seabed preparation	<p>Site preparation activities may be required including Unexploded Ordnance (UXO) clearance, boulder clearance, pre-lay grapnel runs, bedform clearance³ and dredging.</p> <p>Exact requirements for boulder clearance and dredging will only be confirmed during the next stage of the Project design process. Environmental impacts from these activities have been assessed to the extent that it is possible based on current available information in the Offshore EIA Report. Separate Marine Licence applications, with all appropriate supporting information will be made separately and subject to additional consultation.</p> <p>The UXO clearance procedure would also be subject to an agreed method statement detailed within a separate Marine Licence application submitted post-consent.</p>
WTG foundation installation	The WTGs will be supported by fixed-bottom foundations. The specific technology and makeup of the WTG foundations has not yet been selected, and the final technology selection will be driven by a range of environmental, technical and commercial variables, as technologies and methodologies continue to evolve. The design options being considered for the offshore Project include monopiles and jacket foundations (piled or suction buckets).
OSP installation	<p>A maximum of five OSPs are required for the offshore Project. They will collect, transform and export the power generated by the WTGs. OSP foundations are pre-installed ahead of the topside structure. OSP foundations will either be pre-piled (i.e. piled in advance of the jacket structure being placed on the seabed) or post-piled.</p> <p>The topsides will be manufactured onshore and equipped with all electrical and mechanical equipment prior to being transported offshore to be installed atop the OSP foundations. The topsides will be grouted or bolted to the foundation. The OSP topsides will be installed by a semi-submersible crane vessel.</p>

³ Bedforms include sandwave bedforms, bedform fields comprising of sand and gravel, megaripples and rippled scour depressions which are present in different areas across the offshore Project area (see chapter 8: Marine physical and coastal processes of the offshore Project EIA Report for further information).



ACTIVITY	DESCRIPTION
Inter-array and interconnector cable installation	<p>Inter-array cables carry the electrical current produced by the WTGs and connect them to the OSPs. The primary method of installation is to bury the cable under the seabed to a target depth of 1 - 3 metres (m), and this is also the primary approach to protecting the cable itself. External protection options include concrete mattresses, rock placement, rock bags, grout bags, cement bags, sandbags, articulated pipes, cast iron shells, bend restrictors and vortex-induced suppression strakes. Such options will only be used where adequate burial is not achievable or additional protection is required.</p>
Offshore export cable installation	<p>The offshore export cables each correspond to an HVAC submarine power cable system consisting of a three-core armoured submarine power cable with one (or more) fibre optic units embedded in the main submarine cable. The offshore export cables export energy from the OSPs to the onshore export cables via the offshore / onshore interface at the landfalls. Up to five offshore export cables will be required to the landfall(s) at Caithness. Each offshore export cable will be installed in a separate trench within the offshore ECC. At approximately 13 km from the landfall(s), the offshore ECC diverges into two cable route options, to the east and west of the OAA (Figure 18-1). One or both of the landfall options may be utilised.</p> <p>The primary method of installation is to bury the cable under the seabed, and this is also the primary approach to protecting the cable itself. External protection options include concrete mattresses, rock placement, rock bags, grout bags, cement bags, sandbags, articulated pipes, cast iron shells, bend restrictors and vortex-induced suppression strakes. These will only be used where adequate burial is not achievable and/or additional protection is required.</p>
WTG installation / commissioning	<p>The WTGs convert wind energy to electricity and consist of rotor blades, towers, gearboxes, transformers, power electronics and control equipment.</p> <p>The WTGs will be installed following the installation of the foundations. The WTGs will be transported via a vessel from the construction base to the OAA for installation, either by a self-propelled installation vessel or transport barge. The assembly and construction base(s) has not yet been identified, as this is dependent on the Project-specific requirements based on the final design, the availability of ports at the time of construction and practical considerations, such as local facilities and ease of access.</p> <p>The exact approach for the installation of the WTGs depends on the final WTG design option and the installation contractor. This will be determined post-consent. Following installation of the WTG and connection to the inter-array cabling and wider infrastructure, a process of testing and commissioning will be undertaken.</p>

18.2.3 Operation and maintenance

An Operator will be appointed by the Project who is responsible for the co-ordination and execution of the operation and maintenance activities, including Health and Safety and Environment (HSE) management. The Operator will employ remote monitoring of the offshore Project, either from an onshore operation and maintenance base or another location. Options for the onshore operation and maintenance base are currently being considered and work has already been undertaken to assess Scottish port capabilities to understand the viability of options available to meet the Project requirements. It is anticipated that the Project will be managed from a local onshore facility for the lifecycle of the Project.

During the operations period, the following classifications of maintenance may be required:

- Scheduled / preventative maintenance;



- Correction of unplanned events (either remotely or through the attendance of technicians and/or trouble-shooters);
- Major component replacement; and
- Remote monitoring and routine inspections.

It is anticipated that routine maintenance will be provided through Service Operated Vessels (SOVs), Crew Transfer Vessels (CTVs), daughter craft, Remote Operated Vehicle Support Vessels (ROVSVs) and helicopters. Any major exchanges may require the use of jack-up barges or semi-submersible crane vessels.

18.2.4 Decommissioning

The Energy Act 2004, as amended by the Scotland Act 2016 contains statutory requirements in relation to the decommissioning of offshore renewable energy installations and requires the offshore Project to provide a Decommissioning Programme, supported by appropriate financial security, prior to construction. The Decommissioning Programme will follow the guidance found in the Scottish Government's 'Decommissioning of Offshore Renewable Energy Installations in Scottish Waters or in the Scottish Part of the Renewable Energy Zone under the Energy Act 2004' guidance note (Scottish Government, 2022) and 'Guidance Notes on Decommissioning of Offshore Renewable Energy Installations under the Energy Act 2004' from the United Kingdom (UK) Department for Business Energy and Industrial Strategy (BEIS) (BEIS, 2019). Decommissioning activities will comply with all relevant legislation at that time and best practice at the time of decommissioning will be followed.

Throughout the offshore Project lifespan, the Decommissioning Programme will be reviewed and updated every five years. Consultee bodies listed in the S105 Notices⁴, and any additional consultees identified by MD-LOT or OWPL will be provided with the opportunity to comment on the Decommissioning Programme prior to it being finalised. It is anticipated that the final revision process will commence two years prior to the initiation of decommissioning activities. Best practice will be followed when developing a Decommissioning Programme.

18.3 Summary of the Offshore EIA Report

The Offshore EIA Report assesses the potential effects of the offshore Project on the receiving environment, including direct, indirect, cumulative, inter-related, whole project assessment and transboundary effects.

The following topics were scoped in for assessment within the Offshore EIA Report:

- Chapter 8: Marine physical and coastal processes;
- Chapter 9: Water and sediment quality;
- Chapter 10: Benthic subtidal and intertidal ecology;
- Chapter 11: Fish and shellfish ecology;
- Chapter 12: Marine mammals and megafauna;
- Chapter 13: Offshore and intertidal ornithology;
- Chapter 14: Commercial fisheries;
- Chapter 15: Shipping and navigation;
- Chapter 16: Marine archaeology and cultural heritage;

⁴ Section 105 notices are issued under the Energy Act 2004 (as amended) following consent of a Marine Licence, after which the Applicant must submit a Decommissioning Programme including details on the costs and financial securities for decommissioning.



- Chapter 17: Military and aviation;
- Chapter 18: Seascape, landscape and visual impact assessment (SLVIA);
- Chapter 19: Socio-economics; and
- Chapter 20: Other sea users.

A summary of the assessment of effects presented within each topic-specific assessment for the Offshore EIA Report is provided in the following sections, including an overview of key receptors and the assessment conclusions.

18.3.1 Chapter 8: Marine physical and coastal processes

Marine physical and coastal processes receptors include the seabed, the coast at the export cable landfall location (seaward of Mean High Water Springs (MHWS)), designated sites with physical receptors, tidal currents, wave climate and the sediment transport regime. The assessment also characterised a number of pathways, such as sediment transport, which can have consequences for the assessment of impacts on other receptors.

