

Orkney Island Council Harbour Authority (OICHA) Scapa Deep Water Quay Development - EIA Scoping Report



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Author: Various
Reviewer: Dr C G Fleming

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Glasgow

Craighall Business Park
8 Eagle Street
Glasgow
G4 9XA
0141 341 5040
info@envirocentre.co.uk
www.envirocentre.co.uk

Aberdeen

Banchory Business Centre
Burn O'Bennie Road
Banchory
AB31 5ZU
01330 826 596

Inverness

Alder House
Cradlehall Business
Park
Inverness
IV2 5GH
01463 794 212

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Contents

1	Introduction	1
1.1	Background	1
1.2	The Applicant	1
1.3	Project Team	2
1.4	The Legislative Context.....	2
1.5	Screening Opinion.....	3
1.6	Scoping under the EIA and Marine EIA Regulations 2017	3
1.7	Consultation and Stakeholders	4
1.8	Report Usage	4
2	The Proposed Development.....	5
2.1	The Site and Surrounding Area	5
2.2	The Proposed Development	5
3	Appraisal of Potentially Significant Environmental Effects	8
3.1	Introduction.....	8
3.2	Topic Areas to be Included	8
3.3	Other Assessments	8
3.4	Cumulative Assessment.....	10
4	Water Environment and Coastal Processes	11
4.1	Introduction.....	11
4.2	Proposed Development.....	11
4.3	Baseline Conditions	11
4.4	Potentially Significant Effects (Construction)	13
4.5	Potentially Significant Effects (Operation).....	13
4.6	Inclusion of Exclusion from EIA.....	14
4.7	Assessment Methodology	14
5	Ecology	16
5.1	Introduction.....	16
5.2	Baseline Conditions	16
5.3	Potentially Significant Effects (Construction)	18
5.4	Potentially Significant Effects (Operation).....	18
5.5	Design and Mitigation.....	19
5.6	Inclusion and Exclusion from EIAR	19
5.7	Assessment Methodology	20
6	Archaeology and Cultural Heritage	21
6.1	Introduction.....	21
6.2	Baseline Conditions	21
6.3	Potentially Significant Effects (Construction)	27
6.4	Potentially Significant Effects (Operation).....	29
6.5	Assessment Methodology	31
7	Seascape/Landscape and Visual	32
7.1	Introduction.....	32
7.2	Baseline Conditions	32
7.3	Potentially Significant Effects (Construction)	35
7.4	Potentially Significant Effects (Operation).....	35
7.5	Design and Mitigation.....	36
7.6	Inclusion or Exclusion from EIA	36
7.7	Assessment Methodology	36
8	Airborne Noise	37
8.1	Introduction.....	37
8.2	Baseline Conditions	37
8.3	Potentially Significant Effects (Construction)	37
8.4	Potentially Significant Effects (Operation).....	38
8.5	Inclusion or Exclusion from EIA	38
8.6	Assessment Methodology	39
9	Conclusions	40

Appendices

A Drawings

Tables

Table 1-1: The Project Team 2
Table 4-1: Tidal range at Kirkwall Standard Port..... 12
Table 6-1: Overview of identified marine historic environment assets 23
Table 6-2: Overview of identified onshore historic environment assets 25
Table 6-3: Potential impacts and mitigations for marine historic environment receptors..... 27
Table 6-4: Potential impacts and mitigations for onshore historic environment receptors..... 29
Table 6-5: Potential impacts and mitigations for historic environment receptors..... 30

1 INTRODUCTION

1.1 Background

EnviroCentre Ltd has been appointed by Orkney Island Council Harbour Authority (OICHA) to undertake an Environmental Impact Assessment (EIA) in relation to the proposed development of Scapa Deep Water Quay (SDWQ), ~8km south of Kirkwall at Bay of Deepdale, Scapa Flow (as demonstrated within Appendix A: Drawing No 673702-014). The purpose of this report is to seek a Scoping Opinion from the appropriate Regulatory Authority as required by the relevant Environmental Impact Assessment (EIA) legislation.

This report has been laid out as follows:

- Section 1 introduces the applicant, the project team and the regulatory background to which this Scoping Request is made;
- Section 2 sets out a description of the proposed development upon which to base an appraisal of potentially significant environmental effects upon. Please note: the development description may evolve as the engineering design progresses but in principle is expected to be unchanged;
- Section 3 sets out the approach to EIA based upon the legislative context introduced within section 1;
- Sections 4 – 8 discuss potentially significant environmental effects on a topic by topic basis.
- Section 9 draws together the conclusions reached for each topic considered in the scoping report.

