

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



Note: The above image is indicative and provided for information purposes only

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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 Orkney Harbour Authority infrastructure to create a base for innovation and secure the long-term future for the community associated with maritime activities.

The Masterplan embraces and supports decarbonisation and transition away from fossil fuels. The infrastructure proposals have been designed to enable Orkney to manage this transition while continuing to generate social and economic benefit from the oil and gas industry while it slowly declines.

Phase 1 of the Masterplan considers five main locations on the Orkney Mainland, namely and in no priority:

1. Scapa Deep Water Quay;
2. Hatston Pier and Harbour;
3. Existing Scapa Pier;
4. Kirkwall Pier and Harbour; and
5. Stromness.

It is proposed that a future Phase 2 of the Masterplan exercise will address development of smaller harbours and piers across the archipelago.

Full details of the Masterplan can be found at <http://www.orkneyharboursmasterplan.com/>

Consenting Process

The Environmental Impact Assessment (EIA) was undertaken under both the Town & Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 and the Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017 ('the Marine EIA Regulations').

The purpose of this Non-Technical Summary (NTS) is to provide a summary of the findings of the EIA. The purpose of the EIA is to determine whether the Scapa Deep Water Quay development will have significant effects on the environment. Where significant effects are predicted, the EIA considers the scale and magnitude of these effects, together with measures to mitigate them. This NTS sets out the scope of the EIA, the methods used, and the findings of the assessment.

The EIA Report (EIAR) will be submitted to Orkney Islands Council (OIC) and Marine Directorate Licencing Operations Team (MD-LOT¹ for consideration as part of the respective applications for consents for the project. Members of the public may make representations to these organisations during the formal consultation process for each consent. Details of how and when representations can be made will be publicised in The Orcadian newspaper. The period for

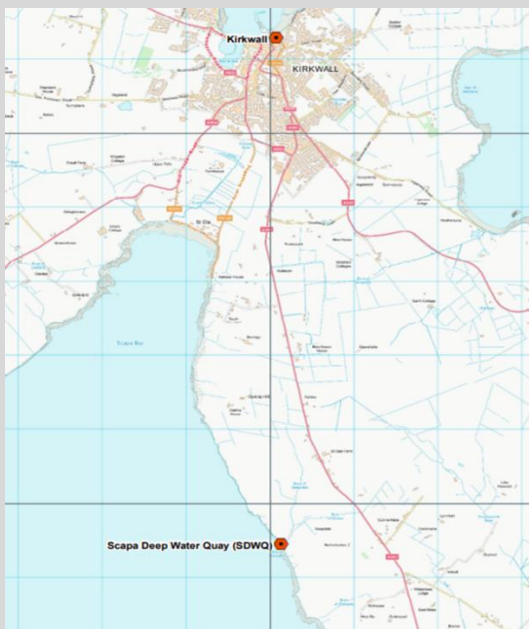
¹ Previously called Marine Scotland Licensing Operations Team (MS-LOT)

representations for each consenting regime will be determined by the respective consenting bodies.

The Site

Scapa Deep Water Quay 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.



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 Report (EIAR), 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.

- 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).



The Proposed Development

Need for Development

There are specific market opportunities in the offshore wind and oil and gas sectors that need access to deep water pier infrastructure, both deep water access and laydown / working areas. However, there is currently no such facility located on the Orkney Mainland coast, and an under provision of such facilities generally in Scotland and the UK. As part of the Orkney Harbours Masterplan Phase 1 development, consideration was given to several possible locations for a deepwater quayside facility, with the site at Deepdale, to the south of the existing Scapa Pier being the final preferred option following a multi-criteria appraisal.

The main purpose of this facility would be to undertake multiple industrial activities that require both deepwater berthing and large laydown area. It is envisaged that the main activity will be the construction/assembly and

maintenance of offshore wind turbines, particularly, and in the first instance, associated with ScotWind developments, which support Scotland's approach to transforming the energy sector.

This is also a potential location for the development of a storage and supply hub for future marine fuels, a key project as part of the Islands Growth Deal.

