

Scapa Deep Water Quay Environmental Impact Assessment Report: Non - Technical Summary

July 2026

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Introduction

Background

In August 2020, Orkney Islands Council Harbour Authority (OICHA) launched the Orkney Harbours Masterplan Phase 1, (after Orkney Island Council (OIC) Members approval in April 2020) a proposed and ambitious £230 million infrastructure vision to be completed over a 20 year period. Proposals focus on harbour infrastructure enhancements that will generate jobs, additional revenue and attract new business. It represents the first step in a review of OICHA infrastructure to create a base for innovation and to secure the long-term future for the community associated with maritime activities.

A core objective of the Masterplan is to support decarbonisation and the transition toward cleaner energy. The proposed infrastructure is designed to manage this shift effectively, ensuring Orkney continues to secure social and economic benefits from the oil and gas sector during its gradual decline.

Phase 1 of the Masterplan focuses on five key locations across the Orkney Mainland, presented here in no order of priority:

- Scapa Deep Water Quay (SDWQ)
- Hatston Pier and Harbour
- Existing Scapa Pier
- Kirkwall Pier and Harbour
- Stromness

Phase 2 of the Masterplan has commenced. This subsequent phase will assess the structural condition and future development requirements of the smaller harbours and piers located throughout the wider archipelago.

Consenting Process

The Environmental Impact Assessment (EIA) was undertaken in accordance with both the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations

2017 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

The purpose of this Non-Technical Summary (NTS) is to present the findings of the assessment in a clear, accessible format for the public. The EIA process identifies whether the SDWQ development will result in significant environmental effects. Where significant effects are predicted, the assessment evaluates their scale and magnitude, and proposes mitigation measures to avoid, reduce, or offset them. This NTS outlines the scope of the EIA, the methodology applied, and the core findings of the assessments

Supplementary Environmental Information

The Supplemental Environmental Information Report (SEIR), dated July 2026, updates the 2023 Environmental Impact Assessment Report (EIAR) and its 2024 addendum. It addresses specific feedback from consultees, primarily NatureScot, regarding modified project description, assumptions and updated environmental data. Mirroring the structure of the original EIAR, the SEIR report evaluates changes to predicted significant environmental effects and includes the following appendices:

- **Appendix A:** Habitat Regulations Appraisal
- **Appendix B:** Seal Risk Assessment
- **Appendix C:** Basking Shark Risk Assessment
- **Appendix D:** Marine Mammal Risk Assessment

The Site

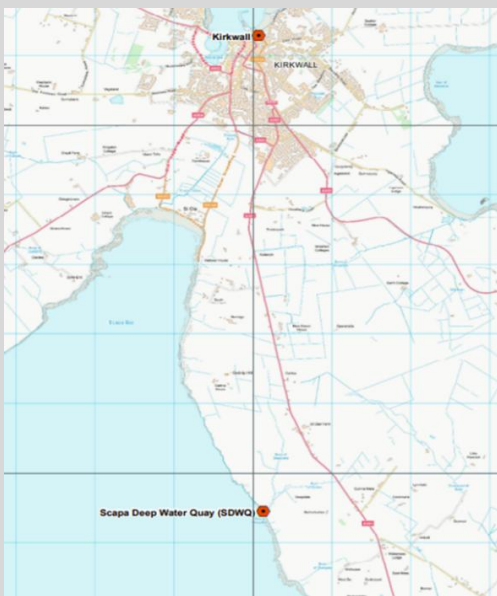
SDWQ will be situated within a rural area of the Orkney Mainland, circa 4km south from the existing Scapa Pier, and ~6km from the centre of Kirkwall – within the parish of Holm, in the vicinity of Deepdale. The site at present is

largely pastureland, with isolated residential dwellings and farmsteads located along the extent of the A961.

The site itself is currently undeveloped coastline comprising a gravelly beach and in places exposed rock bordered on the landside by a rock face circa 3m in height. The land above the rock face comprises rough grazing which slopes upwards to the east and the A961. The Burn of Deepdale is to the north with a rocky promontory forming a natural barrier to the south. There is currently a rough track from the A961 to the coastline.

The Gaitnip Hill Local Nature Conservation Site (LNCS) is situated immediately north of the Burn of Deepdale. Several key marine and heritage features are located near the proposed development:

- **The Royal Oak War Grave:** This designated military wreck and its associated exclusion zone lie approximately 1,200 metres northwest of the site.
- **Aquaculture:** An active fish farm is situated approximately 835 metres to the south.



Above: Site Location Plan

Gaitnip Hill Local Nature Conservation Site (LNCS) is located immediately to the north of the Burn of Deepdale. The Royal Oak designated war grave, and consequent Military Wreck exclusion zone is located ~1,200m to

the northwest of the site, and a fish farm is situated ~835m to the south.

Structure of this Non-Technical Summary

The NTS is set out in the same order as the EIA Reports (EIAR) and Supplemental Environmental Information Reports (SEIR), to facilitate cross-referencing and to offer a summary of the environmental findings that will be submitted. The sections within this NTS are therefore as follows:

- 1 Introduction
- 2 Proposed Development
- 3 EIA Methodology and Scoping
- 4 Water Environment
- 5 Biodiversity
- 6 Archaeology and Cultural Heritage
- 7 Seascape, Landscape and Visual Impact Assessment
- 8 Socio-Economics
- 9 Airborne Noise
- 10 Supporting Assessments
- 11 Summary of Significance of Effects

The overall suite of documents associated with the applications comprises the following:

- The EIAR –reports the potentially significant environmental effects of the proposed development on the environment, and is made up of the following:
 - Volume 1: Written Statement –contains discussion of potentially significant environmental effects and proposed mitigation measures
 - Volume 2: Figures – this volume includes figures, drawings and diagrams which support Volume 1
 - Volume 3: Technical Appendices – this volume contains the technical background reports written and used to inform the environmental assessment.
- Supplemental Environmental Information Reports: have been produced to address

consultee queries and supplemental information to the EIAR.

- Pre-Application Consultation (PAC) Report: this provides information on the community engagement which has been undertaken prior to this submission with regards to the proposed development, and details public engagement initiatives and attitudes towards the proposed development.
- Non-Technical Summary (NTS) (this document provides a description of the EIA process and its findings in non-technical language).

Dates of Previously Submitted Reports and Hyperlinks

- Environmental Impact Assessment Report (July 2023). Scapa Deep Water Quay. Volume 1: Environmental Impact Assessment. **Available at :**
<https://marine.gov.scot/?q=node/24419> and <https://planningandwarrant.orkney.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RYTOJOMDHCH00>
- EnviroCentre (August 2024). Scapa Deep Water Quay. Additional Information. **Available at :**
<https://marine.gov.scot/?q=node/25697>
- EnviroCentre (May 2025). Scapa Deep Water Quay. Supplementary Environmental Information Report – May 2025. **Available at:**
<https://marine.gov.scot/?q=data/additional-information-2025-scapa-deep-water-quay>
- EnviroCentre (September 2025). Scapa Deep Water Quay. Supplementary Environmental Information Report – October 2025. **Available at :**
<https://marine.gov.scot/?q=node/26879>

The Proposed Development

Need for Development

There are specific market opportunities in the offshore wind sector that need access to deep water pier infrastructure, both deep water access and laydown and working areas. No such facility currently exists on the Orkney Mainland, reflecting a wider infrastructure shortage across Scotland and the UK. To address this gap, the Orkney Harbours Masterplan Phase 1 evaluated several potential locations. Following a comprehensive multi-criteria appraisal of all options, Deepdale, located south of the existing Scapa Pier, was selected as the preferred site.

The primary purpose of the new facility is to accommodate industrial operations requiring deepwater berthing alongside a large onshore layout area.

Since the adoption of the Masterplan, the overall concept and business case for the SDWQ has been refined. This includes re-siting the proposed development from its original location north of the Burn of Deepdale. Following initial site investigations and preliminary ecological surveys, the footprint was moved south of the burn.

This repositioning was driven by key engineering and environmental benefits:

- **Reduced Excavation:** Moving the development south significantly minimised the volume of rock and soil requiring removal.
- **Stream Protection:** The updated layout completely avoids crossing the Burn of Deepdale.
- **Habitat Preservation:** Shifting the footprint south eliminated direct encroachment into the Gaitnip Hill Local Nature Conservation Site (LNCS).

The Proposed Development

SDWQ design evolution

The original SDWQ EIAR and Habitats Regulations Appraisal (HRA) were prepared based on the Exemplar Design submitted in July 2023 and subsequently updated in August 2024. Developed by Arch Henderson and OICHA, this initial design served as the baseline solution for the consenting and tender development phases, forming the basis of the original consent applications.

Following these submissions, the project underwent a comprehensive 'mitigation by design' process in collaboration with the preferred construction contractor. This process resulted in two key design modifications that significantly reduce the development's potential environmental impacts. These changes are detailed throughout the project description below and form the basis of this Supplemental Environmental Information (SEI) Report, however they are summarised as follows:

- Quay wall construction
 - **Exemplar Design:** piled wall construction
 - **Current Design:** precast concrete caisson construction, providing a considerable reduction in underwater noise.
- Dredging methodology
 - **Exemplar Design::** dredge and re-use with disposal off-site
 - **Current Design:** Dredge and re-use majority of material in reclamation, providing a significant reduction in dredging programme and vessel movements to disposal site.