1.2 The Applicant

OICHA is responsible for the safe and efficient operation of 29 piers and harbours, including Scapa Flow. It is owned by OIC, who are the Statutory Harbour Authority, and is one of the UK's most diverse commercial ports.

In August 2020, OICHA launched the Orkney Harbours Masterplan Phase 1, (after OIC 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-owned infrastructure to create a base for innovation and secure the long-term future for the community.

The Masterplan embraces 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 ongoing oil and gas activity. Harbour users and key stakeholders were consulted from the outset to help gain an understanding of the issues, constraints and opportunities associated with the harbour infrastructure around Orkney through workshops and interviews. The range of stakeholders includes local communities, harbour users, potential funders and environmental bodies such as NatureScot.

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;
3. Scapa Pier;
4. Kirkwall Pier; and

5. Stromness.

It is proposed that a future Phase 2 will develop smaller harbours and piers across the archipelago.

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

1.3 Project Team

This Scoping Report has been prepared by EnviroCentre Ltd with input from other organisations shown in Table 1.1.

Table 1-1: The Project Team

Topic	Specialist
EIA, Ecology, Water, Noise and Other Assessments	EnviroCentre Ltd.
Landscape and Visual	Doug Harman Landscape Planning
Cultural Heritage and Archaeology	Orkney Research Centre for Archaeology (ORCA)
Engineering Design	Arch Henderson

1.4 The Legislative Context

The continued management and development of harbours in Orkney is subject to local, national and European legislation of which the following is the principal legislation relevant to the current development programme:

- Orkney County Council Act 1974: section 7 of this Act provides that “*The Council may construct, place, maintain and operate in and over a harbour area such works as are required for or in connection with the exercise by them of any of their functions under this Act an may alter, renew or extend any works so constructed or placed.*”
- The Harbours Act 1964 (when not contained within the Orkney County Council Act 1974;
- The Town and Country Planning (Scotland) Act 1997, as amended by the Planning etc. (Scotland) Act 2006 – for works on land and to the mean low water mark. An application for Planning Permission will be determined by OIC;
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (hereafter referred to as ‘the EIA Regulations’);
- The Marine (Scotland) Act 2010 (Marine Licences) – Under Section 20(1) of the Marine (Scotland) Act 2010 (from 0 -12nm) and Section 65(1) of the Marine and Coastal Access Act 2009 (from 12 – 200nm)¹, a marine licence from Scottish Ministers is required if organisations intend on carrying out certain acts in the Scottish marine area such as:
 - the deposit or removal of a substance or object;
 - Construction, alteration and improvement works,
 - Dredging, and
 - The deposit or use of explosives.
- Marine Scotland stipulate that any associated dredging works taking place that involves disposal at sea, then a Marine Licence for Sea Disposal may also be required; and
- The Marine Works (Environmental Impact Assessment) Regulations 2017) (for works below the mean low water mark) (hereafter referred to as ‘the Marine EIA Regulations’).

¹ Circular 1/2015 The Relationship Between the Statutory Land Use Planning System and Marine Planning and Licensing - <http://www.gov.scot/Publications/2015/06/5851/4>

1.5 Screening Opinion

As the proposed development contains elements which are above and below Mean High Water Springs (MHWS), which constitutes the dividing line between terrestrial and marine planning, consents will be required from both the Council (for any elements not covered under OICHAs' permitted development rights) and Marine Scotland.

A Screening Request was submitted to both OIC and MSLOT in July 2020 to confirm if the proposed development, as described in Section 2.1 and 2.2 of this document was deemed to fall within either Schedule 1 or 2 development as defined by the EIA Regulations and the Marine EIA Regulations.

OIC confirmed in their Screening Opinion, dated 3 August 2020 that the proposed development is considered to constitute Schedule 1 development as it falls under Paragraph 8 (2) of the EIA Regulations.

MSLOT confirmed in their Screening Opinion, dated 22 July 2020, that the proposed works are considered to constitute Schedule 1 development as it falls under Paragraph 8 (2) of the Marine EIA Regulations.

In both cases Paragraph 8 (2) refers to:

“Trading ports, piers for loading and unloading connected to land and outside ports (excluding ferry piers) which can take vessels of over 1,350 tonnes”.

Accordingly, an EIA will be prepared to cover both consents under both the EIA Regulations and Marine EIA Regulations.