Since the Masterplan was adopted, the overall concept and business case for Scapa Deep Water Quay (SDWQ) has evolved and been redefined. This includes the refinement of the siting of the proposed development, which was originally positioned in an area to the north of the Burn of Deepdale. Following initial site investigations and preliminary ecological surveys, it was concluded a move of the development to its current location would be preferable. The move was a result of the engineering and environmental considerations as listed below:

- The quantity of rock and soil to be removed was determined to be greatly reduced by re-positioning the development on the land to the south of the burn;
- The current site selected avoided crossing the Burn of Deepdale; and
- Moving the development footprint to the south avoided encroachment into the Gaitnip Hill LNCS, which would have been the case if it was situated to the north of the Burn of Deepdale.

The Proposed Development

This proposal comprises approx. 597m long main quayside berth with general -15m CD water depth, incorporating a 135m quayside pocket with -20m CD water depth. Further north tug (3No.) and pilot boat (2No.) berth approx. 180m long with depths between -6 and -9m CD. Laydown area directly behind quay face approx. 22.85 Hectares

The proposals also include the access road leading from the A961 to the laydown area.



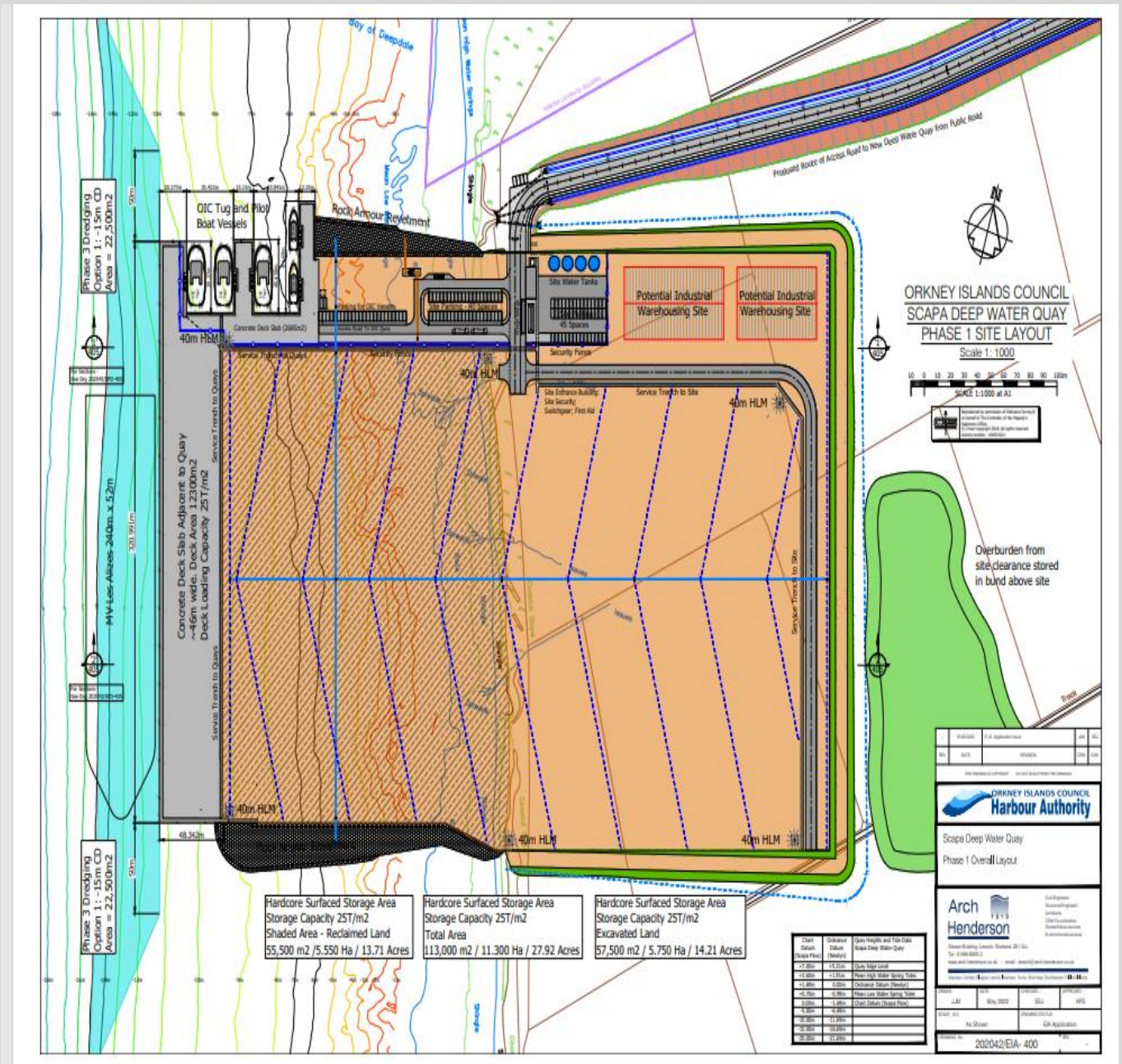
Above Schematic of the Proposed Development
Note: The above image is indicative and provided for information purposes only.