While the overall development footprint remains identical to the exemplar design, the proposed dredge pocket has been extended within the development boundary to accommodate the concrete caisson foundations. Upon completion, the marine

infrastructure asset will deliver 23.1 hectares (ha) of operational laydown area alongside 3.1 ha of dedicated quayside concrete hardstanding. The exemplar design solution was initially assessed as appropriate at the scheme design stage; however, as stated within Volume 3: Technical Appendix 2.1 of the EIAR, this design “may vary once final design and build tender procurement is progressed and contractors' individual construction methods are known.”

Construction

Programme

The Table below outlines the key construction stages, their indicative durations, and the projected timeframes for these works.

Outline Construction Programme

Works Description	Est. Duration	Est. Works period
Access road construction, haul road, earthworks and A961 re-alignment	60 weeks	Dec 2027 – Feb2029
Caisson fabrication (off-site)	24 weeks	Dec 2027 – June 2028
Caisson transport	8 weeks	June 2028 – August 2028
Dredging bund construction	32 weeks	Dec 2027 – July 2028
Dredging	12 weeks	June 2028 – August 2028
Caisson installation	8 weeks	August 2028 – Sept 2028
Landside earthworks – Overburden removal, rock blasting and excavation	100 weeks	October 2027 – Sept 2029
Quay finishings	52 weeks	Jan 2029 – Jan 2030
Demobilisation	12 weeks	Jan 2030 – ~Feb 2030
Completion	N/A	February 2030

*Completion of the quay wall, including the infilling of caisson cells and backfilling behind the units, is scheduled to continue until February 2029. Depending on the local availability of suitable materials on-island, these activities may require the vessel movements detailed in Table 2-3. The vessel data presented in Table 2-3 represents a conservative, worst-case scenario for caisson infilling operations.

Terrestrial blasting is scheduled for completion within the initial 59 weeks of the landside earthworks programme. However, to accommodate potential variations in ground conditions, a maximum design scenario of up to 100 weeks is assessed. Terrestrial blasting frequency will be limited to two events per week.

Outline design criteria

These design criteria establish a robust framework for the marine assets, verifying structural integrity, stability, and operational safety. Adherence to these parameters ensures long-term durability when subjected to the site-specific hydrodynamic and metocean conditions of the Scottish marine environment.

- **Dredging Requirements:** The operational depths of -15.0m Chart Datum (CD) and -20.0m CD
- **Environmental conditions:** Consideration of climate change and sea-level rise scenarios (A projected sea level rise of 0.9 m by 2100 is considered, based on national climate projections), with tidal lag (normal conditions) and wave conditions (1 in 50-year, 1 in 200-year, 1 in 570-year return periods) integrated into the design.
- **Materials:** Concrete and reinforcement materials must comply with Eurocodes and British Standards, with specifications for exposure classes, cement types, and aggregate properties.
- **Caisson design:** The caissons are designed with a focus on durability, using concrete that is resistant to degradation in marine environments. Concrete properties, cement types, and aggregate characteristics have been carefully specified to ensure a long lifespan.

- **Caisson foundations and fill:** Crushed imported rock is used as the foundation layer, with strict controls on durability and strength. Fill materials inside and behind caissons are selected for high density and internal friction to ensure stability.
- **Scour protection:** Concrete scour protection mattresses and rock armour is installed to mitigate seabed erosion caused by vessel thrusters and propellers near the quay wall.

Site establishment and access

The access road design comprises of an 8 m wide asphalt surfaced roadway, 1.8 m wide hard verge (service strip) and 1.8 m wide remote path (south side), 1.5 m soft verge (north side) and surface water conveyance swales (both sides).

Access will be formed from A961 which is to be realigned as part of the works. This road realignment has its own planning permission and is not part of this application. Safe access and egress from the A961 will be achieved with reflective signage and 2-way lights as necessary.

The access road is prioritised as a critical path activity as its completion triggers the commencement of the laydown area, landside cut and fill operations and shall provide access for the construction of the dredge containment bund, allowing dredge operations to commence. The contractor will require temporary service connections to the landside site area early in the programme to facilitate blasting, quarrying and earthworks operations.

The contractor will carry out the topsoil strip, overburden removal and elements of rock cut for the new access road. The contractor will place the subbase and surcharge it to act as a robust haul road during the construction programme. This will take cognisance of Scottish Environment Protection Agency (SEPA) comments on the need to protect Groundwater Dependent Terrestrial Ecosystems at the Project site.

The contractor will install the service trenching, drainage and ducting as the works progress to ensure water is managed effectively, services can be connected, and a safe road is completed prior to temporary traffic using it. Upon completion of the project, the contractor will trim the surcharge and carry out the final surfacing.

Dredging

Prior to the commencement of dredging operations, a containment bund will be constructed around the proposed reclamation area using site won general fill material screened of fines and suitable for placement below water, sourced from the initial landside excavation works and transported from the on-site designated processing areas. The bund shall be constructed up to a level of +4.0m CD using general fill below-water material, placed from the land. The bund shall be located approximately 40m behind the position of the caissons (i.e. within the footprint of the development). Integrated into this bund, a weir box system shall be installed in the northwest corner of the reclamation area. The weir box is an adjustable weir used to dewater the reclamation area, control the water level and the discharge of water/fines at a designated discharge point. All suitable dredged material will be placed in a reclamation area behind the pre-constructed bund, with any unsuitable material disposed at the licenced sea disposal site.

The dredging works extend along the entire quay alignment, including the main quay as well as the small vessel berths to the northern end, and are essential for preparing the seabed for subsequent caisson installation. The structures will be founded on hard bearing strata, requiring the removal of superficial soils and hard strata from approx. -15m CD down to a maximum depth of -20.5m CD. The dredged area edge slopes depend on the material type, ranging from 1:3 in superficial soils to 1:1 in engineering rock, whilst the dredging berth pockets are required to be operative for elevations of -15m CD and -20m CD.

Dredging works will be executed in a single campaign using a cutter suction dredger (CSD) specifically selected for its capacity to operate efficiently under the anticipated soil, sea and weather conditions at Scapa Flow.



Above: Dredging and reclamation areas

The discharging process to the reclamation area shall be carried out through the integration of the dredger pumps with the designated discharge pipeline system where the dredged material will be transported into the reclamation area. This operation will be carried out in parallel with the dredging activities, beginning at the northwest portion of the reclamation.

Turbidity meters will be installed to detect any increase in turbidity outside the reclamation area, the details of which will be included within the supporting Construction Environmental Management Document (CEMD).

Through the early contractor involvement design stage, it has been identified that a significant reduction in material disposed at sea could be achieved from that which was originally defined in the exemplar design. There is, however, potential for up to 82,000m³ of glacial till which may be unsuitable for re-use, to be disposed at sea (Table Below).

Barge(s) will be used to transport material to the licensed offshore deposit site **F1040**. If the maximum volume (82,000m³) is deposited, there will be 21 round trips to the sea deposit site (42 vessel movements) over 12 a week

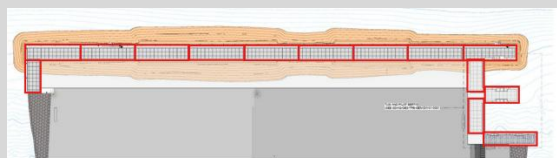
period, typically this activity will be carried out between the beginning of June to the end of August (currently 2027).

Proposed Dredge Volumes

Description	Total volume dredged (m ³)	Volume reused on site (m ³)	Volume disposed offshore (m ³)
Hard Dredge	72,653	72,653	0
Soft Dredge	306,754	306,754	0
TOTAL	379,407	379,407	0
Disposal Contingency	379,407	297,407	82,000

Quay wall construction

The quay wall will be formed from reinforced concrete caissons installed on a rock bed foundation, as shown below. The main quay is composed of nine large reinforced concrete caissons, with a smaller caisson at the south end that ties into the adjacent rock armour revetment. At the north end, the small vessel berths are formed by four caissons.

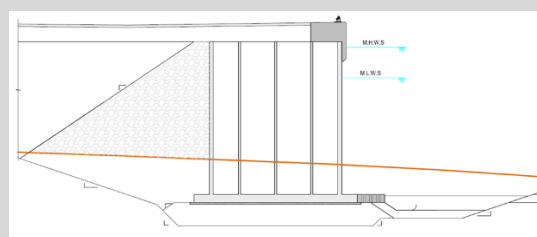


Above: Quay Wall General Arrangement

Caisson design criteria

The main quay structure comprises nine large reinforced concrete caissons, complemented by a smaller caisson at the southern return that ties into the adjacent rock armour revetment. A range of caisson cross-sections is incorporated along the quay alignment to accommodate variations in finished dredge depths and underlying geotechnical conditions. The quay cope level is fixed at +7.00 m CD, with dredging in front of the quay generally extending to –15.0 m CD, including a 1 m over-dredge allowance. Near the southern end, a 140 m section includes a deeper dredge pocket reaching –20.5 m CD, also with a 1 m

over-dredge allowance. At the northern end, the small vessel berths are formed using a series of smaller caissons. Dredging design accounts for slope requirements based on soil type to ensure foundation levels are established on engineering rock, and the geotechnical performance of the caissons is assessed for sliding, overturning, bearing capacity, and overall stability. The Figure below outlines a typical cross section for the caisson wall structure.