The baseline was characterised using a combination of data from site-specific geophysical, environmental and reconnaissance geotechnical baseline surveys conducted in 2022 and desk-based studies. The key features in the study area include Whiten Head Bank and Stormy Bank within the OAA, Sites of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) Sites located on the north coast of Caithness. The two bank features in the OAA are stable with no evidence of migration. Water depths within the OAA range between approximately 41 m Lowest Astronomical Tide (LAT) and 90 m LAT with the shallowest areas located on the two banks. Surface sediments are mostly sandy and quite coarse, with significant quantities of gravel also making a considerable component in places and areas of exposed bedrock. Boulders are also a common feature, with extensive areas, known as boulder fields, characterised as having medium to high boulder density. The coastline where the offshore ECC landfall(s) will occur is characterised by hard and mixed substrate which is considered to be erosion resistant with the presence of exposed bedrock.

It should be noted that dredging and boulder clearance are two key sources of impact. However, details on the boulder clearance and dredging activities are yet to be confirmed and, if required, will be subject to separate Marine Licence applications. Environmental impacts from these activities have been assessed to the extent that it is possible for the offshore EIA.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Change to seabed levels, sediment properties and suspended sediment concentrations;
 - Impact on designated features within the designated sites due to export cable construction; and
 - Change to coastal landfall morphology.
- Operation and maintenance:
 - Change to the tidal, wave and sediment transport regimes resulting in impacts on morphology and coast receptors;
 - Introduction of scour;
 - Changes to water column structure with impact to stratification; and
 - Re-exposure of buried cables at landfall and changes to coastal processes and landfall morphology from remedial protection measures.



The assessment was informed by site-specific data and the 'West of Orkney' numerical model. NatureScot and Marine Scotland Science were consulted with during the EIA, with regards to the scope and input data for the model. It was concluded that impacts would be highly localised and no significant effects to any marine physical and coastal processes receptors are predicted, either for the offshore Project alone, or cumulatively with other developments adjacent to the offshore Project. In addition, there will be no direct impacts on the intertidal area due to the use of trenchless landfall technology Horizontal Directional Drilling (HDD) at the landfall. No secondary mitigation or monitoring requirements were proposed.

18.3.2 Chapter 9: Water and sediment quality

The water and sediment quality assessment considered any potential reductions in water and sediment quality resulting from the offshore Project and assesses the potential effects on designated waters⁵.

The baseline characterisation was informed by a combination of site-specific surveys (including water and sediment sampling and contaminants analysis) and desk-based studies. There are two designated waterbodies that overlap the offshore Project area, Strathy Point to Dunnet Head (cable export corridor at the landfall) and Sule Skerry and Sule Stack (extreme north of OAA), both defined as being in high or good condition. The Cape Wrath to Strathy Point designated waterbody and one bathing water is located within the wider study area. The results of the site-specific surveys and the associated contaminants analysis, the scope of which was subject to consultation and agreement with NatureScot indicate that there were generally low levels of contamination across the offshore Project area.

Radiological contamination in the form of radioactive particles are known to be present in the marine environment at the coast of Dounreay, due to historic practices of the coastal nuclear facilities at the Dounreay Nuclear Power Development Establishment (NPDE) and Vulcan Naval Reactor Test Establishment (NRTE). The Scottish Environment Protection Agency (SEPA) has established a 2 km radius protected zone (under the Food and Environment Protection Act 1985 Act) ('the FEPA order zone'). The offshore Project area does not overlap this zone. There has been extensive remediation and monitoring efforts to reduce radioactive contamination in the region and there is considered to be a low potential for radiological particles to be present within the offshore Project area.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Disturbance and release of contaminated sediments or radioactive particles; and
 - Impacts on water quality status of designated waterbodies due to increased suspended sediment and potential release of contaminants or radioactive particles.

All effects for the operation and maintenance stage were scoped out of the assessment.

The assessment of effects for construction (including pre-construction) and decommissioning was informed by the 'West of Orkney' numerical model.

⁵ Designated waters is a collective term for designated waterbodies, designated bathing waters, designated shellfish waters and nitrate sensitive areas.



Overall, it was concluded that due to the low levels of contamination and the highly localised and temporary nature of the impacts, no significant effects to any water and sediment quality receptors were predicted, either for the offshore Project alone or cumulatively with other plans or developments. No secondary mitigation or monitoring requirements were proposed.

18.3.3 Chapter 10: Benthic subtidal and intertidal ecology

Benthic ecology concerns the species and communities that live on or in the seabed. The baseline was characterised through a combination of site-specific survey data and desk-based studies. The site-specific data comprised of offshore and nearshore baseline surveys conducted in 2022 to collect information on the benthic communities present (including seabed imagery and sediment grab sampling). Benthic intertidal ecology surveys (including aerial imagery and a walkover survey) were also conducted.

The seabed within the OAA contains a patchwork of mixed and coarse sediments with extensive areas of boulders and cobbles. A range of benthic subtidal and intertidal ecology receptors of conservation importance are present in the study area, including those that are protected through national or international legislation and policy, namely: stony reef and bedrock reef (potential Annex I habitat⁶), offshore subtidal sands and gravels habitat (a common seabed habitat in British waters and a Scottish Priority Marine Feature (PMF)), ocean quahog (a slow growing and long-lived burrowing bivalve mollusc that is on the OSPAR Convention's List of Threatened and Declining Species), and kelp and seaweed communities on Atlantic infralittoral rock (a PMF and a 'blue carbon' habitat).

Areas of potential Annex I reef⁷, stony reef were assessed against published criteria to further understand the potential resemblance of habitats in the offshore Project area to Annex I reef. The seabed in the south-west of the OAA represents 'medium resemblance' Annex I stony reef, with areas of "low to medium resemblance" stony reef found largely in the north of the OAA. Further study was undertaken to provide information on the characteristics and patchiness of the "low to medium resemblance" stony reefs within the OAA. This work concluded that approximately 60% of the "low to medium resemblance" stony reef was likely to be reef habitat. All areas of delineated Annex I reef in the OAA and offshore ECC were very patchy in nature and associated with sands and gravels in almost all cases. Based on the survey results, the reef is associated with lower levels of biodiversity than in areas unaffected by scour resulting from coarse sediment, such as within the Solan Bank Reef Special Area of Conservation (SAC), a designated site protected for Annex I reefs (bedrock and stony) approximately 25 km west of the OAA, which are unaffected by scour resulting from coarse sediment.

The following impacts were identified as requiring assessment:

⁶ Habitats of conservation interest that are listed on Annex I of the Habitats Directive, for which one or more Special Area of Conservation (SAC) are designated in the UK Site Network.

⁷ Annex I reefs occur where 'rocky areas or concretions made by marine animals arise from the surrounding seafloor and are a protected habitat under Annex I of the Habitats Directive (92/43/EEC)



- Construction:
 - Temporary habitat loss/ disturbance;
 - Increased suspended sediment concentrations and associated deposition;
 - Increased risk of introduction and spread of Invasive Non-Native Species (INNS); and
 - Release of sediment bound contaminants.
- Operation and maintenance:
 - Temporary habitat loss/ disturbance;
 - Long-term habitat loss/ disturbance;
 - Increased suspended sediment concentrations and associated deposition;
 - Colonisation of hard structures;
 - Changes in physical processes;
 - Impacts from the release of sediment bound contaminants;
 - Impact to benthic communities from any thermal load or Electromagnetic Fields (EMF) arising from the cable during operation; and
 - Introduction and spread of INNS.
- Decommissioning:
 - Removal of hard substrate during decommissioning.

The assessment of effects was informed by site-specific data, the 'West of Orkney' numerical modelling, and a quantification of the worst-case seabed footprint associated with the offshore Project construction (including pre-construction) and operation and maintenance. It was concluded that impacts related to seabed disturbance and the presence of infrastructure would occur over a small area in the context of the national distribution and extent of benthic receptors, and no significant effects to any benthic subtidal and intertidal receptors are predicted, either for the offshore Project alone, or cumulatively with other plans or developments. A quantification of the temporary and long-term impacts on Annex I reef habitat revealed that only the equivalent of up to 0.77% of the area of Annex I reef in Scottish Special Areas of Conservation (SACs) would be affected and only 0.5% of Annex I reef in UK SACs, which is low in national terms.