The phasing details are:

Phase 1

- Installation of the access road from the A961 to the site;
- Excavation of current landform along with reclamation of shore to form 12Ha of laydown area bounded by bunds on the north and eastern edges;

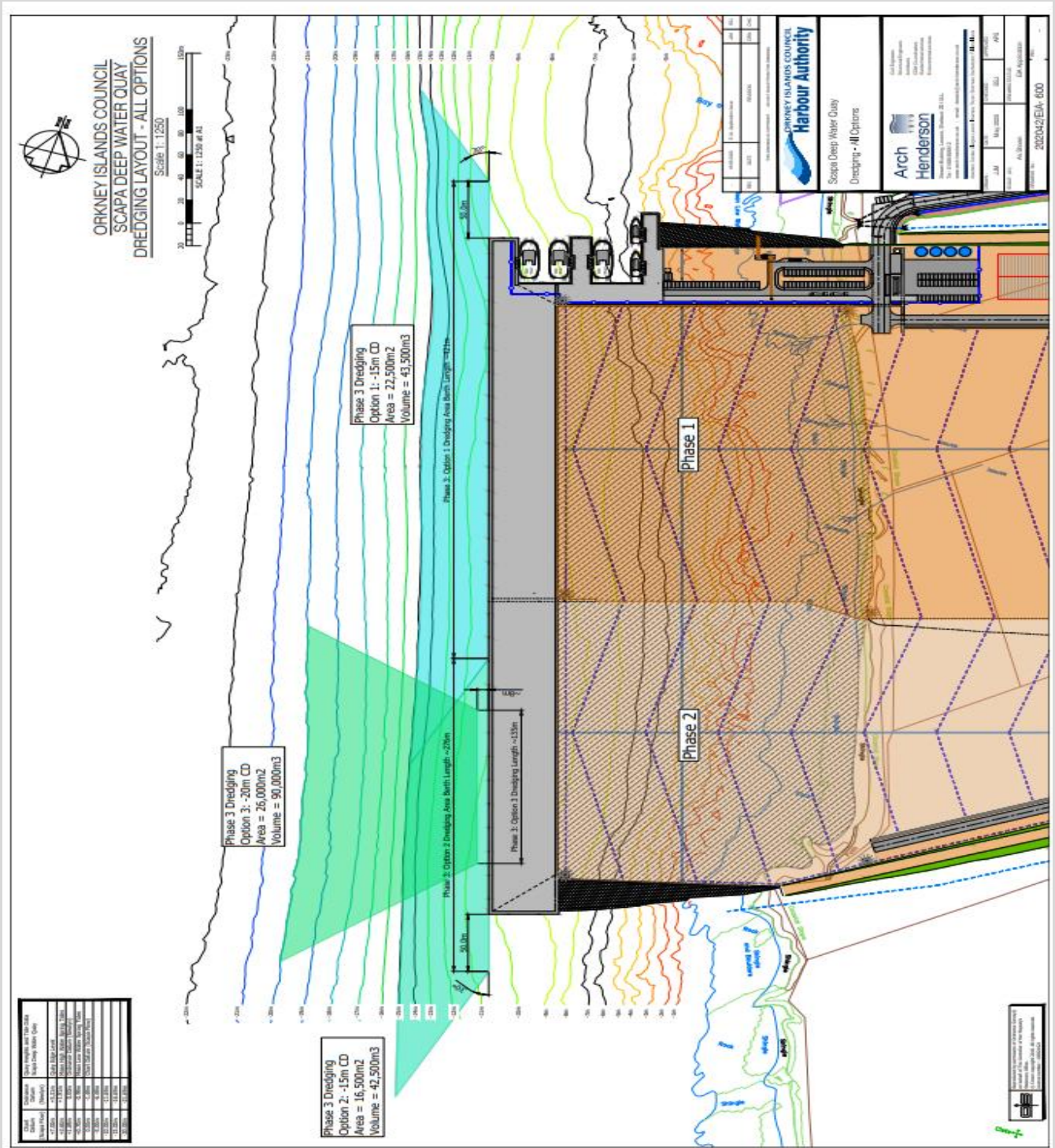
- Creation of 450m of berthing by formation of a quay 320m x ~46m wide; and
- Dredging adjacent to the newly formed Phase 1 quay and proposed Phase 2 quay (i.e. one dredge campaign) to provide -15m CD water depth.