1.6 Scoping under the EIA and Marine EIA Regulations 2017

The general environmental topic areas to be considered within the context of EIA are summarised below:-

- Population / Human Health;
- Biodiversity (e.g. Fauna and flora);
- Land (e.g. land take) / Soil (e.g. organic matter, erosion, compaction, sealing);
- Water (e.g. hydromorphological changes, quantity and quality);
- Air Quality;
- Noise and Vibration;
- Climate (e.g. greenhouse gas emissions, impacts relevant to adaptation);
- Material Assets;
- Cultural Heritage (e.g. architectural and archaeological); and
- Landscape.

Both terrestrial and marine EIA Regulations state that a developer may ask the relevant regulatory body for their formal opinion on the information to be supplied in the EIA Report (a 'scoping opinion'). This provision allows the developer to be clear about what the regulatory authority considers the significant effects of the development are likely to be and, therefore, the topics on which the EIA report should focus.”

Additional objectives of EIA Scoping are to:

- Establish the availability of baseline data;
- Request that statutory consultees provide any relevant environmental information relating to the site and surrounding area;
- Define a survey and assessment framework through which comprehensive impact assessment can be achieved; and

- Provide a focus for the planning authority and the consultees' considerations – in terms of:
 - Potential impacts to be assessed;
 - Assessment methodologies to be used;
 - Other areas which should be considered; and
 - Any other environmental issues of perceived concern.

Each regulation requires that any scoping request should be accompanied by:

- A description of the location of the development, including a plan to identify the land;
- A description of the proposed development, and of its likely significant effects on the environment; and
- Such other information or representations as the developer may wish to provide or make.

1.7 Consultation and Stakeholders

The Applicant recognises the importance of consultation and community involvement throughout the project development process in line with "PAN 3/2010 Community Engagement" (PAN 3/2010). PAN 1/2013 also reinforces the importance of public involvement in the Scoping process and makes it clear that the EIA process is intended to ensure that consultation bodies and the public have the opportunity to express their opinion on both the proposed development and the EIA Report (EIAR).

The Applicant has already held informal discussions with local stakeholders and has sought initial advice from OIC Planning and Marine Scotland Licensing Operations Team (MSLOT). This advice has been reflected in this Report and will be taken forward to the design of the proposed development as appropriate.

1.8 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

Whilst the Client has a right to use the information as appropriate EnviroCentre do not accept liability to any third party for the contents of this report unless written agreement is secured in advance, stating the intended use of the information.

EnviroCentre accept no liability for use of the report for purposes other than those for which it was originally provided, unless EnviroCentre have confirmed it is appropriate for the new context.

2 THE PROPOSED DEVELOPMENT

2.1 The Site and Surrounding Area

Drawing No 673702-014 shows the site in context with its surrounds and is contained in Drawings, Appendix A.

2.1.1 The Site

Scapa Deep Water Quay will be situated circa 4km south from Scapa Pier – before Holm and round about Deepdale. It is currently untouched 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.

2.1.2 The Surrounding Area

The preferred location of the deep water quay is set within a rural area of the mainland island which is largely pastureland. Isolated residential dwellings and farmsteads are located along the extent of the A961. Gaitnip Hill Local Nature Conservation Site is located to the north of the Burn of Deepdale.

2.2 The Proposed Development

The drawings listed below present illustrative layouts of the planned development and are contained within Appendix A:

- Site Location Plan (Drawing No 202042 / FS-01 Rev P1, dated February 2021);
- Phase 1 Overall Layout (Drawing No 202042 / FS-10 Rev P1, dated February 2021);
- Phase 2 Overall Layout (Drawing No 202042 / FS-20 Rev P1, dated February 2021);
- Phase 3 Overall Layout (Drawing No 202042 / FS-30 Rev P1, dated March 2021); and
- Site Access Road: Proposed Layout (Drawing No 202042 / FS-40 Rev P1, dated February 2021)

2.2.1 The Need for the Development

There are specific market opportunities in the offshore wind and oil and gas sectors that need access to deep water pier infrastructure. However there is currently no such facility located on the Orkney mainland coast. As part of the Orkney Harbours Masterplan Phase 1 development, consideration was given to several possible locations for a deep water quayside facility with the site at Deepdale, to the south of Scapa Pier being the final preferred option.

The main purpose of this facility would be to undertake multiple industrial activities that require both deep-water berthing and large laydown area. It is envisaged that the main activity will be the construction / assembly and maintenance of offshore wind turbines.

This is also a potential location for the development of a storage and supply hub for future marine fuels, as contained within the Islands Deal documents signed off at Heads of Terms level on 17 March 2021.