Above: Simple cross section of caisson quay wall structure

Each caisson will be ballasted as per design, ensuring naval stability in all phases of transport and installation.

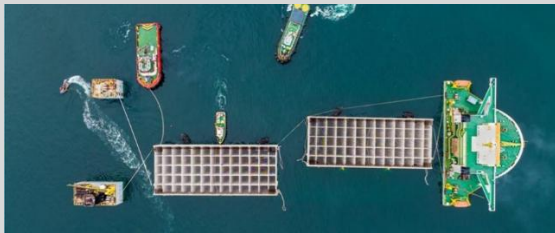
The fourteen caissons will be transported to the site in four shipments (figure below). The first batch of caissons will be directly installed in their final positions along the quay line from the semisubmersible delivery vessel. The remaining caissons of a batch in subsequent deliveries will be towed to a temporary wet storage area within the Project boundary until its final installation on the quay line.



Above: Image of caisson loading operation

Caissons will be dry stored during transport from Spain, reducing the risk of transporting non-native species. A Biosecurity Plan will be produced as part of the CEMD, which will set out the measures to prevent the introduction of invasive non-native species, in accordance with relevant legislation and best practice.

The unloading operation at Scapa Flow requires water depths over 27 m due to the draft of the vessel and caissons, and favourable metocean conditions. The caisson deliveries will be unloaded using 3 tugboats of at least 4,000 Horsepower (3,000kW) which will be hired locally, with the operation carried out in one to two good weather days per shipment.



Above: Caisson loading onto Semi-submersible vessel

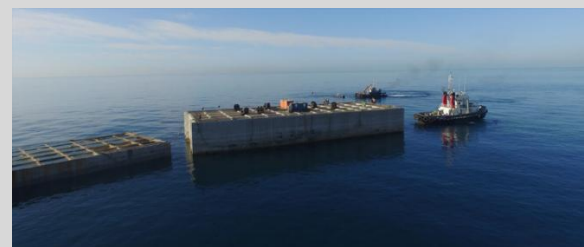
Caissons will be unloaded from the semisubmersible vessel either directly to the quay line or to a nearby storage area, where they will remain until placement. The caissons will be fitted with auxiliary equipment including winches, mooring ropes and anchors, walking platforms, ballast systems, topographic prisms and fenders. After unloading, they will be temporarily secured either by tying them together alongside the partially constructed quay or by anchoring them to the seabed close to the project site. No piling or drilling is required for this operation and underwater noise will be negligible. When weather conditions permit, the caissons will be sunk into their final positions. Alternatively, they may be temporarily set down on the quay-line foundation and later refloated for final installation within tolerance.

Caisson installation

The process to install a caisson is typically performed during daylight hours in around 6-8 hours, given suitable metocean conditions. Caissons will be towed individually from the semisubmersible vessel or their temporary storage location to the quay line. Typically, one to three tugboats will be sufficient for towing from temporary storage, with the same tugs used to assist the installation operation.

Each caisson will be positioned while sinking, using tugs and winches, until a final controlled touchdown on the prepared foundation. Each caisson has independent and watertight groups of cells. During the operation, each group of cells is filled simultaneously with seawater either using a pump or a valve, with surveyors monitoring the level in each group to ensure that the installation process is performed in a controlled manner.

Ballasting water will be taken from the sea at Scapa Flow after caisson placement. If placement meets tolerance, ballasting continues until filled; otherwise, de-ballasting and repositioning are repeated until successful, usually in one attempt.



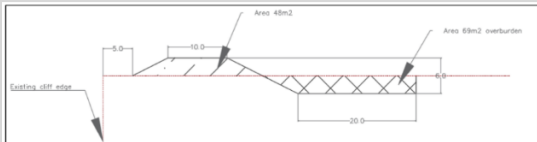
Above: Caisson control platform and positioning equipment

Landside excavation platform

Mechanical methods will be used to excavate soft soils on land, while rock removal will involve drilling and terrestrial blasting, with no marine blasting planned. The overall landside earthworks programme is scheduled to be ongoing for approximately 100 weeks (Oct 27' to Sept 29' provisionally) with blasting taking place intermittently throughout this period. Due to the nature of the works, the exact timing of the blasts cannot be confirmed and should not be constrained to specific seasons of the year. It is estimated that during the 100 weeks of earthworks, a total of 35 blasts shall be carried out with no more than 2 blasts per week. Initially, the contractor will set up pre-earthworks drainage to manage surface water runoff.

After establishing perimeter cut-off V ditches and before starting main land excavation and blasting, a 6m high bund will be built at least 5m from the cliff edge to ensure safety and reduce noise impact on marine life. The bund

height shall be achieved by reducing the landside level by 3m and constructing a 3m high bund at the top of the excavation to achieve the overall height of 6m as shown below.



Above: Noise bund section

Reclaimed land (sea filling)

During the dredging campaign, the dredge bund and reclaimed area which it contains shall be completed forming the initial section of land reclamation. Once caissons are installed, filled and backfilled, rock armour revetments shall be constructed at the north and south ends of the quay wall, closing the perimeter. Rock-armoured revetments protect the north and south sides of the site from wave action. These are designed for a 60-year lifespan and to withstand extreme wave conditions (1:200 years). Armour layers consist of 2.5 tonnes (north) and 4.5 tonnes (south) rocks with appropriately sized underlayers and geotextiles. At this stage, general infilling from land will commence using excavated suitable material from the landside development.

The majority of land reclamation material is comprised of dredged material and land-based excavated material (which will be screened on site to remove fines before placement). There is a requirement for imported quarry material to be used at the rear of the concrete caissons to achieve the correct grading and compaction requirements as per the caisson stability design.

Substantial marine area containment will be achieved before land reclamation fill is progressed by construction of the containment bund mentioned above, thus minimising sediment discharge outside the works.

Pollution control

There is the risk of pollution events (oil spills, etc.) during the construction phase of the Project. Adherence to strict Pollution

Prevention controls during land reclamation works will mitigate against pollution spills.

In terms of surface water pollution, drainage will be designed, in accordance with best practice and SEPA requirements, to ensure that there are no untreated surface water discharges directly to the surrounding coastal waters. Suitable prevention measures will be in place at all times to prevent the release of pollutants to the water environment, including adjacent coastal waters.

An Outline CEMD has been produced specifically tailored to this project. This document will be further developed and enhanced to fully reflect the potential effects and suitable forms of mitigation specific to the chosen contractor’s construction methods and the conditions of all consents.

Construction Vessel Movements

The construction phase will see the following vessel movements:

Based on baseline vessel movements (as informed by the Navigational Risk Assessment (NRA); see Appendix 2.3 of EnviroCentre, 2025a) and summarised in section 10.2.2.3 of Appendix A: HRA), this will result in an additional 21.5 vessel movements per month on average (+0.16% from baseline) during winter months (October-March) and an additional 90.4 vessel movements per month on average (+0.5% from baseline) during summer months (April-September).

Number of Predicted Vessel Movements During Construction

Vessel	Predicted Number of Vessel Movements.	Timescales
Caisson delivery, offloading and installation	20 movements (4 deliveries) using a semi-submersible vessel (3 tugs for offloading, 1 tug for installation)	July 2028 – Sept 2028

	Tugs deployed from nearby Scapa Pier	
Scour protection	10 trips (20 movements)	Aug 2028 – Sept2028
Caisson infilling	15 trips (30 movements)	Aug 2028 – Feb 2029
Dredging	21 trips (42 movements)	June 2028– Aug 2028
Total	112	

Operational Phase

The Project is likely to operate as a marine facility 24 hours per day and 7 days per week, so there is the potential for activity at any time of the day or night. This will include:

- Flatbed lorries: delivering and uplifting from site.
- HGVs: delivering and uplifting from site.
- Light vans: delivering cargo or providing maintenance and servicing to site.
- Road Tankers: delivering bulk goods and liquids to site or removing liquids and waste from site; and
- Forklift trucks: loading and unloading vehicles servicing the site. In addition to the general cargo operations, there will be:
- Minibuses / cars collecting and returning people working one site - these vehicles not allowed in the working area.
- Security staff based within the site and undertaking patrols when appropriate.
- Staff looking after the facility maintenance and assisting with vessel moorings.
- Third Party Stevedore Companies loading and unloading vessels; and
- Coaches and taxis facilitating crew changes on vessels.

The internal roadways and footpaths will be demarcated with designated routes, and barriers will be installed where necessary. There will be a security fence around the working area perimeter to protect it as well as the public, in addition to preventing access to breakwaters, rock armour revetments etc. (access gates will be provided for maintenance). The fence will be constructed in accordance with the requirements of the

International Ship and Port Facility Security Code (ISPS).

The Table below provides a summary of the indicative infrastructure likely to be present upon completion of the Project.

Indicative Operational Infrastructure

Infrastructure Type	Qty	Description
Future Marine Fuels	TBC	Possible storage and supply to vessels of very low or zero carbon fuels. Note this will be subject to further assessments and approval.
Water Tanks	4	Outside of the main working area.
Sub-station	1	Main electric supply point to site (not in main working area).
Main gatehouse / Access building	1	Outside of main working area, may contain admin offices and is the security control for site
Car park, cycle storage and bus stop	-	Vehicle parking spaces and bicycle racks. Bus stop for use by internal bus services (drop off and pick up only)

Quayside Services

The indicative locations of quayside infrastructure services are shown on the Figure Below.