The introduction and spread of INNS will be minimised through the implementation of an INNS management plan, developed post-consent. Overall, no significant effects were identified, and no secondary mitigation requirements were proposed.

Effects on benthic receptors as qualifying features of European Sites, i.e. SACs, have been considered by the HRA process. The screening process, undertaken in consultation with NatureScot and Marine Scotland - Licensing Operations Team (MS-LOT), concluded there was no potential for Likely Significant Effect (LSE) and therefore no further assessment was required under the HRA process.



18.3.4 Chapter 11: Fish and shellfish ecology

A range of fish and shellfish ecology receptors were considered for the fish and shellfish ecology assessment, including marine finfish⁸ (non-diadromous bony fish), shellfish, elasmobranchs (cartilaginous fish such as sharks, rays and skates) and diadromous fish (fish that migrate between freshwater and marine environments during their life cycle). Fish and shellfish operate at various levels of the food chain, acting as both predators and prey, and play an important role in the transfer of energy across the ecosystem.

The baseline was characterised using a combination of desk-based studies, Environmental Deoxyribonucleic Acid (DNA) (eDNA) analysis of water samples collected throughout the offshore Project area, and consultation throughout the EIA with a range of interested stakeholders, including Fisheries Management Scotland and District Salmon Fishery Boards. Several species were identified as potentially utilising the study area for spawning, foraging, migration, or as a nursery habitat. Key species of conservation importance include those with declining populations and/or those that are protected through national or international legislation and policy, such as Atlantic salmon (*Salmo salar*), flapper skate (*Dipturus intermedius*), cod (*Gadus morhua*), herring (*Clupea harengus*) and sandeel (*Ammodytes* spp.). Additionally, the North West Orkney Nature Conservation Marine Protected Area (NCMPA), designated for sandeels, is located approximately 11 km from the OAA, however there will be no impacts on this designated site as a result of the Project. Other species in the study area were considered to be of commercial value, such as mackerel (*Scomber scombrus*), haddock (*Melanogrammus aeglefinus*), brown crab (*Cancer pagurus*) (considered to be a key species for the local fishing community) and scallops (*Pectinidae* spp.), and certain species are important as prey for other fish, marine mammals and birds, including sandeel, herring, mackerel and sprat (*Sprattus sprattus*). Brown crab are considered to be a key species for the local fishing community and available tagging studies for brown crab indicate the potential for brown crab migratory routes to intersect the offshore Project area.

Diadromous fish migrate between freshwater and marine environments during their life cycle. For example, Atlantic salmon depart Scottish rivers as juveniles to migrate to offshore feeding grounds before returning back to their native river to spawn. The presence, abundance and origin of diadromous fish (e.g. Atlantic salmon and sea trout) in the vicinity of offshore Project area remains relatively unknown, as there are uncertainties around the migration routes and behaviours by these species. Although it is expected that these species may migrate through the offshore Project area, including but not limited to those originating from rivers along the north coasts of Scotland, the eDNA surveys did not detect any of these species, in the offshore Project area.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Temporary habitat disturbance and loss;
 - Underwater noise; and
 - Indirect effects related to changes in availability or distribution of prey species.
- Operation and maintenance:
 - Habitat loss and disturbance;
 - EMF effects;

⁸ Including those that are pelagic (inhabit the water column) and demersal (bottom dwelling).



- Potential fish or predator aggregation;
- Barrier effects to diadromous fish; and
- Indirect effects related to changes in availability or distribution of prey species.

The assessment of effects was informed by a combination of qualitative assessments and quantitative underwater noise and EMF modelling studies. Any habitat loss or disturbance, EMF effects or potential increases in fish or predator aggregation were anticipated to be highly localised. These effects were considered unlikely to affect long-term functioning of the wider available spawning and nursery ground or migratory routes for fish or shellfish (e.g. brown crab). Underwater noise effects were considered to be short-term. The implementation of embedded mitigation measures, such as the development of a Piling Strategy ahead of construction that defines mitigation measures to be implemented once the offshore Project design has been further refined, will act to reduce impacts on fish and shellfish ecology receptors. No barrier effects to diadromous fish are expected to affect migration success and the indirect effects related to changes in availability or distribution of prey species will be minimal. Therefore, no significant effects to any fish and shellfish ecology receptors were predicted, either for the offshore Project alone, or cumulatively with other plans or developments, including to the North West Orkney NCMPA, and no secondary mitigation requirements were proposed.

This fish and shellfish ecology assessment uses the best available evidence to inform the assessment of potential effects. There remain data gaps in our understanding of the spatial and temporal patterns of diadromous fish movements not only in the offshore Project area but throughout / around Scotland. Strategic research initiatives beyond the scope of a single project developer are required to address these data gaps. The potential for monitoring of diadromous fish will be explored post-consent, focussing on the key data gaps identified in the Scottish Marine Energy Research (ScotMER)⁹ diadromous fish and fish and fisheries evidence maps^{10,11}.

Due to the nature of diadromous fish inhabiting both marine and freshwater habitats in their life-cycle, they may also be affected by the onshore Project, and this has been considered in chapter 9: Freshwater ecology. A consideration of the potential interaction between the effects of the onshore and offshore Project is summarised in section 18.4.

Effects on diadromous fish and associated features as qualifying features of SACs have been considered by the HRA process. The screening process, undertaken in consultation with NatureScot and MS-LOT, concluded that there was no potential for LSE in relation to effects on sea lamprey or river lamprey and no further assessment was required under the HRA process. Feedback from NatureScot stipulated that although Atlantic salmon and Freshwater Pearl Mussel (FWPM) are qualifying features of European Sites, impacts on these species should be considered within the EIA only, due to inherent issues on apportioning population estimates to specific designated sites.

⁹ As part of the ScotMER programme, the Scottish Government has collaborated with representatives from academia, industry, statutory nature conservation bodies and environmental non-governmental organisations to map evidence gaps for environmental and socio-economics impact assessments for offshore renewable energy developments.

¹⁰ <https://www.gov.scot/publications/diadromous-fish-specialist-receptor-group/>.

¹¹ <https://www.gov.scot/publications/fish-and-fisheries-specialist-receptor-group/>.



18.3.5 Chapter 12: Marine mammals and megafauna

A range of marine mammals (e.g. whales, dolphins and seals) and megafauna (e.g. basking shark) may occur within the offshore Project area and its vicinity. The baseline was characterised using a combination of desk-based studies, digital aerial surveys (July 2020 – September 2022), sightings obtained from observers aboard survey vessels, and eDNA analysis. Ten marine mammal species, harbour porpoise (*Phocoena phocoena*), white-beaked dolphin (*Lagenorhynchus albirostris*), common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), minke whale (*Balaenoptera acutorostrata*), white-sided dolphin (*Lagenorhynchus obliquidens*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*), along with basking sharks (*Cetorhinus maximus*), were considered to use the offshore Project area regularly and considered in the impact assessment. There are no designated sites with marine mammal and megafauna features or seal haul out sites in the vicinity of the offshore Project.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Injury and disturbance from underwater noise-generating activities;
 - Disturbance due to physical presence and underwater noise from vessels;
 - Vessel collision; and
 - Indirect effects related to changes in availability or distribution of prey species.
- Operation and maintenance:
 - Noise related impacts during operation;
 - Disturbance due to physical presence and underwater noise from vessels;
 - Vessel collision;
 - Displacement or barrier effects associated with physical presence of devices and infrastructure; and
 - Indirect effects related to changes in availability or distribution of prey species.

The assessment of effects was informed by a combination of qualitative assessments and quantitative underwater noise modelling studies, and population modelling (Interim Population Consequences of Disturbance (iPCoD)) was also undertaken to understand the population-level consequences for certain species (harbour porpoise, harbour seal and grey seal). NatureScot, as the statutory consultee with an interest in marine mammals, was consulted throughout the EIA to agree modelling and assessments scopes and input data, as well as having the opportunity to comment on early impact assessment findings. No significant effects to any marine mammal and megafauna receptors are predicted, either for the offshore Project alone or cumulatively with other plans or developments, and this includes the precautionary assessment of underwater noise generating activities such as UXO clearance and pile installation. Some temporary and highly localised injurious or behavioural effects were expected to occur at an individual level for several marine mammal species. However, no population level effects were anticipated.