2.2.2 Outline Design Principles

This proposal comprises the creation of a 575m of quayside with water depth of -15m CD, a 110m x 75m quay extension with water depth of -20m CD and formation of 18 hectares of laydown area (not including the quay areas). The proposal will also include an access road leading from the A961 to the laydown area.

The development is designed to be built in three phases although the ordering of Phases 2 and 3 will be dependent on the economic need for these facilities. 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 300m x ~46m wide with a 100m wide section on the northern edge providing water depth of up to -15m CD; and
- Dredging adjacent to the newly formed quay.

Phase 2

- Excavation of current landform along with reclamation of shore to form an additional 6Ha of laydown area to the south of Phase 1 laydown area. The bund on the eastern edge will be extended along the length of the new laydown area and partially along the southern edge;
- Extension of the Phase 1 quay area by 275m x ~46m to the south; and
- Dredging adjacent to the newly formed quay extension to provide -15m CD water depth.

Phase 3

- Creation of a 110m x 75m quay extension on the northern edge of Phase 1 quay out to -20m CD ; and
- Dredging on the northern side of the newly formed quay extension to provide -20m CD water depth.

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. Sea disposal of dredging material will be avoided as far as possible.

2.2.3 Construction

It is intended that the contract for construction of the facility will be awarded as a design and build. Therefore until the preferred Contractor is identified the exact construction methodologies cannot be confirmed at this stage in the development process. However, based on professional advice from the project engineers the following construction activities are anticipated:

Access Road Construction

- Installation of access road to 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 the excavation may require pre-treatment through drilling and controlled delayed explosives;

- 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 several months for both development phases.

Initial Reclamation (Phase 1 only)

- Prior to work commencing a silt boom 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 (All Phases)

- In Phase 1 the bund and armoured slope formed in the initial reclamation phase shall 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; and
- Tubular steel piles (approximately 1.6m to 2.2m diameter) will be installed 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;
 - Quay infill to be vibro-treated to compact and reduce future consolidation and settlement; and
 - Concrete deck immediately behind the quay face shall be placed no less than 6 months after fill takes place.

Reclamation and Quay Works (Phases 1 and 2 only)

- As the quay works advance south then the reclamation fill would advance behind thereby affording additional sea fetch protection to the silt boom used to shore; and
- Once concrete deck behind the quay face is placed then the remaining reclamation and laydown area shall be capped and compacted with graded hard core with the surface falling to V ditch and French drains.

(Note: Impact hammer piling is not envisaged at this stage of the development but may potentially be required.)

Dredging

- Dredging to required depth in front of new quay face using back hoe dredger; and
- Depending on suitability, dredged material may be used for fill or disposed at a suitably licensed marine site if absolutely necessary.

Prior to dredging a Site Investigation (SI) will be carried out to determine the Best Practicable Environmental Option (BPEO) for the dredging spoil. This will determine whether the dredge material will be suitable for use as infill material.

3 APPRAISAL OF POTENTIALLY SIGNIFICANT ENVIRONMENTAL EFFECTS

3.1 Introduction

Both OIC Planning and MSLOT have confirmed that the proposed development will fall under Schedule 1 of the 2017 EIA and Marine EIA Regulations. It is therefore appropriate to request a Scoping Opinion from each regulatory body under the EIA and Marine EIA Regulations. As required, sufficient baseline information has been provided regarding the proposed development and the surrounding and receiving environment upon which to base a decision.

This Scoping Report is submitted to OIC Planning and MSLOT with the intention that it should form the basis of their Scoping Opinion.

The information contained in this document is based on our current understanding of the nature of the site and the proposed development and preliminary assessment of the potential environmental impacts of the proposed development.

3.2 Topic Areas to be Included

Our current thinking in the terms of the topics which fall within the scope of the EIA and subsequent EIAR are listed below:

- Water Environment and Coastal Processes;
- Ecology;
- Archaeology and Cultural Heritage;
- Seascape, Landscape and Visual; and
- Airborne Noise.

The approach to the appraisal of each of these topic areas is outlined in Sections 4 – 8 with the inclusion of baseline data where available. The appraisals will consider the potential environmental impacts related to both the construction and operational phases, where applicable, and either scope in or out the need for further assessment through the EIA process.

3.3 Other Assessments

This section describes those issues which are relevant to the proposed development however do not in our view merit or justify a full chapter within the EIAR.

On the basis of professional judgement and review of baseline conditions, full impact assessment is not considered necessary for the following topics:

- Climate Change;
- Air Quality;
- Accidents and Natural Disasters; and
- Population and Human Health.

The justifications for our intended discounting the above environmental topics from inclusion as full chapters in the EIAR are provided below.