Above Phase 1 Works

Phase 3

- Dredging on the southern side of the newly formed quay extension to provide a berthing pocket with -20m CD water depth.



Above Phase 3 Works

It should be noted that as a design principle, it has been attempted to balance any dredging or cut into the land with construction and/or reclamation requirements. This has avoided the requirement to import virgin material to create the development platform. Sea disposal of dredging material will be avoided as far as possible.

Construction Phase

It is important to note that the contract for construction of the facility may be awarded on a design and build basis. Therefore, while exemplar tender designs have been completed by Arch Henderson (Project Technical Advisors), until the preferred contractor is identified, and procurement complete, the exact detail of the construction methodologies cannot be confirmed. However, based on professional advice from the Project Technical Advisors, Arch Henderson, the following construction activities are considered most suitable for assessment in the EIA:

Access Road Construction (Phase 1)

- Installation of access road to the main cut and fill site.
 - Laying of all ducts and services to the site within the road verge;
 - Initial bitmac surfacing at junction of access road with main road; and
 - Laying of the final road surfacing on completion of the development.

Laydown Area (Phases 1 and 2)

- Installation of perimeter V ditches and silt retention prior to stripping operations commencing;
- Stripping of all non-inert material (organic soil and peat along with unsuitable clays) and creation of temporary stockpiles;
- Heavy tracked plant used to excavate and rip material;
- For harder strata on land the excavation may require pre-treatment through drilling

100mm diameter holes and controlled delayed explosives (approximately 25kg per hole);

- Recovered material would be screened and suitable inert stone and glacial till (both to be free of all organic and clay material) to be stockpiled on site for use as fill in future reclamation and quay works;
- All non-inert material recovered during initial site stripping and the main excavation operations to be used to form perimeter bunds; and
- Works estimated to take place over ~10 to 14 months for each development phase.

Initial Reclamation (Phase 1 only)

- Prior to work commencing a silt boom to minimise dispersion of fine material will be moored out from the foreshore;
- The north perimeter bund will be formed from suitably won materials extending from the access road to the rear of the proposed quay works;
- The advancing head of the perimeter core bund will be protected by the silt boom which shall advance in front of the work;
- As the northern bund progresses, geotextile will be placed on the northern slope to mitigate the migration of fines; and
- Secondary armour and primary armour stone to be placed on top of the geotextile. (Note: it is envisaged that the majority of armour stone will be brought to site by sea.)

Reclamation and Quay Works (Phases 1 and 2)

- The access road formed in the initial reclamation phase will be used for labour, plant, and construction materials to access the quay works and laydown area construction sites. For Phase 2 and Phase 3 construction work access will be from Phase 1;

- Tubular steel and sheet piles will be installed to form a combi wall as follows:
 - Drill rigs to work over water from temporary piling platforms from the reclamation bund or a jack up barge to install tubular and sheet piles;
 - Both types of piles to be installed by vibro-hammer to required depth;
 - Piles will then be filled with tremie concrete, tie rods installed and secured between the front face and rear sheet pile wall and a concrete cope formed; and
 - The infill will then be compacted and a concrete deck installed after a period of no less than 6 months in order to minimise differential settlement and consolidation.
- As the quay works advance south the reclamation fill would advance behind thereby affording additional sea fetch protection to the shore works; and
- Once the concrete deck behind the quay face is placed then the remaining reclamation and laydown area would be capped and compacted with graded hard core with the surface falling to V ditches and French drains leading to interceptors and eventually sea outfalls.

Dredging (All Phases)

- Dredging adjacent to the newly formed Phase 1 quay and proposed Phase 2 quay (i.e. one dredge campaign) to provide -15m CD water depth. Key points to note are:
 - A Site Investigation has been carried out to determine the nature and chemistry of the sediment in Phase 1 and Phase 2 dredge area. This information was used to inform the Best Practicable Environmental Option (BPEO) for reuse / disposal of the dredge material; and
 - The conclusions of the BPEO identifies that this dredge material is suitable for use as infill material. The small component of the dredge material

unsuited for this purpose can either be disposed of to a licensed marine disposal site or used to form the northern and eastern bunds.