Embedded mitigation measures will be in place to reduce underwater noise effects. The development of a Piling Strategy ahead of construction, will define mitigation measures to be implemented once the offshore Project design has been further refined, such as soft-starts and ramp-up procedures. An outline Marine Mammal Mitigation Protocol supported the Offshore EIA Report. A separate EPS Licence application and risk assessment will be undertaken, once all the appropriate information is collated to inform the Piling Strategy. This information will also feed into the final Marine Mammal Mitigation Protocol.



Underwater noise impacts from other sources (e.g. cable laying and dredging), disturbance or collision with vessels, and any displacement or barrier effects from the presence of infrastructure are anticipated to be highly localised and/or temporary. Any the indirect effects related to changes in availability or distribution of prey species were expected to be minimal. No secondary mitigation requirements were proposed. A detailed monitoring programme will be developed through consultation with relevant stakeholders and will be presented within the Project Environmental Monitoring Programme (PEMP) that will be subject to approval as part of the discharge of consent conditions.

Effects on marine mammal features as qualifying features of European Sites, i.e. SACs, have been considered by the HRA process. The screening process, undertaken in consultation with NatureScot and MS-LOT, concluded there was no potential for LSE and therefore no further assessment was required under the HRA process.

18.3.6 Chapter 13: Offshore and intertidal ornithology

The offshore ornithology assessment evaluates the potential effects of the offshore Project on breeding, non-breeding and migratory seabirds and designated sites.

The baseline characterisation was informed by a combination of desk-based studies and site-specific surveys. The site-specific surveys comprised digital aerial surveys between July 2020 and September 2022. These surveys identified the following key species within the offshore Project area: kittiwake (*Rissa tridactyla*), great black-backed gull (*Larus marinus*), Arctic tern (*Sterna paradisaea*), great skua (*Stercorarius skua*), guillemot (*Uria aalge*), razorbill (*Alca torda*), puffin (*Fratercula artica*), fulmar (*Fulmarus glacialis*) and gannet (*Morus bassanus*). Species recorded regularly in most months within the OAA, and its vicinity included kittiwake, guillemot, razorbill, puffin and gannet. For most species recorded at most times of year, relative abundance in the OAA was low or very low in the context of their population size. Great skuas (*Stercorarius skua*) and European storm-petrels (*Hydrobates pelagicus*) were generally absent from the OAA during the non-breeding season, and storm petrels were recorded only in August and September. The key species present within the offshore Project area are considered to have a moderate sensitivity to disturbance. Four species (kittiwake, great black-backed gull, Arctic tern and gannet) have a moderate to high vulnerability to WTG collision risk.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Distributional responses and displacement effects;
 - Indirect effects on prey species;
- Operation and maintenance:
 - Distributional responses, displacement and barrier effects;
 - Indirect effects on prey species;
 - Direct collision risk; and
 - Combined disturbance and collision risk.



Disturbance and displacement during construction (including pre-construction) was assessed as short-term, temporary and reversible and considered not significant in EIA terms. Displacement mortality for the operation and maintenance stage was assessed using a matrix approach and collision mortality during operation and maintenance was predicted for species that commonly fly at rotor height using stochastic collision risk models.

Population Viability Analysis (PVA) was also undertaken for certain species to understand the potential effects on regional populations. Collision risk, disturbance, displacement, and barrier effects stage were assessed as affecting very low proportions of breeding and non-breeding populations.

For the offshore Project alone, the assessment of potential effects from disturbance and displacement combined with collision risk shows that for all species for all times of year, effects would also have negligible impact on receptor populations. Indirect effects from impacts to key prey species (e.g. sandeel and herring) were informed by the outcomes of other topic-specific assessments such as fish and shellfish ecology and were assessed as not significant. Embedded mitigations will be implemented to reduce impacts on birds, where practicable, such as establishing an adequate minimum clearance between the lowest WTG blade tip above sea-level, set by the engineering requirements, is above the minimum required clearance, which reduces potential collision risk.

For cumulative impacts with other projects, the potential for combined disturbance and collision effects on kittiwake, Article tern and gannet were identified. The cumulative impacts on the regional breeding and non-breeding populations were assessed to be minor and impacts assessed as not significant.

For cumulative impacts with other projects, the potential for disturbance, displacement and barrier effects only effects on guillemot, razorbill, puffin and fulmar were identified. The cumulative impacts on the regional breeding and non-breeding populations were assessed to be minor and impacts assessed as not significant.

For cumulative impacts with other projects, the potential for collision only effects on great black-backed gull and great skua were identified. The cumulative impacts on the regional breeding and non-breeding populations were assessed to be minor and impacts assessed as not significant.

No secondary mitigation measures were identified. An assessment of effects on Special Protection Areas (SPAs), as required by the Habitats Regulations Appraisal (HRA) process, is reported in the Report to Inform the Appropriate Assessment (RIAA). The RIAA concluded that when considering the "best scientific knowledge in the field" and using available evidence from operational offshore windfarms, no adverse effects on site integrity can be concluded for all SPAs. Details of any required monitoring will be determined post-consent and discussed and agreed via a Regional Advisory Group (or equivalent). Monitoring details will be presented within the PEMP that will be subject to approval as part of the discharge of consent conditions.

OWPL are committed to enhancing local biodiversity wherever possible and are proposing to undertake a range of biodiversity enhancement projects onshore and offshore to help achieve this goal. One of the offshore biodiversity enhancement projects would involve the installation of storm petrel nest boxes at Sule Skerry and Sule Stack. This proposal will be consulted on with the relevant stakeholders and subsequently tailored to produce a detail plan, post-consent, that will fulfil current policy, community benefit and the Project's ambition to protect and conserve the natural environment.



18.3.7 Chapter 14: Commercial fisheries

In the context of the Offshore EIA Report, commercial fishing activity was defined as legal fishing activity undertaken for commercial profit. The baseline desk-based study, supplemented with data received during consultation, identified the following key fleets as being operational in the study area: creelers (i.e. pots and traps, including smaller local vessels and larger vivier crabbers¹²), demersal trawls (i.e. vessels using conical nets towed along the seabed) and scallop dredges (i.e. rigid structures towed along the seabed to collect scallops). Non-UK fishing activity was expected to occur in the area at low levels, mostly by Dutch and Norwegian pelagic vessels (i.e. vessels towing large conical nets through the water column). Key commercial species were identified as whitefish (e.g. haddock, cod), brown crab, mackerel, herring and scallops.

OWPL set up a Fisheries Working Group with representatives across various fisheries groups / organisations to discuss any issues arising and consult with the fishing industry on relevant matters. Three fisheries working group meetings were held at various stages of the EIA and were a key source of input to the assessment. The following impacts were identified as requiring assessment during construction (including pre-construction), operation and maintenance and decommissioning:

- Loss or restricted access to fishing grounds;
- Displacement of fishing effort;
- Interference with fishing activity as a result of increased vessel traffic;
- Increased steaming times;
- Safety issues for fishing vessels; and
- Socio economics impacts to commercial fisheries.

The impact assessment was qualitative in nature and was informed by stakeholder consultation through discussion of impacts and their significance with the Fisheries Working Group. The assessment concluded that the majority of impacts during construction (including pre-construction) will be highly localised and short term, and therefore not significant. However, potentially significant effects on creelers from temporary loss or restricted access to fishing grounds and displacement of fishing effort within the OAA during the construction (including pre-construction) and decommissioning stages were identified. Therefore, secondary mitigation measures have been proposed to reduce the significance of effect for these impacts. OWPL will continue dialog with the directly-impacted fishers to develop cooperation agreements, such as new gear, adaptations to gear (e.g. escape hatches to reduce juvenile catch and improve overall productivity and sustainability of the stock), guard vessel offset etc. These discussions are ongoing and any cooperation agreement discussions will be held post-consent once the Project design is refined. This secondary mitigation will be presented in a Fisheries Management and Mitigation Strategy (FMMS), alongside embedded mitigation measures around the management of commercial fisheries impacts. An outline FMMS supports the Offshore EIA Report application and will be finalised post-consent.