3.3.1 Climate Change

Climate change has taken a prominent position within policy and legislation at a national level, with the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 setting a target date of net-zero emissions of all greenhouse gases by 2045. The Climate Change Plan update published in December 2020 provides a pathway for Scotland to meet the emissions reduction targets through to 2032. It identifies that public bodies have a part to play in decarbonising Scotland through leading by example.

As mentioned in Section 1.2, OICHA have developed a Masterplan which provides a framework for improving and expanding existing harbours and assets so that Orkney becomes a world leading maritime hub providing world class facilities. Decarbonisation of shipping and ports as well as the transition of fuels from hydrocarbons to carbon free are central to the Masterplan proposals and will allow new opportunities and diversification of existing ones to continue for future generations.

The proposed development at Deepdale will be able to accommodate multiple activities in the energy sector such as construction, operation and maintenance of offshore wind farm components and maintenance of structures and vessels. There is also the potential to incorporate a storage and supply hub for future marine fuels at the site.

It is therefore considered at the scoping stage that the proposed development would not result in a significant effect upon climate given the nature of the development (Refer to Section 2.2.2). Any increase in emissions created during either construction or operation is likely to be negligible, and for the construction phase pollution and emissions control would be discussed within a detailed Construction Environmental Management Plan (CEMP).

Discussion of the vulnerability of the project to climate change is primarily concerned with the water environment, including flood risk and wave overtopping due to increases in sea level. This will be taken into account in the design of the facility.

3.3.2 Air Quality

The development site is located within a relatively rural area influenced by maritime weather conditions. In order to inform the Scoping Report, the relevant 1km background air quality concentration maps were obtained from the Scottish Air Quality and DEFRA websites. The 2019 measured annual average concentrations of NO₂, PM₁₀ and PM_{2.5} for Orkney indicates that air quality is good with the pollutant concentrations being well below the relevant National Air Quality Objectives of 40µg/m³, 18µg/m³ and 10µg/m³ respectively. The 2019 Air Quality Annual Progress Report for OIC (the most up-to-date report available) does not identify any Air Quality Management Areas (AQMAs) within the council area. In addition OIC does not currently operate any automatic air quality monitoring stations within their boundary.

The development however, has the potential to impact local air quality in a number of ways with the key issues in relation to this environmental topic being traffic emissions from the local road network both surrounding and accessing the site and dust emissions during the construction phase.

This is a new facility which is sited within a rural location. It should be noted that the A961 public road is a key route for ferry traffic, with cars and HGVs travelling daily to and from St Margaret's Hope to travel on the ferry service operated by Pentland Ferries. It is envisaged at this stage in the project that the traffic generated by the development will be restricted to site workers. Marine assets and supplies will largely be brought to and from site by sea with only some materials/goods being transported overland sporadically. As such the increase in traffic on the local road network as a result of the development is regarded as being insignificant.

Construction of the proposed development is considered to be a temporary impact and can be controlled through developing a site-specific Dust Management Plan as part of a Construction Environmental Management Plan (CEMP). The dust impact assessment requires specific information

on site operations during construction, including preparatory earthworks, general construction and the potential for trackout. Currently this information is still being finalised. It is therefore proposed to defer the construction dust assessment and formulation of a Construction Dust Management Plan until such time as details on construction activities have been finalised.

Accordingly, it is proposed to discount Air Quality from further EIA assessment.

3.3.3 Accidents and Natural Disasters

Similar to other ports, there is potential for accidents to occur, however OICHA operate a Marine Safety Management System / Standard Operating Procedures to promote safe and efficient harbour operations and is compliant with the Port Marine Safety Code. 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 environment. These procedures will also be introduced at this new facility once operational thereby reducing the likelihood of accidents occurring.

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

Accordingly consideration of accidents and natural disasters is scoped out of the EIA.

3.3.4 Population and Human Health

Although the proposed development will be a new facility within a rural area a Safety Management System / Standard Operating Procedures will be introduced by OICHA when site operations commence (as noted in Section 3.3.3). During its construction and operational phases it is therefore considered there will be no significant direct or indirect impact on either population or human health as a result of the development subject to other assessments (i.e. Air Quality etc)

3.4 Cumulative Assessment

It is acknowledged that the proposed development is part of a larger Masterplan for the area which has been promoted by the Applicant. However, it is not proposed to incorporate a section within the EIA report dedicated to cumulative assessment. Instead, the chapter for each environmental discipline will consider the potential for cumulative impacts within their individual impact assessments.