Above: Proposed SDQW Operational Layout

Quayside services such as potable water and shore power will be incorporated into a service trench that will run around the Project with bunker points to the quayside at regular intervals.

Four water storage tanks with built-in treatment systems (as required) will be installed as to supply potable water to the whole site and vessels. Located near to the water tanks will be a 33kV /11kV/415V substation for whole site supply, including shore power for vessels. Service vehicles will be accessing the Project for crew and maintenance support to these vessels.

Vessel Movements

The Project is designed to be flexible so that many types of vessels can berth, subject to draught and length. While the quay is a major strategic facility, its operational profile is characterised by the infrequent arrival of large vessels, likely to be aligned with the integration and deployment schedules of major offshore wind developments. Approximately 80% of vessel activity will take place in the summer months.

There is significant existing vessel activity in the wider area around the proposed Project. There will be increased vessel activity introduced by the Project in the area from the existing shipping route to the site (Appendix C EnviroCentre, 2025a); however, there are existing vessel movements in this area, as shown by the vessel tracks in Appendix C EnviroCentre, 2025a, and in more detail in the NRA submitted with the EIAR (Appendix 2.3 of EnviroCentre, 2025a).

The table below outlines the annual and seasonal operational vessel activity expected for the Project.

Annual and seasonal operational vessel activity

	Per year		Per winter season (October-March)		Per summer season (April-September)	
	Vessel number	Vessel movements (return trips)	Vessel number	Vessel movements (return trips)	Vessel number	Vessel movements (return trips)
Large vessels	28	56	6	12	22	44
Smaller vessels	12	24	2	4	10	20
Pilot boats for large vessels	56	112	11	22	45	90
Total	96	192	19	38	77	154

Based on baseline vessel movements (as informed by the NRA; see Appendix 2.3 of EnviroCentre, 2025(a) and summarised in section 10.2.2.3 of Appendix A, this will result in an additional 6 vessel movements per month on average (+0.3% from baseline) during winter months (October-March) and an additional 26 vessel movements per month on average (+1.0% from baseline) during summer months (April-September).

Wet storage

There is no planned wet storage of fully constructed turbines at the SDWQ site. Any future proposals for wet storage will be conducted in accordance with the relevant regulations/consents.

Quayside cranes

No fixed or permanent craneage will be installed at the Project site. Instead, lifting operations will be carried out by a combination of cranes

fitted to heavy lift vessels and temporary mobile cranes deployed from the quayside. Heavy lifting activities will typically coincide with large vessel movements, so cranes will be operating to similar timeframes as vessel movements.

Crane activity will be dependent on weather conditions, particularly in the winter months, as lifting of large loads is highly susceptible to even light to moderate winds. Based on analysis of 1 in 10-year weather averages in Kirkwall (1979-2010), the time lost to wind in the winter months is >200 hours per month. As such, less than 20% of lifting operations will likely take place in the winter.

There will be approximately 30 operational vessel trips per year (60 vessel movements) that involve a requirement for craneage, with approximately 24 occurring in the summer months and 6 in winter). This equates to 4 vessel trips per month (1 a week) in summer and 1 vessel trip per month (0.25 a week) in winter. As each vessel will be berthed at the Project for approximately 2-5 days, in the summer months cranes are likely to be active between 8 – 20 days per month, and in winter 2 – 5 days per month.

The mobile cranes will typically be up to 250 tonnes capacity (Liebherr LTM1250 or similar). This type of crane has an extendable telescopic boom with a maximum height of 60m in vertical lift. Smaller mobile cranes of 60 and 90 tonnes capacity will be used to support the larger cranes and will find more use during the winter months due to lower boom heights and lower windage. The maximum boom height for Liebherr LTM10-60 is 48m. On-board vessel cranes would be in the region of 70-125m height. The maximum number of cranes in use on site will depend on activities undertaken, but in the summer months, including on-board vessel cranes, could be up to 4 cranes on site, i.e. one on-vessel crane plus 3 mobile cranes. In winter, this number will be far less and is expected to be 2 (smaller) mobile cranes, given that large shipments requiring on-vessel cranes will be planned for summer months.

Mobile cranes are slow-moving and generate limited engine noise at ground level.

During the summer months, mobile cranes will typically be stored on site at the Project, and in winter, either stored on site or taken offsite if they are required elsewhere. When not in use, mobile cranes will be lowered with booms retracted and placed horizontally. In this configuration, they are approximately 5m in height. These types of cranes do not normally provide their own lighting, and lifting operations in winter will typically be carried out in daylight hours.

EIA

Methodology & Scoping

General EIA Methodology

The purpose of an EIA is to identify and evaluate the likely significant effects of a proposed development on the environment, both direct and indirect, and then identify measures to mitigate or manage any significant adverse effects before a planning or marine application is determined.

The EIA process provides an opportunity to 'design out' adverse effects wherever possible by making alterations to the design of the proposed development before the application is submitted and based upon feedback from consultees.

Where significant adverse effects cannot be designed out, mitigation measures can be proposed to avoid, compensate, or reduce significant environmental effects to an acceptable level.

The environmental information gathered during the EIA is derived through a methodical process of identification, prediction, and evaluation of the likely significant environmental effects of the proposed development. This process includes: -

- identifying the sensitivity of the baseline conditions / receptors;
- predicting the magnitude of potential impacts;
- predicting the significant effect of the impacts;
- detailing mitigation measures to limit impacts; and
- predicting the potential residual effects as well as the potential cumulative impacts.

The results and findings are presented in full within the EIAR and summarised in this document.

Scoping as part of the EIA Process

Scoping is defined as ‘the way in which key issues are identified from a broad range of potential concerns for inclusion in EIA studies, the areas affected, and the level to which they should be studied.’ The scoping process enables the topics to be covered in the EIAR to be agreed, and for those topics not considered pertinent to be scoped out of the study or reduced in scope (i.e. topics where it is unlikely that significant environmental effects will occur).

Scoping Requests were submitted to OIC and Marine Directorate – Licensing Operations Team (MS - LOT) on 31st March 2021. A Scoping Opinion was received from OIC on 13th October 2021, and from MD-LOT on 22nd October 2021.

Consultation

Consultation responses were obtained from the following organisations in respect of the Scoping Reports issued to OIC and MD-LOT:

- Airfield Superintendent;

- Crown Estate Scotland;
- Defence Infrastructure Organisation (Ministry of Defence);
- Fisheries Management Scotland (FMS);
- Health and Safety Executive;
- Highlands and Islands Airports Ltd.;
- Historic Environment Scotland (HES);
- Holm Community Council;
- Kirkwall Airport – Senior Pilot;
- Kirkwall Fisheries Office;
- Marine Safety Forum;
- Marine Scotland;
- Marine Services;
- Marine Scotland Science (MSS);
- Marine Scotland – Marine Analytical Unit (MAU);
- Marine Scotland Planning and Policy;
- Maritime and Coastguard Agency;
- NatureScot;
- Northern Lighthouse Board;
- OIC departments;
- Orkney Marine Planning Partnership;
- Orkney Sustainable Fisheries;
- Orkney Trout Fishing Association;
- Orkney Fisheries Association;
- Royal Society for the Protection of Birds (RSPB);
- Royal Yachting Association Scotland (RYA Scotland);
- Scottish Environment Protection Agency (SEPA);
- Scottish Fishermen’s Federation;
- Scottish Fishermen’s Organisation;
- Scottish Sea Farms;
- Scottish Water;
- Scottish Wildlife Trust;
- Transport Scotland;
- UK Chamber of Shipping;
- VisitScotland; and
- Whale and Dolphin Conservation.

Supplemental Environmental Information

Following review of the 2023 EIAR, statutory consultees requested additional information and this was provided in an amended 2024

EIAR. Orkney Islands Council Planning and statutory consultees requested further supplemental environmental information for ornithology, seals, vessel movements within Scapa Flow and the interaction with birds and seals i.e. disturbance, displacement and potential fatalities and potential terrestrial noise disturbance. Additional information was also requested for Biodiversity Net Gain/ biodiversity enhancement and Groundwater Dependent Terrestrial Ecosystems (GWDTEs).

In order to ensure statutory consultees were kept informed of proposed amendments and to allow for discussion on proposed methods etc. (NatureScot in particular) three Consultation Workshops were held on 21st January 5th March and 27th March 2025.

A supplemental Environmental Information Report (May 2025) was issued to Orkney Islands Council Planning and MD-LOT. NatureScot in particular again requested additional information and this was provided in September 2025.

The SEIR dated July 2026 is the result of a further information request from NatureScot.

Scope of the Environmental Impact Assessment (EIA)

Based on the consultation undertaken and responses received, a view was reached on the key topics to be assessed as part of the EIA. These were:

- Water Environment;
- Biodiversity;
- Archaeology and Cultural Heritage;
- Seascape, Landscape and Visual Impacts;
- Socio-Economics;
- Airborne Noise; and
- Other Supporting Assessments, including: Accidents and Natural Disasters; Air Quality; Carbon, Climate Change and Greenhouse Gas; and Transport.

Water Environment

Introduction

This section of the EIAR and SEIRs considered potential impacts of the proposed development upon water quality, groundwater, tides, waves and sediment transport. The assessment was undertaken in accordance with relevant best practice guidance, by experienced hydrologists and coastal modellers.