¹² Larger vessels targeting crab with a vivier tank on board to store the specimen until landed.



For operation and maintenance, it is recognised that some larger vessels may not choose to resume fishing or transit through the OAA due to the potential safety risks. However, alternative fishing areas were considered to be available to these vessels that have a larger operational range and it was anticipated that smaller vessels and creelers (that do not tow gear) may be able to resume fishing in the OAA. The effects of interference with fishing activity and safety issues are anticipated to be adequately managed through the implementation of embedded mitigation measures, including the charting of infrastructure and effective fisheries engagement and notifications to ensure all fishers are aware of offshore Project works and can plan accordingly.

18.3.8 Chapter 15: Shipping and navigation

The shipping and navigation assessment considered the impact of the offshore Project on vessels within the vicinity of the offshore Project, including in relation to key navigational features such as ports, harbours and anchorages.

Shipping and navigation activity within the vicinity of the offshore Project was characterised by 28 days of site-specific vessel traffic survey data (split between summer and winter 2022), stakeholder consultation and desk-based studies, including analysis of long-term shipping track data. The key navigational features in the study area include the nearby Area to Be Avoided (ATBA)¹³ surrounding Orkney and the local rock/shallow features to the north-west of the OAA, notably the Sule Skerry and Sule Stack. The closest port or harbour is Stromness Harbour, located approximately 20 Nautical Miles (NM) (37 km) to the east, on the Orkney mainland coast. The OAA is located north of the main shipping route around the north of Scotland. During the Project specific vessel traffic survey, the scope of which was agreed with the key consultee, the Maritime and Coastguard Agency, there was an average of six to seven unique vessels recorded within the OAA. During the winter survey period, an average of 18 unique vessels were recorded per day with an average of five to six within the OAA. The main vessel types were cargo vessels and fishing vessels, and 12 commercial shipping routes were identified that cross the study area.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Vessel displacement and increased third-party vessel to vessel collision risk;
 - Increased third-party to project vessel collision risk;
 - Adverse weather routing;
 - Creation of vessel to structure collision risk; and
 - Reduced access to local ports and harbours.
- Operation and maintenance:
 - Vessel displacement and increased third-party vessel to vessel collision risk;
 - Increased third-party to project vessel collision risk;
 - Creation of vessel to structure collision risk;
 - Changes in under keel clearance;

¹³ The International Maritime Organisation defines an Area to Be Avoided as “an area within defined limits in which either navigation is particularly hazardous or it is exceptionally important to avoid casualties and which should be avoided by all ships, or by certain classes of ships.” See here: <https://www.imo.org/en/OurWork/Safety/Pages/ShipsRouting.aspx#:~:text=area%20to%20be%20avoided%3A%20an,by%20certain%20classes%20of%20ships>.



- Increased interaction with sub-sea cables;
- Adverse weather routeing;
- Reduced access to local ports and harbours; and
- Reduction of emergency response provision.

All impacts assessed were determined to be broadly acceptable or tolerable risk levels with the implementation of embedded mitigation measures, such as the application and implementation of safety zones during construction and major maintenance works, the establishment of construction buoyage and compliance with relevant industry best practice guidelines. Measures to be implemented around navigational safety and vessel management during construction and operation and maintenance will be detailed within the Navigational Safety and Vessel Management Plan (NSVMP). An outline NSVMP supports the application for the offshore Project and will be finalised post-consent. Furthermore, once site constraints are further understood, additional post-consent consultation will be undertaken with key stakeholders as part of the Development Specification and Layout Plan (DSLPL) process to ensure the overarching spatial area covered by the WTG layout is appropriate and that all impacts are reduced to acceptable levels. With the consideration of this secondary mitigation, all effects are assessed as being As Low As Reasonably Practicable (ALARP) and not significant. No specific monitoring for shipping and navigation is proposed.

Please note that the assessment of potential major accidents in relation to vessel collision or allision was assessed in a separate report, as detailed in section 18.3.14.1.

18.3.9 Chapter 16: Marine archaeology and cultural heritage

The marine archaeology and cultural heritage assessment evaluates the potential effects of the offshore Project on marine historic environment assets (e.g. shipwrecks and aviation crash sites) and also onshore historic environment assets (e.g. scheduled monuments) in relation to visual impacts on setting. The setting of historic environment assets was defined by establishing how the surroundings contribute to the ways in which the historic structure is understood, appreciated and experienced.

The baseline characterisation was informed by a combination of desk-based studies, site-specific marine geophysical surveys and stakeholder consultation with Historic Environment Scotland, and THC and Orkney Island Council (OIC) country archaeologists. In addition, fieldwork conducted for SLVIA at relevant onshore historic environment asset viewpoints was conducted in July and August 2022, informed the assessment of impacts on setting. The initial desk-based study indicated that there were a number of post-medieval and 20th century wreck sites within the offshore Project area. However, analysis of the site-specific geophysical survey results did not identify any evidence of these wreck sites being present. Parts of one of the largest German minefield from the First World War, known as the Whitten Head Field, are in or are very close to the offshore Project area with the potential for live mines to be present. A review of the site-specific survey data identified the potential for UXO which will be confirmed through more targeted surveys ahead of construction.

A core retrieved from the offshore Project area potentially contained a pocket of organic material that may contain microfossils that could provide palaeoenvironmental information (i.e. information from a period in geological past) on a now eroded former terrestrial land surface close to the shore at Caithness. Subsequent analysis of this sample confirmed that there was no organic material within this sample, and therefore, no potential for it to provide palaeoenvironmental information.



The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Loss of or damage to known marine and intertidal historic environment assets;
 - Loss of or damage to unknown marine and intertidal historic environment assets; and
 - Loss of or damage to submerged prehistoric landscapes.

- Operation and maintenance:
 - Loss of or damage to known marine historic environment assets;
 - Loss of or damage to unknown marine and intertidal historic environment assets;
 - Loss of or damage to submerged prehistoric landscapes; and
 - Long term changes to the setting of onshore historic environment assets that reduces their value.

No significant direct impacts relating to known or unknown marine and intertidal historic environment assets (including the potential impacts on paleoenvironmental deposits) were identified. However, embedded mitigations will be implemented in the event of any accidental discoveries of archaeological interest to ensure these are dealt with appropriately. This includes the production of a marine heritage Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) to avoid or mitigate impacts due to accidental discoveries of archaeological interest. An outline WSI and PAD will be contained within the EMP. An outline EMP supports the application for the offshore Project and will be finalised post-consent.

18.3.10 Chapter 17: Military and aviation

This military and aviation assessment evaluates the potential effects from the offshore Project on military and aviation receptors (e.g. airports, air traffic control and air defence radars, military activities, helicopters and space ports).

The military and aviation study area was determined by the presence of potentially affected aviation receptors; in particular, air traffic control and air defence Primary Surveillance Radars (PSRs). The study area included any radars that could potentially detect WTGs within the OAA; and was defined by the furthest potential aviation receptor. The key features within the study area include:

- Military Danger Area D801 (Cape Wrath) which is activated periodically from the surface up to 55,000 ft and used for air to ground bombing exercises (immediately west of the OAA). This is the only range in Europe where land, air and sea training activities can be conducted simultaneously;
- An active Helicopter Main Route (HMR) (HMR YANKEE) located 3 nm (6 km) to the east of the OAA. This feature was specifically avoided during the selection of the OAA location;
- A helicopter landing pad located at Sule Skerry lighthouse 3 nm (6 km) to the northwest of the OAA; and
- Space Hub Sutherland, a space port located on the A' Mhòine peninsula, Sutherland located approximately 16 nm (30 km) south-southwest of the OAA. An exclusion zone will be established during launch events which will extend offshore and may overlap the OAA.