- Phase 3 – deepening of an area on the southern side of the newly formed quay extension to provide a berthing pocket with -20m CD water depth.

The future Phase 3 dredging campaign will require a SI to confirm the nature of the sediment between -15m CD and -20m CD within the area of the deeper berthing pocket. As this information is currently unknown at the time of writing, a separate application will be submitted to MD-LOT at a later stage for the Phase 3 dredge.

Construction Timescales and Working Hours

The anticipated timetable for works is expected to be:

- Main Works – Commencing September 2024 assuming planning and marine licences can be obtained.
- Phase 1 is anticipated to be completed by 2027; and
- Phase 2 is anticipated to commence September 2027 and completed in 2028.

The normal working hours for construction are expected to be Monday – Saturday 7am to 7pm and Sunday 7am until 2pm. Dredging and drilling would be 24 hours, 7 days a week.

Operational Phase

For the operational phase, expected site activities are the delivery and partial assembly of offshore windfarm turbines. It is also envisaged that the pilot and tugboats that currently operate out from Scapa Pier would be relocated to SDWQ.

The development will create new high value-added jobs requiring specific skills. There would also be opportunities during both the

construction and operational phases for training and apprenticeships.

Decommissioning Phase

For a development of this type, decommissioning is not envisaged. Should decommissioning ever be planned in the future Statutory Regulators would be consulted and applications made at that time under whatever future regulatory regime exists at that point in the future.

Vessel Movements

A Navigation Risk Assessment (NRA) has been undertaken to consider the potential for the additional vessel movements to increase navigational risks within the area of Scapa Flow. In summary, the NRA concludes there is a low risk, and a number of recommendations were made regarding navigation during the operational and construction phases. These recommendations will be implemented in line with Marine Services ongoing operational requirements.



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 Scotland – Licensing Operations Team (MS - LOT) on 31st March 2021. A Scoping Opinion was received from OIC on 13th October 2021, and from MS-LOT on 22nd October 2021.

Consultation

Consultation responses were obtained from the following organisations in respect of the Scoping Reports issued to OIC and MS-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 Form;
- 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 Water;
- Scottish Wildlife Trust;
- Transport Scotland;
- UK Chamber of Shipping;
- VisitScotland; and
- Whale and Dolphin Conservation.

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.



Environment

Introduction

This section of the EIAR 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 Groundwater Dependent Terrestrial Ecosystems (GWDTE) 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 the small 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 Plan (CEMP) will be developed to ensure that the mitigation measures outlined in the EIAR are followed. The CEMP 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 CEMP 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 Marine Directorate.

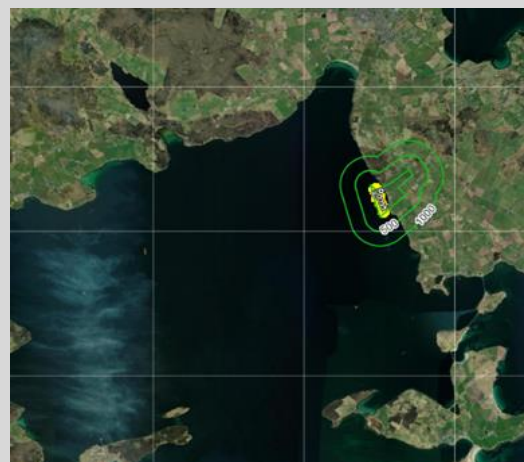
With implementation of surface water management and pollution prevention measures, no construction or operational activities were found to have a significant effect upon the water environment or coastal processes.

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.



Above: Vibration piling (1hr) impact zones on other cetaceans

Designated sites in proximity to the development include:

- Scapa Flow Special Protection Area (SPA);
- Orkney Mainland Moors SPA; and
- Sanday Special Area of Conservation (SAC) and East of Sanday Site of Special Scientific Interest (SSSI).

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.

[Redacted]

In relation to birds, 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 won't 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 piling and dredging and/or pollution events. Underwater noise can result in changes of behaviour, disturbance, injury or even death 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 piling and 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 the deep water quay 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 majority of 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.

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 will visually search within a buffer area to make sure there aren't any sensitive species present.



Above Marine Mammal Observer

Activities such as piling will also employ a 'soft start' approach, where the machinery starts up slowly and therefore more quietly before ramping up, giving mobile species a chance to move out of the area.