The assessment process involved an initial desk-based review of level surveys of the land and seabed, review of literature, ordnance survey, geological mapping, nautical charts, ground investigation and sediment sampling. Consultation was undertaken with key stakeholders to obtain relevant information and to ensure any concerns were addressed within the study.

Computer modelling of tides and waves was undertaken, for both existing and future conditions.

The National Vegetation Classification (NVC) survey identified GWDTEs located along the cliffs within the site.



Above: GWDTE comprising a Tufa forming spring

Impact Assessment and Significance of Effects

The potential impacts on the Water Environment were identified as:

- Hydrology;
- Water and sediment quality;
- GWDTE;
- Tidal regime;
- Wave climate; and
- Sediment transport.

Hydrology, Water and Sediment Quality

During the construction phase, due to dredge volume, coarse nature of the sediment, and weak tidal currents, the impact of proposed dredging and land reclamation activities was found to be low within the immediate vicinity of the works, and negligible out with the works.

The potential for the operation of the proposed development to impact the water environment found that due to the small contributing catchment and the coastal location, potential impacts on the water environment and coastal processes, with appropriate mitigation in place, would be negligible.

During both phases of the development there is a risk of accidental pollution incidences affecting the water environment (i.e. coastal waters and sediment). The effect of the potential pollution incidences during construction on water quality (high sensitivity) would be dependent on the scale and nature of the incident, therefore the magnitude of impact prior to mitigation may range from low to high, giving rise to effects of moderate to major significance prior to mitigation.

GWDTE

The tufa forming spring communities on the cliff face will be lost because of the proposed development. The proposed development is therefore assessed as having a high magnitude of impact on GWDTE (medium sensitivity)

giving rise to effects of major significance prior to mitigation.

Tidal Regime, Wave Climate and Sediment Transport

The results of computer modelling of tides and waves indicate that the impact of the proposed development on coastal processes will be negligible. Given the negligible impact on tidal velocities and limited localised impact to the wave climate it is considered that there will be a negligible impact on sediment transport (high sensitivity) giving rise to effects of negligible significance prior to mitigation.

Proposed Mitigation Measures

During the construction phase a Construction Environmental Management Document (CEMD) will be developed to ensure that the mitigation measures outlined in the EIAR are followed. The CEMD will include surface water management and pollution prevention measures which follow best practice and comply with SEPA guidance.

A suitably qualified Environmental Clerk of Works (EnvCoW) will monitor the construction works to ensure that the CEMD and associated mitigation measures are being implemented effectively.

During the operational phase, an Operational Environmental Management Document (OEMD) will be in place, and this will include surface water management and pollution prevention measures, which follow best practice and comply with SEPA guidance.

The loss of GWDTE communities will be offset by compensatory habitat creation within the cut faces of the laydown area in the northeast corner of the site.

OICHA shall undertake a planned programme of compliance monitoring to verify the effectiveness of the project's environmental management. Monitoring plans will be established and implemented with the agreement of SEPA, NatureScot and MD-LOT.

With implementation of surface water management and pollution prevention measures, no construction or operational activities were found to have a significant effect upon the water environment or coastal processes.

As a precautionary measure, OICHA proposes to undertake turbidity monitoring to protect water quality and ensure minimal environmental impact. OICHA propose to monitor sediment re-suspension levels to prevent damage to the local ecosystem and aquaculture as high suspended sediment concentrations can contribute to suboptimal conditions and may harm fish since it affects the overall ecological balance. High turbidity can reduce photosynthetic activity, leading to lower oxygen levels, which in turn affects aquatic organisms. By monitoring turbidity, OICHA can review the site works to confirm that the works are resulting in similar conditions to that predicted in the dredge plume modelling and review the findings to confirm that there are no significant impacts associated with the works. Should the review identify turbidity levels that are higher than were predicted in the modelling works then corrective actions will be implemented.

Biodiversity

Introduction

The biodiversity assessment considered the impact of the proposed SDWQ on designated sites, marine and terrestrial habitats, and protected wildlife, including birds, marine mammals, otters and fish. The assessment was carried out according to the latest guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) by experienced and competent ecologists who are all Members of CIEEM and follow its Code of Professional Conduct.

A number of studies were conducted to gather baseline information regarding sensitive

features within the site and wider area. This included a review of desk-based information available from biological records and bodies such as NatureScot and Marine Directorate. Field surveys were also conducted to identify marine and terrestrial habitats, determine how birds use the site, and if there were protected species such as otter present. Computer modelling was used to determine how noise generated through construction activities would travel underwater.

Designated sites in proximity to the development and scoped into the Habitats Regulations Appraisal (July 2026) for assessment include:

- Scapa Flow Special Protection Area (SPA);
- North Orkney SPA;
- Orkney Mainland Moors SPA;
- Sanday Special Area of Conservation (SAC); and
- Loch of Stenness SAC

Habitats in close proximity to the development include:

- Unimproved acid grasslands;
- Semi-improved neutral grassland;
- Marshy grassland;
- Bryophyte dominated spring;
- Crevice/ledge vegetation;
- Coastal grassland;
- Kelp and Seaweed communities on sublittoral sediment; and
- Reefs.

Species/species groups include:

- Otter;
- Birds;
- Grey and harbour seal;
- Harbour porpoises;
- Minke whale;
- Dolphinids (Risso's dolphin, white-beaked dolphin, long-finned pilot whale, killer whale);
- Basking shark;
- Marine fish; and
- Commercial Fisheries.



Above Underwater Orca Pod

Website: [20 Incredible Facts About Orcas - Passport Ocean](#)

Impact Assessment and Significance of Effects

In order to assess the significance of impacts, consideration was given to the predicted duration, frequency, timing, geographical extent and reversibility of impacts, as well as the number of individual animals in a population who would be exposed, or the area of habitat affected.

The proposed works are outside of all the designated sites, with the exception of the Scapa Flow SPA, which overlaps with the site boundary. The protected sites considered within the assessment are designated for mobile species, such as marine mammals and sea birds which could use the waters within and surrounding the site for finding food, resting, or travelling between other important habitats. It was considered that the area of habitat and number of individuals likely to be affected were small in comparison to the total habitat range and populations present within the Orkney Isles, and that with some mitigation, no significant effects would occur.

Surveys identified evidence of otter using the site in the form of spraints, feeding remains and paths. There are also features such as enlarged rabbit burrows along the cliff top which could be used for shelter. The site is not considered to be used for breeding. Some of

these shelters will be lost within the footprint of the development. Further survey will be required to confirm their status, and the need for a protected species licence. Otter could be disturbed and avoid using the site during the construction works, but this will not affect the local population as there are alternative habitats they can use.

It is acknowledged that, in its advice of 7 November 2025, NatureScot was unable to conclude no adverse effect on the integrity of the Scapa Flow SPA in respect of the black-throated diver feature, on the basis of the potential disturbance and displacement associated with crane operations, and considered that this effect could not be fully mitigated. The SEIR and HRA have been prepared to provide the Competent Authorities with the further information necessary to inform their determination.

In relation to birds within the Scapa Flow SPA, the HRA (Appendix A of the SEIR) assessment concludes that the Project, alone and in combination with other plans and projects, will not adversely affect the integrity of the site in respect of any of its qualifying ornithological features. This conclusion is reached with the benefit of the additional information now provided, including the assessment of disturbance and displacement arising from the operation of mobile and vessel-mounted cranes, which has been extended to the black-throated diver, great northern diver and red-throated diver features in response to NatureScot's advice, together with the expanded in-combination assessment.

In addition the 2023 and 2024 EIARs concluded that nesting habitat for waders, such as Oystercatchers, Curlew and Lapwing, will be lost due to the creation of the access road and laydown area. However suitable habitat is prevalent in the wider site environs therefore the impact is considered to be minor.

A small area of open water foraging habitat for Terns will also be lost (i.e. 0.1% of the available habitat within the wider area). As such it is considered there will not be any long-term

effect on the populations of these species in the local area.

For marine mammals and fish, the main impacts arising from construction are from underwater noise generated by activities such as dredging and/or pollution events. Underwater noise can result in changes of behaviour, disturbance, injury or even death in some circumstances when experienced at close range. As these species can all swim freely within the water, as long as they are not too close to the source of the noise when it commences, they will be able to move away before it causes an issue.

Fish kept in commercial cages do not have the option to swim away. The underwater noise model predicts that the fish farm located to the southwest of the development site is not within the area in which permanent injury / fatality could occur as a result of dredging activities. However, the fish farm is in the area in which temporary hearing loss could occur. The temporary loss of hearing is not considered to affect the overall fitness of fish as the farmed fish will be regularly fed and therefore do not need to actively hunt for food resources. In addition, fish have the capacity to replace hair cells over time.

Once SDWQ deep-water is operational, the main impact to marine mammals and large fish such as basking shark is from the increased risk of vessel strikes, however mitigation will reduce the overall risk.

For the features assessed, the impacts were considered not to be significant at any level once mitigation was taken into consideration. The loss of Priority Marine Habitat within the footprint of the development is considered to be significant within the context of the site, but not the wider Orkney Isles area.

No significant cumulative impacts were identified.