The WTGs will be outside the safeguarding area of any civil airports and also outside the coverage of any civil air traffic control radars, military air traffic control/air defence radars or Met Office radars. The location of the pre-assembly port(s) (where WTGs, foundations and other infrastructure will be stored, assembled and transported to the



OAA) is currently undefined. Once confirmed, the locations will be communicated to Highlands and Islands Airports Limited and further consultation will be carried out to determine whether there could be any impact to any safeguarding area of civil airports during the assembly and transport (to the OAA) of 'tall' (greater than 91.4 m) offshore components such as turbine towers and jacket structures. Any such impacts will be managed via the Notice to Airmen (NOTAM) system.

Space Hub Sutherlands construction commenced in July 2023 with the first space launch expected in 2024; launches are capped at 12 per year. Impacts on Space Hub Sutherland were scoped out as subsequent consultation with the operator of this facility (Orbex) confirmed that the operation of the offshore Project would not disrupt Space Hub Sutherland's operations.

The following impacts were identified as requiring assessment:

- Construction (including pre-construction) and decommissioning:
 - Potential impact on military low flying and UK Search and Rescue (SAR) helicopter operations due to presence of obstacles (WTGs in construction).
- Operation and maintenance:
 - Potential impact on military low flying and UK SAR helicopter operations due to presence of obstacles (WTGs in operation).

The presence of the offshore Project was not expected to affect any of the aviation receptors assessed with the exception of the WTGs themselves creating obstacles to military aircraft operating at low level and to Search and Rescue (SAR) helicopters operating within the OAA in the event of a rescue mission. Any potential impact will be mitigation through engagement with the Ministry of Defence (MoD) and Maritime and Coastguard Agency (MCA) on the development of the specific turbine layout and by a Lighting and Marking Plan that will need to be approved in consultation with the Civil Aviation Authority (CAA) prior to the construction stage of the offshore Project. Therefore, no significant effects to any military and aviation receptors were predicted, either for the offshore Project alone or cumulatively with other plans or developments. No military and aviation monitoring was considered necessary.

18.3.11 Chapter 18: SLVIA

The SLVIA identified and assessed the significance of changes resulting from the construction (including pre-construction), operation and decommissioning of the offshore Project. The assessment focused on the operation and maintenance stage, as this is when the significant effects are most likely to arise over the long-term, although construction impacts were still considered. The SLVIA was carried out in relation to both the seascape character and landscape character as environmental resources in their own right, and on people's views and visual amenity.

The assessment of effects was informed by desk-based studies and field work to understand the key receptors potentially impacted, and 28 viewpoints were photographed as agreed in consultation with THC and OIC, with regards to the viewpoints that needed considered in the offshore EIA. The receptors with the potential to be affected included landscape and coastal character types, landscape designations (e.g. National Scenic Areas, Highland Council Special Landscape Areas and Wild Land Areas), and visual receptors (i.e. the different groups of people who may experience views of the development) with associated viewpoints.



There are three National Scenic Areas within the SLVIA study area, Kyle of Tongue, North West Sutherland and Hoy and West Mainland NSAs, six Highland Council Special Landscape Areas and seven Wild Land Areas.

The following impacts were identified as requiring assessment during construction (including pre-construction), operation and maintenance and decommissioning:

- Effects on landscape character / coastal character;
- Effects on designated landscapes;
- Effects on visual receptors;
- Night time effects; and
- Cumulative effects.

To understand the potential effects on the landscape and visual amenity, the SLVIA developed a Zone of Theoretical Visibility (ZTV), encompassing the area in which the offshore Project could be visible. The ZTV was mainly limited to the sea and along the coastal parts of Caithness, Sutherland and Orkney. Although theoretical visibility could also occur further inland, this would largely be from elevated locations affording panoramic views within the 60 km study area, and the offshore Project would be visible only in very clear conditions.

Due to the offshore Project's location, approximately 24 km from the coast, it would only be seen on the horizon. Offshore visibility is affected by a number of factors including distance, weather, atmospheric perspective and sunlight.

Significant effects on seascape and coastal character were identified for the Kyles and Sea Lochs seascape character in Sutherland and the Rora Head and St John's Head Regional Coastal Character Area (RCCA) in Orkney. Significant effects on landscape character would be limited to parts of the Sandy Beaches and Dunes Landscape Character Type (LCT) in Sutherland and the Rugged Hills and Enclosed Bays LCTs which overlap with the Rora Head and St John's Head RCCA in Orkney. Significant effects on two Special Landscape Qualities (SLQs) of the Kyle of Tongue National Scenic Area (NSA) were identified. Additional significant effects (including cumulative effects) were identified at small settlements and visitor destinations in Caithness, Sutherland and Orkney and on short sections of the North Coast 500 and Sustrans National Cycle route 1, core paths on Orkney, as well as at sections of the Scrabster to Stromness ferry route. A night time lighting assessment also identified potentially significant effects at night during periods of poor visibility that would be expected 6% of the time when brighter lights would be required.

The assessment was based on the worst case scenario layout, and therefore, not all significant effects would be realised. The layout assessed represents the maximum effect in terms of the proximity, scale, spread, density and prominence of the WTGs from receptors around the coastline. In reality, WTGs will not be present at both the size and numbers assessed, nor be present along all the southern and eastern boundaries of the OAA (i.e. nearest to the coast), therefore reducing the magnitude of impact from that assessed at some locations and viewpoints based on the final WTG layout. The detailed design of the offshore Project is ongoing, and therefore, mitigation measures relevant to the final layout that would potentially reduce significant effects, cannot be adopted at this stage. Design objectives have been identified and will be considered as part of further iterative design refinements and consideration of environmental impacts within the post-consent stage. This process will involve further consultation with MD-LOT and statutory nature conservation bodies. The final design of the offshore Project will be secured within the DSLP.



In relation to the acceptability of significant impacts on seascape, landscape and visual receptors, NPF4, that was adopted earlier this year, recognises *'that such impacts [significant landscape and visual impacts] are to be expected for some forms of renewable energy. Where impacts are localised and/or appropriate design mitigation has been applied, they will generally be considered to be acceptable.'*

18.3.12 Chapter 19: Socio-economics

The socio-economics assessment (including tourism) evaluates the potential socio-economic effects in the following spatial areas: UK; Scotland; Highland; Orkney; Caithness and Sutherland. The assessment considered potential effects from the onshore and offshore Project as a 'whole Project'. This is because project expenditure for the onshore and offshore Projects are intrinsically linked, and people have the potential to be affected by impacts from both aspects.

The desk-based study, supplemented with data received through stakeholder and community consultation, including an extensive questionnaire, and consultation with Community Panels (groups of local Community Councils in Orkney, Caithness and Sutherland), identified evidence of local economic vulnerability, especially in Caithness where there is a depopulation trend. At the time of the assessment, a total of 356 local resident responses to the questionnaire survey were received, including 240 Orkney residents, 85 Caithness residents and 31 Sutherland residents. In addition, a Socio-Economics Working Group was set up to provide a forum for local authorities, local enterprise agencies and other key stakeholders to provide views on the Project, input to initial assessment findings and share relevant information. The Socio-Economics Working Group has met regularly since June 2022.

Labour market activity metrics indicate long-term structural weakness to the Caithness economy, but there is also evidence of increasing vulnerability for the Orkney economy. Tourism is identified as an important industry in Caithness and Sutherland, and also in Orkney, with visitor numbers rebounding following the difficulties caused by the Covid-19 pandemic. The baseline assessment indicated that there are business sub-sectors that have the potential to contribute to the supply chain for the Project, including the provision of civil engineering, transport services, and professional services. There are existing concentrations of deprivation in Caithness, particularly in Wick, but not in areas that are likely to be epicentres for the Project.

The following impacts were identified as requiring assessment during construction (including pre-construction), operation and maintenance, and decommissioning:

- Effects on employment and economic output (Gross Value Added) receptors;
- Effects on the demand for housing and local services receptors;
- Effects on tourism industry receptors;
- Effects on onshore businesses associated with the processing of commercial fish and/or the commercial fishing industry supply chain receptors;
- Effects on socio-cultural receptors; and
- Effects on distributional receptors.

The assessment of effects was informed by Project-specific economic modelling, using a range of assumptions around Project expenditure. The assessment of potential effects took account of embedded mitigation measures, including measures that are committed to as part of the Supply Chain Development Statement (SCDS) for the Project agreed with the Crown Estate Scotland (CES) as part of the ScotWind bid application.