4 WATER ENVIRONMENT AND COASTAL PROCESSES

4.1 Introduction

The water environment is considered to encompass hydrology, hydrogeology and water quality, whilst coastal processes are considered to encompass tides, waves and sediment transport processes. This section of the Scoping Report will therefore address all of these subject areas, in addition to geology. The associated interactions between the water environment, ecology and fisheries will be considered within the ecology section of this document.

The Water Framework Directive (WFD) (Council Directive 2000/60/EC) aims to protect and enhance water bodies within Europe and covers all estuarine and coastal waters out to 1 nautical mile. This requires that there is no deterioration in the quality of surface or groundwater bodies and aims to achieve good ecological status or potential. The implications of the WFD must be considered when assessing this project and the details of how compliance will be achieved provided in the EIA.

The development proposals for construction, and associated dredging, have the potential to cause changes to the baseline hydro(geo)logical conditions and the ongoing coastal processes at the site, and in the wider area. Given the importance of water as a valued resource, coastal processes to the surrounding environment, and of ensuring sustainable development, this initial assessment of the water environment and coastal processes is considered essential.

4.2 Proposed Development

The proposed development is located on the southern shore of the Orkney mainland, approximately 8km south of Kirkwall. It is located on the coastline within Scapa Flow, approximately 4km south of the existing Scapa Pier.

4.3 Baseline Conditions

4.3.1 Geology and Soils

The online British Geological Survey (BGS) 1:50,000 map identifies that the development site is mainly underlain by siltstone, mudstone and sandstone of the Caithness Flagstone Formation².

The BGS 1:50,000 map shows that superficial deposits are absent from the shoreline. Till (Devension – Diamicton) underlies the site approximately 100m inland of the shore.

The site is underlain by a moderately productive aquifer of sandstone, siltstones, mudstones and conglomerates yielding small amounts of groundwater locally.

4.3.2 Tidal Water Levels

The closest port referenced in Admiralty tide tables is Kirkwall (standard port). Tidal water levels at the Kirkwall Standard Port as presented within the Admiralty tide tables are shown in Table 4-1³. The mean tidal range at Kirkwall is 2.4m during spring tides and 1.1m during neap tides.

² British Geology Survey 1:50,000 (Geology of Britain Viewer- <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>)

³ UK Hydrographic Office, 2020 (Admiralty Tide Tables – Volume 1B)

Table 4-1: Tidal range at Kirkwall Standard Port

Tide Condition	Chart Datum (mCD)	Ordnance Datum (mAOD)
Highest Astronomical Tide (HAT)	3.5	2.1
Mean High Water Spring (MHWS)	3.0	1.6
Mean High Water Neap (MHWN)	2.4	1.0
Mean Low Water Neap (MLWN)	1.3	-0.1
Mean Low Water Spring (MLWS)	0.6	-0.8

*Chart datum correction for Ordinance datum is -1.4 (relative to OD at Newlyn)

Extreme sea levels have been predicted around the whole UK coastline and published by the Environmental Agency / Department for Environmental Food and Rural Affairs report⁴. These extreme levels include the effects of both tides and storm surge but not the effect of amplification within estuaries or sea lochs. In order to provide better estimates around the Scottish coastline, SEPA have updated the original estimates. However, it is noted that the proposed development site is situated inshore of the estuary limit of the extreme sea level predictions for Scapa Flow, and therefore predictions from the Coastal Flood Boundary programme cannot be applied directly to the site.

The SEPA derived extreme sea levels, predicted at the closest point to the development within Scapa Flow (offshore of the prediction limits), are 2.77m Above Ordnance Datum (AOD) for the 1 in 200 year return period event and 2.89mAOD for the 1 in 1,000 year return period event. SEPA recommend a 2100 climate change uplift of 0.93m for coastal levels. Therefore the 1 in 200 year return period plus climate change event at the prediction location has a level of 3.70mAOD and the 1 in 1000 year return period plus climate change event has a level of 3.82mAOD

4.3.3 Coastal Processes

Tidal Currents along the nearshore within Scapa Flow are insignificant, with the exception of the entrances to Scapa Flow. The fetch lengths for wind generation of waves are restricted by the surrounding topography, with wave conditions tending to be dominated by locally generated wind-waves. The entrances to Scapa Flow dissipate much of the offshore wave energy limiting propagation of waves generated around the Orkney Islands into Scapa Flow. Much of the coastline near to the proposed site is fronted by a rock platform with shingle and sand beaches. There is little littoral transport other than limited reworking of glacial till, input of sediment to Scapa Flow is restricted by the construction of the Churchill Barriers⁵. The European Nature Information System (EUNIS) seabed habitat map shows the dominant seabed habitat around the proposed development to be infralittoral sandy mud and infralittoral mixed sediment in a low energy environment⁶.