Proposed Mitigation Measures

A plan detailing all the mitigation requirements for the project will be drawn up ahead of construction, and its implementation during construction will be audited independently. This will include a detailed biosecurity plan to avoid the spread of marine invasive species as well as pollution prevention measures.

To avoid the risk of injury or death to marine mammals from activities generating loud noises underwater, a designated person (a standard marine mammal observer (MMO) protocol as per JNCC guidance to be implemented Construction) will visually search within a buffer area to make sure there are not any sensitive species present.



Above Marine Mammal Observer

To reduce risk to offshore wildlife collisions, a Vessel Management Plan will be implemented with agreed routes and safe speed limits for all vessels using the site during construction and operation.

Although the above mitigation will reduce the risk of disturbance to marine mammals and basking shark, it cannot be ruled out entirely, so a derogation licence will be required for those species which are legally protected.

A Biodiversity Enhancement Management Plan (BEMP) will be developed for the onshore and intertidal habitats and approved by the regulators prior to construction commencing. The BEMP will include specific, measurable

objectives for habitat creation and management and cover a period of 30 years, with management to be reviewed regularly and informed by monitoring data. It is anticipated that the following actions will be included:

- Creation of habitat features within the rock armour to maximise ecological niches to support a diverse range of species. This can be achieved passively through careful selection and placement of boulders to create ledges and pools or actively through introduction of features such as ridged concrete tiles which are designed to mimic natural rock features;
- Provision of bird nest boxes suitable for a mix of marine and terrestrial species; and
- Creation of onshore insect shelters such as rock piles, dead wood piles or custom-made bug hotels;
- Progression of a native oyster (*Ostrea edulis*) re-introduction programme in conjunction with other proposed developments by OICHA.
- Funding to a PhD, which commenced in September 2024, which will investigate “*The Native Oyster (Ostrea edulis) Restoration Opportunity: optimising site selection modelling and the effect of climate change on oyster restoration.*”

Monitoring will be conducted throughout construction and operational phases to check that mitigation and enhancement measures are achieving their proposed aims. If this is not the case, the mitigation strategies will be reviewed and amended to deliver enhancements as required.

Archaeology and Cultural Heritage

Introduction

The assessment of direct and indirect impacts on the historic environment and assets by the proposed development was a desk-based exercise. The assessment made use of project specific desk-based research, site visits, Zone of Theoretical Visibility (ZTV), assessment of regular side scan sonar surveys undertaken on behalf of OICHA, and assessment of stratigraphic records of core samples collected during geotechnical survey work.

Impact Assessment and Significance of Effects

Three potential historic environment assets were identified within the development area, comprising Deepdale Post-Medieval farmstead, a low mound with a central depression, and a dyke attached to two small sheep pens. Deepdale Farmstead will not be damaged by the development, as it is located out with areas of proposed intrusive development.

The mound with central depression may be prehistoric but will require further investigation to characterise it fully. The impact from development would result in an uncertain/moderate consequence of impact, which could be a significant impact under EIA Regulations.

The dyke and sheep pens are of negligible importance, and their entire removal would result in a minor consequence of impact, which

is not a significant impact under EIA Regulations.

The potential for previously unknown archaeological assets, of low importance, to be present was identified; their entire removal would result in a moderate consequence of impact, which is a significant impact under EIA Regulations.

A single marine historic environment asset - MBES Contact 1 - was identified in the scoping report as being at risk of being impacted by dredging. However changes to the design of the development have ensured there will be no impact upon this asset.

The risk of unknown marine and intertidal historic environment assets in the area of dredging is reduced because of the previous marine geophysical surveys conducted and reviewed. However, it is not possible to entirely discount their presence, as smaller artefacts/wreckage of stone, non-ferrous materials such as aluminium and wood might not be picked up by such surveys. The likelihood of impact on such assets is considered low.

The potential that the site could have long-term effects on the setting of onshore historic environment assets and places, affecting the way in which they are understood, appreciated, and experienced, and thus their significance/importance, was considered. A number of assets and places identified in the scoping were assessed, and no significant impacts were identified.

The potential for the scouring of seabed deposits to expose and damage heritage assets and submerged prehistoric deposits was also considered; the negligible impact from scouring would result in an uncertain/minor consequence of impact, which would not be a significant impact under EIA Regulations.

No significant cumulative impacts were identified.

Proposed Mitigation Measures

Further archaeological investigation, potentially comprising geophysical survey and/or archaeological trial trenching, will be agreed with OIC Planning in advance of the construction phase of the projects. This may lead to further requirements for mitigation, either before or during the construction. Specialist marine archaeological interpretation of the geophysical surveys which took place in 2021 will be undertaken and submitted to OIC and MD-LOT prior to the construction phase of the project.

A Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) to avoid or mitigate accidental impacts and manage any accidental discoveries of archaeological interest will be compiled and submitted for approval to OIC and MD-LOT and fully implemented during the construction phase of the project.

With the implementation of the mitigation measures, the significance of the residual effects will be minor, which is not a significant impact under EIA Regulations.

Seascape, Landscape and Visual

Introduction

A seascape, landscape and visual impact assessment has been undertaken which considers the potential landscape (including townscape) and visual effects of the proposed development.

Impact Assessment and Significance of Effects

Potential effects of the proposed development have been considered for both the construction phase and the operational phase.

The development is a large-scale project proposed in an open, rural and undeveloped part of Orkney. During the construction phase there could be temporary and localised visual impacts for local residents and visitors to the area, and the assessment has predicted that these could be significant.

Significant operational effects would be more widespread. The proposed lighting would be a particular source of adverse landscape and visual effects both at a local, i.e. within 2km distance from the site, and wider scale. The significant effects on seascape, coastal and landscape character would be associated principally with landscape and coastal areas on the eastern side of Scapa Flow in the southern part of the Orkney Mainland.

The significant coastal and landscape effects would principally be associated with areas within approximately 2km of the site at the Bay of Deepdale coastal pastures (the host landscape area and coastline), but also extend to areas on the southern slopes of Gaitnip Hill, immediately to the north, as from here there are views of the site. The significant effects relate to the relatively undeveloped nature of

this area with an absence of large-scale infrastructure. Although anchored rigs are often positioned out to sea (within Scapa Flow), the coastline itself is relatively undisturbed and inaccessible. The effect on the Hoy and West Mainland National Scenic Area (NSA) would not be significant.

Visual effects have been assessed against seven representative viewpoints. Major adverse and significant visual effects would affect residential locations within approximately 2km of the site, however, would extend more widely. Five of the seven principal representative viewpoints assessed would be subject to long term residual significant visual effects (moderate and major). The exception to this would be the more distant views from Scorra Dale and South Ronaldsay from where the site is less visible. The undeveloped nature of this section of coastline is, however, more apparent in views from distances of up to 5km to 7km, such as at Wester Greenigoe and Burray.

Proposed Mitigation Measures

Opportunities to mitigate adverse landscape and visual effects are limited due to the scale of the proposed development, and the visually open character of the proposed site and Orkney. Screening the proposed development using either bunded material or planting is not feasible due to the exposed coastal location and topographical context.



Above View of the development site from West Bu (located to the southeast)

Socio-Economics

Introduction

An assessment was undertaken of the likely potential socio-economics effects associated with the short-term (construction) and long-term (operation) of the proposed development.

The assessment considered potential social and economic impacts from the proposed development at the site, in the local area, and on the wider population and environment of Scotland. The assessment considered:

- The local Orkney communities;
- Local businesses;
- Marine users; and

- Other local community assets.

Impact Assessment and Significance of Effects

The assessment identified potential effects during both construction and operational phases including:

- Employment opportunities;
- Local spend opportunities;
- The ability of existing local businesses to access the existing Scapa Pier and Bay of Deepdale to perform their job;
- Capacity of the local community and businesses to accommodate the inflow of workers and visitors associated with the development.

A summary of construction and operational phase effects is provided in the tables below.

Summary of the identified likely construction effects

Identified Construction Impacts	Identified Effects	Residual Effects
Likely temporary increase in employment / jobs for local, regional and national workers.	Slight beneficial	Moderate beneficial
Likely economic impacts to the local businesses as a result of construction workers temporarily residing in Orkney and associated spend.	Slight beneficial	Slight beneficial
Potential impact on access and operational activities of local businesses and marine users currently using facilities near the development.	Slight adverse	Slight adverse
Potential impact on capacity of local accommodation during peak season and / or during key events and reducing availability for visitors / attendees / organisers out with OIC area.	Moderate adverse	Slight adverse
Potential impact on the tourist offseason in relation to additional income.	Slight beneficial	Slight beneficial

Summary of the identified likely operation effects

Identified Operation Impacts	Identified Effects	Residual Effects
New, permanent jobs for local workers and wider opportunities.	Slight beneficial	Moderate beneficial
Benefits for the Orkney economy.	Slight beneficial	Moderate beneficial
Continued access and operations for existing local businesses.	Negligible	Slight beneficial
Local community capacity and council services.	Slight adverse	Slight adverse

Proposed Mitigation Measures

Proposed mitigation measures can be summarised as follows:

- Construction
 - In terms of employment opportunities, the contractor should provide local jobs and local training to benefit the local communities in terms of contractual community benefits.
 - Continue to consult with local businesses, including local tourists' groups such as Orkney Tourism Group, throughout the proposed development design and construction programme to manage significant inflow of workers during peak tourist season and large scale events, projects and activities;
 - Engage with local businesses, including marine users, to understand their access and operational requirements. The contractor and design team should ensure that current operations can reasonably continue during construction of the proposed development and effectively communicate when there are any changes to access (including short term changes);
 - Dialogue will be required with OIC and other services to ensure there is sufficient capacity in local services and infrastructure (such as housing and public facilities) to accommodate a large inflow of workers.
 - Community benefits should be maximised, such as the provision of apprenticeships, training, and work experience opportunities, especially for people between the age of 18 – 24.