Several significant beneficial effects were identified including impacts on local employment and economic output, and demand for housing and local services. For example, the Project will result in job creation, directly for those employed by OWPL, indirectly through job creation (i.e. those not directly employed by OWPL but involved in the supply chain), and through induced employment as a result of Project expenditure in the local areas. The modelling predicts up to an 8.3% increase in jobs and 5.6% increase in Gross Value Added in Caithness and Sutherland and 17.1% increase in jobs and 6.4% Potential adverse effects were identified on tourism, fish processing, and the commercial fishing industry, socio-cultural receptors (e.g. the potential for the Project to exacerbate existing social problems such as crime) and distributional receptors (e.g. changes in income distribution and housing affordability).

OWPL are committed to implementing a range of initiatives to support the local community and economy. The SCDS, which was designed in collaboration with stakeholders, aims to enhance the level of participation of UK, Scottish and local suppliers within the supply chain for the Project. The SCDS outlines a commitment to:

- Provide £33.5 million into a supply chain investment fund to enhance key supplier capability and competitiveness prior to Contract for Difference (CfD) award;
- Fund UK supplier design and supply studies to allow suppliers to plan investment in additional capability and capacity, and to position themselves competitively in terms of OWPL's procurement requirements;
- Invest £9.3 million to support local port and harbour infrastructure in Orkney and Caithness;
- Fund a bespoke programme with the European Marine Energy Centre to support innovation and cost reduction relevant to the Project and other ScotWind developments;
- Invest in a local skills development programme;
- Develop a Local Accommodation Strategy, including partnership arrangements with local hotels and other accommodation providers to provide a temporary construction workforce with good quality accommodation as close to the Project assembly and marshalling site(s) as possible; and
- Provide a community benefits programme to deliver a range of short-term to longer-term strategic goals, such as support for energy bills, provision of local business grants, and sponsorship of local community events (which OWPL are already involved in). Discussions are ongoing around the specific details of the community benefit fund.

No significant adverse effects on socio-economics receptors were identified in the assessment, either for the Project alone or cumulatively with other plans and developments. Therefore, as no significant adverse effects were identified, no secondary mitigation or monitoring requirements are proposed with respect to socio-economics receptors. OWPL intend to continue monitoring socio-economics related issues in the same manner it has to date. OWPL has built a strong relationship with national and local (Caithness and Orkney) organisations through the Socio-Economics Working Group. This group (or equivalent) will continue to meet post-consent and play a role in ensuring local and national benefits are maximised as appropriate and to monitor any potential adverse effects.

18.3.13 Chapter 20: Other sea users

The other sea users assessment evaluates the potential effects from the offshore Project on all users of the marine environment except commercial fisheries, shipping and navigation and military and aviation receptors, as these receptors were considered elsewhere in the Offshore EIA Report.



The other sea user receptors present in the vicinity of the offshore Project include one marine renewable energy project (the Pentland Floating Offshore Windfarm (PFOWF)), two existing telecommunications cables (British Telecommunications (BT) Northern Lights and Farice-1), three active power cables (Pentland Firth East and Pentland Firth West and the Pentland Firth East replacement cable, which is being replaced by the Pentland Firth East 3 cable), with a fourth consented (Scottish Hydro Electric Transmission plc (SHET-L) Caithness to Orkney HVAC Link).

The intensity of marine recreation and tourism activities is high along the coasts, including activities such as Self-Contained Underwater Breathing Apparatus (SCUBA) diving, surfing, canoeing or kayaking, coastal climbing and coasteering, and wildlife watching, but not prevalent within the OAA which is situated over 20 km from shore, and is also of a lower intensity at the landfall area when compared with neighbouring regions.

Additional other sea users include one active spoil disposal site near Thurso and the Dounreay NPDE and Vulcan NRTE sites and associated decommissioning activities which are located to the west of the landfall options. Finally, the temporary launch exclusion zone associated with the Space Hub Sutherland project has potential to overlap with the offshore Project. The launch exclusion zone would be initiated 1 – 2 hours before each launch and would exclude all other marine users when active. Consultation with the operator of Space Hub Sutherland (Orbex) confirmed that the operation of the offshore Project would not disrupt Space Hub Sutherland's operations, and OWPL will coordinate with Space Hub Sutherland and develop appropriate safety procedures during launches.

The following impacts were identified as requiring assessment during construction (including pre-construction), operation and maintenance and decommissioning:

- Obstruction to the Pentland Floating Offshore Windfarm;
- Obstruction to subsea cables (telecommunication and power cables);
- Obstruction of recreational and tourism activities;
- Obstruction to Dounreay NPDE and Vulcan NRTE seabed decommissioning activities; and
- Obstruction to the Space Hub Sutherland.

All impacts were predicted to be highly localised and manageable through consultation and coordination with relevant receptors. Impacts on recreation and tourism activities were assessed as short-term and intermittent, allowing for marine recreation and tourism users to plan ahead of any offshore Project activities. Furthermore, based on the marine physical and coastal processes assessment on waves, no change in the wave climate at the coast could affect surfing at nearby beaches. Therefore, no significant effects to any other sea user receptors were predicted, either for the offshore Project alone, or cumulatively with other plans or developments. Therefore, no secondary mitigation or monitoring requirements were proposed.

18.3.14 Supporting assessments

18.3.14.1 Major accidents and/or disasters assessment

In line with the EIA Regulations, a major accidents and disasters assessment was undertaken, which considers the potential vulnerability of the offshore Project to major accidents and/or disasters, such as severe weather events and industrial accidents. The following hazards were identified as having the potential to result in a major accident and/or disaster:



- External interference – cable snagging (e.g. fishing gear snagging resulting in potential injury, fatalities, damage to assets and/or vessels);
- External interference – third-party vessel or aviation collision and allision;
- Transport accidents –vessel or aviation collision;
- Ground hazards – unexploded ordnance;
- Natural and climate hazards (e.g. increased frequency of extreme weather events);
- Electrical / system failures; and
- External industrial hazards (i.e. major accidents at a nearby development).

A risk assessment was undertaken of the hazards identified which had a potential to cause a major accident or disaster to understand the potential for a significant adverse effect on the environment, human health or material assets. The assessment references relevant topic-specific assessments and also the Construction Design Management Risk Register¹⁴ to assign a risk consequence and likelihood. All risks were considered to be at an acceptable level with the implementation of embedded mitigation measures and no additional mitigation has been identified. Risk reduction will continue to be refined during detailed engineering design, to ensure that a hierarchy of controls are in place through the various management plans and method statements.

18.4 Whole Project assessment

A ‘whole project assessment’ is presented within each topic-specific assessment within this Onshore EIA Report. The intention of this assessment was to provide a holistic overview of the effects from both onshore and offshore Project elements, to ensure that the whole Project impacts and effects were understood and that neither the onshore nor offshore Project is considered in isolation.

There is a spatial overlap between the onshore Project and offshore Project boundaries at the intertidal area between MHWS (the extent of the offshore Project boundary) and Mean Low Water Springs (MLWS) (the extent of the onshore Project boundary). It should be noted that no direct effects on the intertidal area from the Project are expected, due to the use of HDD for installation of the cables at the landfall. With the use of HDD, the following chapters identified no pathways for the onshore Project to impact offshore receptors:

- Chapter 10: Terrestrial non-avian ecology;
- Chapter 11: Terrestrial ornithology;
- Chapter 12: Land use and other users;
- Chapter 13: Terrestrial archaeology and cultural heritage;
- Chapter 14: Air quality; and
- Chapter 16: Access, traffic and transport,

¹⁴ The Construction Design Management risk register is a live document produced to identify, assess, and control potential hazards and risks, in line with the Construction (Design and Management) Regulations 2015.



The chapters that identified pathways for the offshore Project to impact onshore receptors are listed in Table 18-2, and an appraisal of the potential interaction between the onshore and offshore Project effects is provided. In all instances, no significant effects from any additional impacts from the offshore Project are expected. It should also be noted that the assessment of potential effects on socio-economics receptors is presented in the Offshore EIA Report chapter 19: Socio-economics (summarised in section 18.3.12). This assessment covers impacts associated with the Project as a whole, inclusive of both the onshore and offshore Project.