No seabed sediment is indicated for approximately 500m west from the shore at the proposed development site. Slightly gravelly muddy sand is shown from approximately 500m west of the shore⁷. Due to the nature of the seabed substrate in the vicinity of the proposed development, and the lack of fine sediment, it is not anticipated that there are significant local active sediment transport processes.

Analysis of historical coastline alignments show no major changes to the coastline since 1890 and there has been no significant erosion observed⁸.

4.3.4 Hydrology

The Burn of Deepdale and Burn of Button flow from the northeast and east, respectively before converging and flowing into Scapa Flow immediately north of the proposed development. Both

⁴ McMillan et al, 2011. Coastal Flood Boundary Conditions for UK Mainland and Islands. Environment Agency.

⁵ Ramsay and Brampton, 2000. Coastal Cells in Scotland: Cell 10 – Orkney.

⁶ EUNIS 2017 (<https://emodnet.eu/en>).

⁷ Marine Scotland (<https://marinescotland.atkinsgeospatial.com/nmpi/>)

⁸ Dynamic coast online map available at: <http://www.dynamiccoast.com/webmap.html>

watercourses have a combined catchment of approximately 1.96km² upstream of the point of discharge to Scapa Flow.

There are likely other small inflows discharging into Scapa Flow, as well as piped drainage. The inflow of freshwater remains insignificant relative to the much larger volume of seawater exchanged within Scapa Flow.

4.3.5 Water Quality

The coastal waters of Scapa Flow are classified under the Water Framework Directive (WFD) monitoring programme as a coastal waterbody. The waterbody is classified as being of overall 'Good' status in 2018, with a hydromorphological status of 'High'. There are no watercourses discharging to Scapa Flow large enough to be classified under the WFD.

4.3.6 Flood Risk

The SEPA flood maps do not indicate any fluvial flood risk from the watercourses identified in the vicinity of the development site, this is because the watercourses, and associated catchments, are too small to be included by this method. Isolated areas of pluvial flood risk are identified within low lying areas corresponding to the channels and banks of the Burn of Deepdale and the Burn of Button. It is considered that these areas shown as pluvial flood risk correspond to the likely zones of fluvial flood risk.

A review of the SEPA online flood maps identifies that the lower coastal edge of the proposed development site are at high risk of coastal flooding⁹. This prediction does not account for the potential effects of climate change, local bathymetry or wave action.

4.4 Potentially Significant Effects (Construction)

The proposed development will involve construction activities within, or in close proximity to, the water environment (particularly coastal) including construction of the quay, capital dredging works, land reclamation and formation of the access road, and the creation of a laydown area. The key potential environmental impacts on the water environment during construction are detailed below:

- Potential impact to coastal process including wave action, tidal currents and sediment transport;
- Potential changes in infiltration rates, flood risk and drainage;
- Potential contamination of the water environment (coastal, fluvial and groundwater) from spillages, runoff and/or sediment transfer (oil, fuel, suspended solids and potential contaminants in soil); and
- Potential interaction between water environment and ecology.

4.5 Potentially Significant Effects (Operation)

The completed development will be within, or in close proximity to, the water environment and may result in the following potential impacts on the water environment once constructed:

- Potential impact to coastal process including wave action tidal currents and sediment transport;
- Potential contamination of the water environment from wastewater, site discharge and or traffic; and

⁹ SEPA, 2020 (<http://map.sepa.org.uk/floodmap/map.htm>)

- Potential interaction between the water environment and ecology.

4.6 Inclusion of Exclusion from EIA

The construction activities involved within the proposed development including dredging, construction of the quay, and land reclamation all have the potential to impact the coastal processes within Scapa Flow. However, the development site is considered to have low energy without significant sediment transport, with an absence of fine sediment. In this context it is considered that a qualitative assessment of the impact of the proposed development on coastal processes, including wave action, tidal current and sediment transport is appropriate.

Dredging is proposed to take place as shown in Drawing Nos SK09112020-01, 02 and 03, Appendix A), however, given the limited dredge extent proposed, the low energy nature of the coastal environment, and the general absence of fine sediment and significant sediment transport, a qualitative assessment of the potential impact of dredging on water quality and the production of suspended sediments is considered appropriate.