To reduce risk of both on and offshore wildlife traffic collisions, safe speed limits will be put in place for all vehicles and 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 Action Plan (BAP) will be developed for the onshore and intertidal habitats and approved by the regulators prior to construction commencing. The BAP 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.

Off-site biodiversity enhancement in the form of native oyster (*Ostrea edulis*) restoration project within the Orkney Isles will also take place.

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.



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

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 banded material or planting is not feasible due to the exposed coastal location and topographical context.

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 Marine Directorate. 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, including piling and dredging 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.

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 drilling 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 is calculated to be 153,341 tCO₂e for both construction and operational phases.

Capital carbon emissions during the construction phase are calculated to be 152,277 tCO₂e. The main contributor to the emissions is from the types of construction materials used for the reclamation and quay works. Additional emissions arise from the direct use of plant on site and transport of materials to site. Therefore, these are the main contributors to climate change.

The total embodied carbon emissions associated with the operation phase are estimated to be 1,064tCO₂e. Assumptions on maintenance and repair of the rock armour and

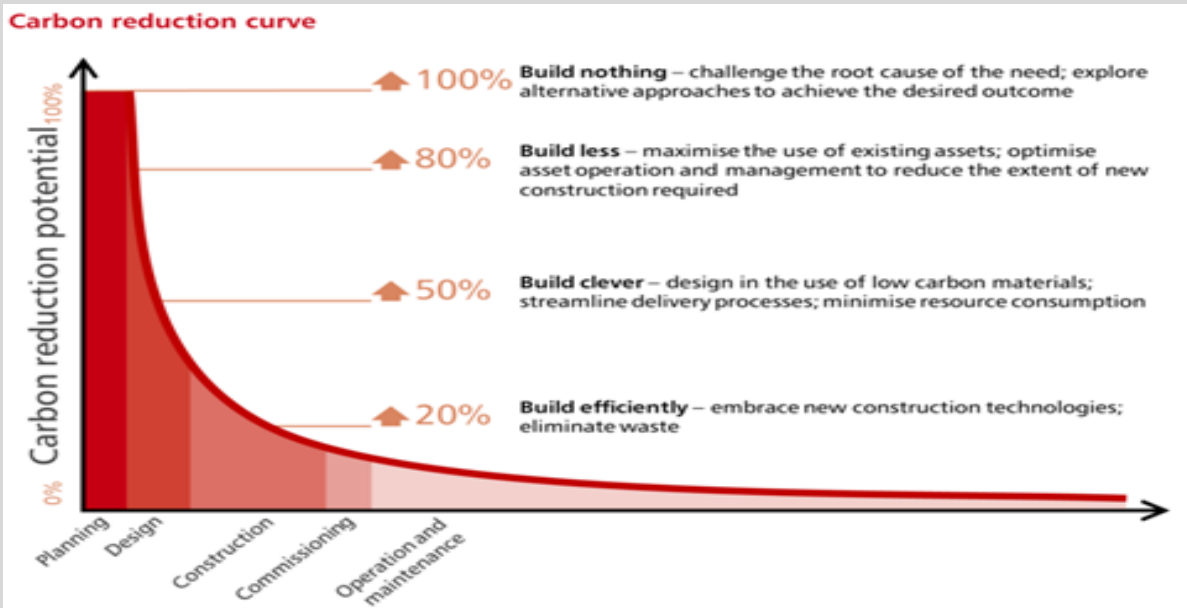
quay works were based on industry standards. Dredging and core fill have no emissions associated with operation as they are one-time activities that occur during the construction phase.

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
 - **Consideration** to measures of emission reduction should follow the Energy 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.
 - **Existing shore power** connections for the pilot vessels and tugs operated by the Harbour Authority will also be maintained at SDWQ.
 - 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 operation 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.

There will be a short period of mobilisation to site when most of the HGVs will arrive and then remain on site and not create trips on the network. A worst case of 10 HGVS per day have been assumed in the assessment, as well as 60 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 3% 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 an access road which locals can use by car or 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 BAP documents would be approved with the regulators prior to construction works commencing.

(inc. Accidents and Natural Disasters, Air Quality, Carbon, Climate Change and Greenhouse Gas Emissions and Transport (Aviation, Marine Navigation and Road)).		
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Summary of Significance of Effects

This NTS reports upon the findings of the EIAR, 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	Not Significant	Not Significant