Table 18-2 Conclusions of the whole Project assessment presented within each topic-specific chapter

ONSHORE REPORT CHAPTER	EIA WHOLE PROJECT ASSESSMENT	RELEVANT OFFSHORE EIA REPORT CHAPTER
Chapter Geology and hydrology	<p>8: Contamination of onshore Project surface watercourses and waterbodies may impact the downstream receiving coastal waterbodies, Thurso Bay and Strathy Point to Dunnet Head. The release of silty water into these coastal receiving waterbodies could impact water and sediment quality, impacting on benthic and intertidal ecology.</p> <p>Effects of the offshore Project on these coastal waterbodies are assessed in Offshore EIA Report chapter 9: Water and sediment quality, and no significant effects identified, either from the offshore Project alone or cumulatively with other developments.</p> <p>With appropriate embedded mitigation measures in place as outlined in both the Onshore and Offshore EIA Reports, adverse effects will be avoided.</p>	Chapter 9: Water and sediment quality.
Chapter Freshwater ecology	<p>9: All freshwater ecology receptors identified are species, or have life history strategies, that require access to and from the marine environment. Therefore, any impacts which originate within the marine ecosystem will translate to the freshwater ecology study area. Subsequently, and perhaps more than any other receptor group, freshwater fish populations are at risk from both the onshore and offshore aspects of the Project.</p> <p>The embedded mitigation should ensure that, over the life of the Project, there are no negative impacts delivered to the freshwater ecology receptors. However, for all species, their presence and persistence are tied to offshore factors. Any influence the Project exerts on the offshore life history stages of eel and salmonids, in particular, has the potential to impact the presence of the onshore receptors.</p> <p>The Offshore EIA Report chapter 11: Fish and shellfish ecology demonstrates that there is potentially some effect on migrating diadromous fish populations from EMF and predator aggregations; but these effects were deemed minor and taking account of embedded mitigation, not of a scale to impact on the populations of diadromous fish. However, these conclusions were based on potentially limited information and the Offshore EIA Report did highlight that there remains data-gaps in our understandings of the spatial and temporal patterns of diadromous fish movements not in the offshore Project Area, but around Scotland. Strategic research initiatives in partnership with other developers and Scottish Government may be required to address these data gaps as identified in the ScotMER diadromous fish and fish and fisheries evidence maps.</p>	Chapter 11: Fish and shellfish ecology.



ONSHORE EIA REPORT CHAPTER	WHOLE PROJECT ASSESSMENT	RELEVANT OFFSHORE EIA REPORT CHAPTER
Chapter 15: Noise and vibration	<p>There is potential for a cable laying sea vessel to be close to shore for a period of time which would coincide with the construction period at landfall for the onshore Project. Therefore, the cumulative impact of these construction activities can be considered. Source noise from the cable laying sea vessel has been estimated by assuming that it is similar to a dredging vessel for which British Standard (BS) 5228-1 provides example source noise information, equivalent to an A-weighted sound power level (LwA) of 110 decibels (dB) (which is considered precautionary). The position of the cable laying sea vessel may vary and for the purpose of assessment it has been taken up to 400 m seaward of the MHWS), and therefore more than 500 m from the nearest noise sensitive receptors for the landfall area. This would represent noise levels of less than 50 dB at these receptors, which would represent a negligible contribution relative to the worst case noise levels considered and therefore, there would be no additional whole project impacts.</p>	n/a
Chapter Landscape and visual	<p>17: There is a spatial overlap between the onshore Project and the offshore Project at the landfall. During the construction period, construction vessels and cable lay vessels associated with the offshore Project and the active change of the erection of the offshore windfarm may be visible at the same time as construction activities at the landfall. Residential and visitor receptors in the immediate vicinity may therefore be subject to a slightly greater level of visual effect than that assessed for the individual elements of the Project during the construction period. However, this would be short term, localised and temporary in nature.</p>	Chapter 18: SLVIA.



18.5 References

British Standard (BS) 5228 1: 2009 (amended 2014) and BS 5228 2: 2009 (amended 2014) provide detailed guidance on construction noise and vibration (respectively), its estimation and control.

BEIS (2019). Decommissioning of Offshore Renewable Energy Installations under The Energy Act 2004 Guidance notes for industry (England and Wales) Available online at: <https://www.gov.uk/government/publications/decommissioning-offshore-renewable-energy-installations> [Accessed 01/09/2022].

Scottish Government (2022). Decommissioning of Offshore Renewable Energy Installations in Scottish waters or in the Scottish part of the Renewable Energy Zone under The Energy Act 2004 Guidance notes for industry (in Scotland). Available online at: <https://www.gov.scot/publications/offshore-renewable-energy-decommissioning-guidance-scottish-waters/pages/4/> [Accessed 01/09/2022].



18.6 Abbreviations

TERM	DEFINITION
ALARP	As Low as Reasonably Practicable
ATBA	Area to Be Avoided
BEIS	Department for Business, Energy and Industrial Strategy
BS	British Standard
BT	British Telecommunications
CAA	Civil Aviation Authority
CES	Crown Estate Scotland
CfD	Contract for Difference
CO ₂	Carbon Dioxide
CTV	Crew Transfer Vessels
dB	Decibel
DSLPP	Development Specification and Layout Plan
ECC	Export Cable Corridor
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
EMF	Electromagnetic fields
EMP	Environmental Management Plan
EPS	European Protected Species
FEPA	Food and Environment Protection Act
FMMS	Fisheries Management and Mitigation Strategy



TERM	DEFINITION
FWMP	Freshwater Pearl Mussel
GCR	Geological Conservation Review
HDD	Horizontal Directional Drilling
HMR	Helicopter Main Route
HRA	Habitats Regulations Appraisal
HSE	Health and Safety and Environment
HVAC	High Voltage Alternating Current
INNS	Invasive Non-Native Species
iPCoD	Interim Population Consequences of Disturbance
km	Kilometre
LAT	Lowest Astronomical Tide
LCT	Landscape Character Type
LSE	Likely Significant Effect
LwA	A-weighted sound power level
m	Metre
MBES	Multi-Beam Echosounder
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate - Licensing Operations Team
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MoD	Ministry of Defence



TERM	DEFINITION
MS-LOT	Marine Scotland - Licensing Operations Team
NCMPA	Nature Conservation Marine Protected Area
NM	Nautical Mile
NOTAM	Notice to Airmen
NPDE	Nuclear Power Development Establishment
NRTE	Naval Reactor Test Establishment
NSA	National Scenic Area
NSVMP	Navigational Safety and Vessel Management Plan
OAA	Option Agreement Area
OIC	Orkney Islands Council
OSP	Offshore Substation Platform
OWPL	Offshore Wind Power Limited
PAD	Protocol for Archaeological Discoveries
PEMP	Project Environmental Management Plan
PFOWF	Pentland Floating Offshore Windfarm
PMF	Priority Marine Feature
PO	Plan Option
PSR	Primarily Surveillance Radar
PVA	Population Viability Analysis
RCCA	Regional Coastal Character Area
RIAA	Report to Inform Appropriate Assessment



TERM	DEFINITION
ROVSV	Remotely Operated Vehicle Support Vessels
SAC	Special Area of Conservation
SAR	Search and Rescue
SCDS	Supply Chain Development Statement
ScotMER	Scottish Marine Energy Research
SCUBA	Self-Contained Underwater Breathing Apparatus
SEPA	Scottish Environment Protection Agency
SHET-L	Scottish Hydro Electric Transmission plc
SLQ	Special Landscape Qualities
SLVIA	Seascape Landscape and Visual Impact Assessment
SOV	Service Operated Vessels
SPA	Special Protection Area
SS	Supporting Study
SSS	Side-Scan Sonar
SSSI	Site of Special Scientific Interest
THC	The Highland Council
UK	United Kingdom
UXO	Unexploded Ordnance
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator
ZTV	Zone of Theoretical Visibility