- Operation
 - New permanent employment opportunities should be made available to residents in the first instance, in combination with appropriate training, support and access to higher skilled / paid jobs.
 - Continued consultation with OIC and Highlands and Islands Enterprise is required, including liaison in respect to undertaking ongoing monitoring of employment forecasts to inform housing need and implications for education, training, and health.

Airborne Noise

Introduction

A Noise Impact Assessment (NIA) was carried out for the proposed development. Noise from the proposed development has the potential to impact surrounding existing residential receptors. Assessment of both construction noise and operational noise has been included in the EIA to address the requirements of OIC and MD-LOT. This has been supported by measurements of baseline background noise at areas representative of the most exposed properties surrounding the development site.

Impact Assessment and Significance of Effects

Construction Phase

Significant noise generating construction activities associated with the construction of the quayside and laydown area have been assessed. The greatest weekday and weekend predicted noise levels are associated with construction Phases 1 & 2, in which activities including land reclamation, and quay works will be carried out. There is the potential that

dredging and drilling may be carried out over a 24-hour period, therefore evening and night-time noise levels have been predicted for this scenario.

Terrestrial blasting will consist of approximately one blast per week over 35 weeks (no marine blasting is proposed). As noted in BS 6472-2:2008 (*Guide to evaluation of human exposure to vibration in buildings - Blast-induced vibration*) "Accurate prediction of air overpressure (from blasting) is almost impossible due to the variable effects of the prevailing weather conditions and the large distances often involved."

As referenced by guidance, it is not possible to predict with accuracy the likely levels of air overpressure that will be generated at receptors by the proposed blasting due to high level of variables involved. The best way to control air overpressure is through good blast design and an appreciation of how local weather conditions can influence levels and impacts. Best practice measures will be recommended to minimise vibration and air overpressure generation due to blasting.

The outcome of the assessment is that Neutral impacts are predicted during the day and night-time periods during all construction phases including dredging and drilling. There are no significant adverse impacts in EIA terms.

Operational Phase

The operational noise assessment considers the increase in potentially significant noise generating activities post development completion.

The following activities have been identified as having the potential to increase noise levels in the surrounding area;

- Deepwater ship berthing and mooring;
- Ship loading / unloading activities including operation of cranes;
- Movement of materials between ships and laydown area;
- Construction / assembly and maintenance of offshore wind turbines;

- Plant and Heavy Goods Vehicle (HGV) movements within quay and laydown area; and
- Loading / unloading of HGVs.

An assessment of operational noise has been conducted. During the day and night-time periods noise levels are predicted to increase by up to a maximum of 2.5 decibels (dB) at Netherbutton Cottages as a result of the operational activities at SDWQ. The maximum significance of the changes in noise levels is Neutral / Slight, which is not significant in EIA terms.

Proposed Mitigation Measures

No significant adverse impacts are predicted during the construction phase.

Noise generating activities including dredging and terrestrial blasting activities during the construction phase will be carried out during the specified working hours and will follow best practice noise management techniques. No additional mitigation measures are proposed.

No significant adverse impacts are predicted during the operational phase. No mitigation measures are therefore proposed.

Supporting Assessments

Accidents & Natural Disasters

Introduction

Major accidents and/or disasters should be considered where the development has the potential to cause loss of life, permanent injury and / or temporary or permanent destruction of

an environmental receptor. This section considered the potential for such eventualities.

Impact Assessment and Significance of Effects

The potential for major accidents and / or disasters was considered in accordance with the recent Institute of Environmental Management and Assessment (IEMA) guidance document "*Major Accidents and Disasters in EIA: A Primer*," hereafter referred to as "The Primer." Informed by The Primer, the assessment considered the following:

- The development itself was considered in regard to being a source of major accidents or vulnerability to disasters;
- Interactions with external hazards or associated activity; and
- If a major accident or disaster occurred would the existence of the development increase risk of significant effects to environmental receptors.

The Site is not located within an area of significant seismic activity, nor are climatic factors prone to creating natural disasters such as tsunamis, hurricanes or catastrophic fluvial flooding.

It should also be noted that:

- OICHA have an existing Safety Management System, which aims to enhance safety within the Harbour Authority area by ensuring that all marine navigation hazards are identified, control measures are in place, and levels of risks are acceptable.
- OICHA are compliant with the Department for Transport Port Marine Safety Code; and
- The OIC Marine Services division of OICHA ensures that all operations under their jurisdiction are done in such a manner so as to keep safe its users, the public, the harbour area and the surrounding environment.

The assessment, conducted in accordance with The Primer, concluded that:

1. The development itself is not a source of a hazard that could result in a major accident and / or disaster.
2. The development does interact with external sources of hazard as the creation of the new deepwater quay will result in additional vessel movements. Vessel movement hazards were therefore assessed further.
3. The development will not increase the risk of significant effects due to other hazards occurring.

Regarding the potential hazards associated with vessel operations, a Navigation Risk Assessment (NRA) was undertaken to take into account the proposed development. All construction and operational phase hazards identified were assessed in accordance with the International Maritime Organisation Formal Safety Assessment methodology. No hazards were found to be in the High Risk or Significant Risk band.

The NRA also identified that there are a number of over-arching merchant shipping regulations that apply in all ports / harbours in the UK. There are also additional Risk Control Measures currently in place within Scapa Flow.

The NRA concluded that both existing and anticipated future traffic levels will be relatively low on top of an already low baseline.

On the basis of the NRA the risk of major accident and / or disaster from shipping associated with the development is not considered significant.

Proposed Mitigation Measures

As no significant adverse impacts were predicted, the only mitigation considered necessary is the ongoing updating and review of existing protocols described above, either in response to legislative changes, if port operations are modified in the future, or as part of normal OICHA periodic review.

Air Quality

Introduction

A construction dust risk assessment was completed to allow for mitigation measures to be identified during the construction phase. Likely changes to local air quality, owing to the Proposed Development, have also been considered.

Impact Assessment and Significance of Effects

Potential impacts were identified and can be summarised as follows:

- Construction Phase:
 - Scapa Flow SPA is adjacent to the proposed development. Given the construction dust control measures proposed, the SPA is unlikely to be significantly impacted upon by the proposed development with regards to construction dust emissions.
 - The dust risk assessment concluded that there is a low risk of dust impacts from earthworks, construction activities and trackout.
- Operational Phase:
 - No further assessment is required as the number of vessel movements associated with SDWQ will be less than 100 per annum. Given the low number of ship movements per annum, the proposed development has no significant adverse impact on human receptors or the Scapa Flow SPA.
 - With respect to operational traffic, there will be limited HGV's (i.e. 3 – 4 per week) accessing the port during operation as all heavy goods will come via sea. The access road will be used by staff in private vehicles and four parking spaces will be available close to the shoreline to allow leisure trips from local residents. Given the low number of vehicle movements associated with the operational phase, and within the context of existing good baseline air quality, the change in traffic will be

negligible, resulting in no significant local air quality impacts to human or ecological receptors.

Proposed Mitigation Measures

To further reduce any potential emissions to air, shore side power for vessels will be provided via a suitable high voltage grid connection power supply (estimated to be 9 MegaVolt Amperes (MVA)). This will include the pilot vessels and tugs operated by the Harbour Authority which will relocate to SDWQ.

The following mitigation measures are recommended in line with the low risk of impact identified:

- **Communications:** including displaying the name and contact details of the person accountable for air quality and any dust issues on site, and developing and implementing a Dust Management Plan.
- **Site management:** including record of all dust / air emissions incidents and complaints, and making the record log available.
- **Monitoring:** including regular site inspections and increasing these when activities with a high potential to produce dust are being carried out, and during prolonged dry or windy conditions.
- **Site Maintenance:** plan site layout to locate machinery and dust causing activities away from receptors; have barriers around dust activities and avoid site runoff of water or mud.
- **Operations and Waste Management:** equipment fitted or in conjunction with suitable dust suppression techniques; ensuring adequate water supply; use of enclosed chutes and covered skips and conveyors; and minimise drop heights and use fine water sprays where appropriate.
- **Vehicle and Plant Operation:** ensure engines are switched off when stationary and avoid diesel- and petrol-powered generators where possible.

Carbon, Climate Change and Greenhouse Gas Emissions

Introduction

The purpose of this assessment was to establish the carbon emissions associated with the construction and maintenance of the proposed development.

PAS 2080 - Carbon Management in Infrastructure is a specification for whole life carbon management within the infrastructure sector (transport, energy, water, waste and communications) and sets out the general principles of a carbon management process, to promote carbon and cost reduction in infrastructure delivery. The framework looks to reduce carbon and cost through more intelligent design, construction, and use.

Impact Assessment and Significance of Effects

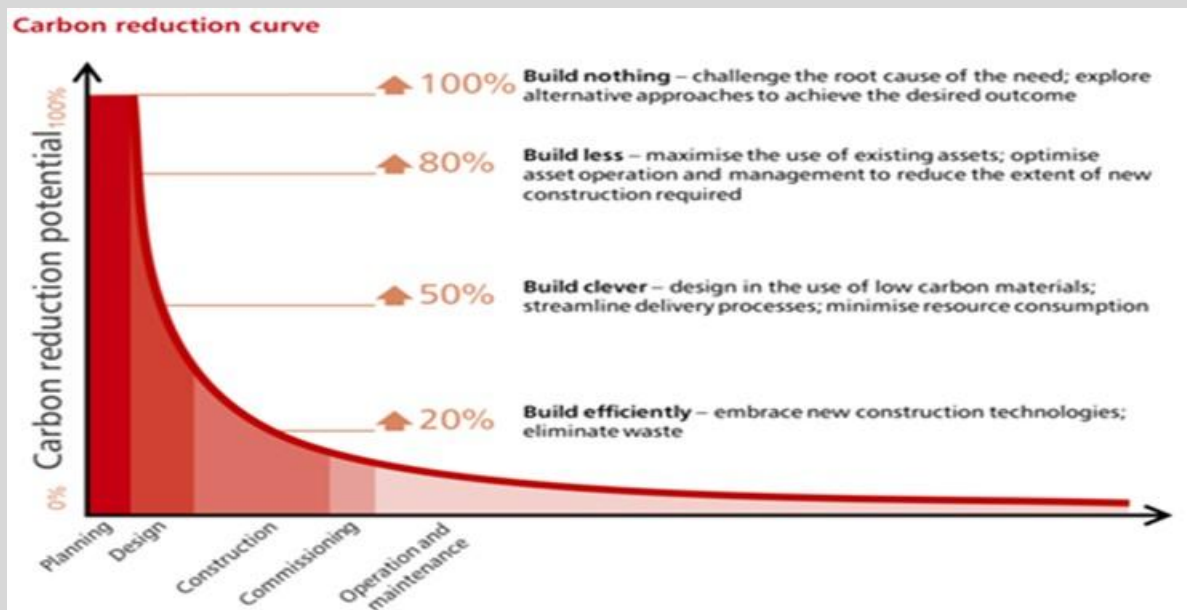
The total carbon emission for the project with updated construction methodology is **95,299 tCO₂e** which is **37.85%** less compared to carbon emissions from the previous construction method, i.e. 153,341 tCO₂e. Considering 20% of risk allowance with the updated method, the total carbon emission will be **114,359 tCO₂e**, so the reduction would still be **25.42%** compared to the previous construction method.

Climate change projections suggest a general trend of warmer, drier summers and milder, wetter winters. With the development in close proximity to the coastline, it is likely that sea level rise and storm surges, as an indirect impact to the projected changes in climate, will become more of a threat to the development in Orkney. The development has therefore been designed at a height that sustains current high tide and projected sea level rise height.

Proposed Mitigation Measures

Carbon mitigation measures can be summarised as follows:

- Construction:
 - **Materials:** Using materials with a lower carbon impact (for example, low carbon concrete or recycled steel) would significantly reduce emissions. The proposed development will aim to use site won material and will only import materials from further afield where absolutely necessary. Doing so will minimise emissions associated with transporting materials to site during the construction phase.
 - **Material efficiency:** Only use the necessary quantity and type of materials. Build efficiently and optimise the use of materials through design, procurement, and the construction phase.
 - **Construction site management:** Sourcing energy efficient plant, regular vehicle maintenance and putting in place good practice site procedures (for example, reducing vehicle/plant idling) to make operations more efficient.
 - **Site Waste Management Plan:** Promoting the reduction and effective management of waste during construction, following the waste mitigation hierarchy and relevant national waste reduction policies. This will fall within the Construction Environmental Management Plan that will be produced.
- Operation
 - **Hierarchy** to reduce energy demand and therefore decrease the related carbon emissions (refer to Graph over page).
 - **Clean fuels** for shipping will be a critical requirement to achieving the UK and Scottish Governments' net zero targets by 2050 and 2045, respectively. In the short term cleaner fuels are needed to enable shipping to meet emissions regulations set by the International Maritime Organisation (IMO). The Future Fuels Hub project, as part of the Islands Deal, could provide storage, supply and bunkering of low and zero carbon fuels at SDWQ.
 - **Shore side power** for vessels will be provided via a suitable high voltage grid connection power supply (estimated to be 9 MegaVolt Amperes (MVA)). This would provide sufficient energy to accommodate future electricity requirements as plant transitions from diesel to electricity as well as further reduce any potential emissions to air for vessels.
 - **Shore power** connections for the pilot vessels and tugs operated by OICHA will also be maintained at SDWQ for when they are at berth.
 - As the site is developed other means to reduce the carbon footprint of the development will be considered (i.e. solar power, battery storage etc).



Above: PAS 2080 Carbon Reduction Hierarchy

Transport - Aviation

Introduction

An Assessment of Instrument Flight Procedures (IFP) was undertaken to consider the operation of SDWQ, especially the construction of turbines, in respect to the operations of nearby Kirkwall Airport, which is operated by Highlands and Islands Airports Ltd. (HIAL).

Impact Assessment and Significance of Effects

The assessment considered operations of aircraft in various scenarios in relation to the elevations of the built turbines. The assessment concluded that for the majority of scenarios, the proposed development would have no impact on the various Kirkwall Airport IFPs apart from:

- RNP RWY 27 which relates to missed approach procedures considering the worst case scenario;
- Visual Circling; and
- The South East Quadrant minima of the published Minimum Sector Altitudes (MSA's).

As such mitigation measures are required.

Proposed Mitigation Measures

OICHA have, since the assessment being completed, established regular meetings with HIAL safeguarding and operational team in order to keep them informed of progress and any new information that comes to light such as turbine construction processes.

Mitigation measures identified include:

- Continuing discussions with HIA to identify suitable mitigation measures, such as altering the airports IFP's; and
- Liaising with Loganair (operator of internal and external scheduled air services) in respect to their operational procedures.

Transport - Roads

Introduction

Based on information supplied on the operation of the proposed development, it is considered that the construction phase will generate a higher level of traffic than the operational phase. This is because during the operational phase, the majority of goods will be transported by sea, reducing the need for

materials to come by road and reducing potential impacts on traffic. On this basis, only the construction phase has been considered within this section.

Impact Assessment and Significance of Effects

For the new quay at SDWQ, onsite cut and fill will be utilised, removing the need for material to be transported onto site.

A worst case of 10 HGVS per day have been assumed in the assessment, as well as 160 cars per day associated with staff.

The traffic flows have been based on staff commuting in private vehicles, however, the contractor, depending upon the mix of staff living on and off-site, in combination with the location and distribution of associated accommodation, may choose to organise transport to the site for workers, which would reduce the impact associated with the project on the road network.

The threshold assessments show there is a 9% increase in vehicles exiting and accessing the site from the north and 2% from the south. Therefore, it is predicted there will be a negligible impact on the surrounding road network.

Overall, the likely land-based traffic impacts resulting from the construction phases of SDWQ are insignificant, and therefore no detailed assessment has been provided.

The traffic generated during the operation phase is lower than that in the construction phase and will therefore also have an insignificant impact on the surrounding road network.

Proposed Mitigation Measures

The creation of active travel modes will provide added community benefit, making this section of the coastline accessible.

EIAR

Conclusions

Schedule of Mitigation

The mitigation and enhancement measures identified by the specialist environmental studies throughout the EIA process are compiled to form a Schedule of Mitigation. The Schedule is designed to provide a comprehensive summary of all mitigation measures that would require to be carried out in the construction and operation of the proposed development, to ensure that the environmental assessment outcomes discussed throughout this EIAR are reached, e.g. to ensure that significant adverse effects are avoided where applicable and possible.

The Schedule of Mitigation would form the basis of the subsequent Construction Environmental Management Document (CEMD).

The CEMD would be a working document which would be updated throughout the construction phase of the project. It would also provide a clear roadmap of the key roles and responsibilities during construction works. An Environmental Manager would be identified who would be responsible for the implementation of the CEMD ensuring that all measures identified within the Schedule of Mitigation are applied and adhered to.

The CEMD and BEMP documents would be approved with the regulators prior to construction works commencing.

Summary of Significance of Effects

This NTS reports upon the findings of the EIAR and subsequent SEIR, which has been shaped by survey, consultation and assessment. The purpose of the EIAR, and the EIA process, is to

establish potentially significant environmental effects and avoid or mitigate these where applicable.

The table below details the residual effects of the proposed development after the mitigation measures outlined in the Schedule of Mitigation have been applied.

Summary of Significance of Effects (Residual Post-Mitigation)

Topics	Construction Phase Impact	Operational Phase Impacts
Water Environment	Not Significant	Not Significant
Biodiversity	Not Significant	Not Significant
Archaeology and Cultural Heritage	Not Significant	Not Significant
Seascape, Landscape and Visual	Significant	Significant
Socio-Economics	Not Significant	Not Significant
Airborne Noise	Not Significant	Not Significant
Topics Not Requiring Full EIA (inc. Accidents and Natural Disasters, Air Quality, Carbon, Climate Change and Greenhouse Gas Emissions and Transport (Aviation, Marine Navigation and Road)).	Not Significant	Not Significant