SEPA flood maps do not show risk of fluvial flooding from watercourses within the vicinity of the site due to the small size of the watercourses and associated catchments. Any fluvial flood risk is considered to be limited to the immediate surrounds of these minor watercourses, as highlighted by the SEPA pluvial flood risk maps. It is therefore proposed to scope out the assessment of fluvial flood risk.

The proposed development is noted to be water compatible for operational reasons. It is considered that given the scale of proposals, the proposed land reclamation works would have a negligible impact on local sea levels. The development design will take account of extreme sea levels and future sea level rise predictions, as appropriate. Therefore it is proposed to scope out the further assessment of coastal flood risk.

The construction of the site has the potential to generate pollutants/contaminates which could impact the water quality of the nearby water environment. The prevention of pollution during construction and operation of the plant will be a key focus of the EIA. It is considered that if best practise is implemented following appropriate guidance, creation of a pollution prevention plan and surface water management plan, and installation of sustainable urban drainage measures that will not be detrimental to the existing environmental conditions. Therefore any potentially significant effects are readily mitigated.

4.7 Assessment Methodology

4.7.1 Design and Mitigation

During the EIA process where any significant effects are identified for the water environment or coastal processes then recommendations for design alterations or mitigation measures which could avoid, reduce or resolve the adverse effects will be identified.

4.7.2 EIA Methodology

The assessment will follow standard EIA procedures and will include:

- Desk based review of the proposed development and surrounding water environment;
- Consultation with key stakeholders to obtain relevant information and ensure their concerns are addressed within the EIAR;
- Establish baseline conditions:

- Review of coastal processes including bathymetry, tidal currents, wave action, seabed sediment and sediment transport;
- Review of hydrology, water quality and drainage;
- Review of geology and soils on site; and
- Reporting of baseline conditions to help inform potential impacts from the development.
- Carry out an EIA assessment:
 - Identify potential sensitive environmental receptors and environmental constraints;
 - Identify any potential impacts and impact significance;
 - Identification and assessment of appropriate mitigation measures to reduce and avoid any potential impacts of the proposed development; and
 - Statement of residual impacts.

Baseline data will be used along with expert opinions to qualitatively assess the potential impacts of the proposed development and the significance to receptors. The potential impacts will be evaluated in comparison with water quality standards and objectives, environmental quality standards and sediment quality standards.

5 ECOLOGY

5.1 Introduction

The assessment of ecology will consider the geographical area potentially affected by the proposed development within Deepdale Bay on the eastern shores of Scapa Flow, known as Scapa Deep Water Quay (SDWQ). Particular attention will be given to:

- Terrestrial habitats and species;
- Birds; and
- Marine habitats, fish and mammals.

The proposed development has the potential to affect ecology in the development footprint in terms of direct habitat losses. It is also envisaged that a range of other effects on terrestrial and marine ecology in the wider area could occur.

The potential impacts of the proposed development on the water environment, including hydrology, hydrogeology, water quality and coastal processes, will be considered in the Water and Coastal Processes section of the scoping report; however any impacts on the water environment will be taken into consideration in the ecological scoping appraisal.

5.2 Baseline Conditions

5.2.1 Designated sites

There are three statutory designated sites within 10km of SDWQ.

Orkney Mainland Moors Special Protection Area (SPA) comprises four areas of moorland on Mainland Orkney. At its closest point it lies within 6km of SDWQ. The predominant habitats include extensive areas of blanket bog, heaths and mires. These upland areas support 5.9% of the UK's breeding and 2% of the UK's overwintering Hen Harrier (*Circus cyaneus*) population, 2% of the UK's breeding Short-eared Owl (*Asio flammeus*) population. In both cases one of very few sites to support such dense and significant numbers. The area also supports 2% of the UK's breeding Red-throated Diver (*Gavia stellata*) population. This site's boundaries also correspond to **Keelylang Hill and Swartaback Burn Site of Special Scientific Interest (SSSI)**, which is designated for breeding Hen Harrier.

The **North Orkney proposed SPA (pSPA)** is afforded the same level of protection as a designated site. This pSPA is located to the north of Mainland Orkney and encompasses 227km² of the waters between the islands of Shapinsay, Rousay, Egilsay and Wyre, including Deer Sound, Shapinsay Sound and Wide Firth. SDWQ also lies within 6km of the North Orkney pSPA. The area included within the pSPA supports populations of European importance of the following Annex 1 species: Great Northern Diver (*Gavia immer*), Slavonian Grebe (*Podiceps auritus*) and Red-throated Diver. It also supports migratory populations of European importance of the following species: Common Eider (*Somateria mollissima*), Long-tailed Duck (*Clangula hyemalis*), Velvet Scoter (*Melanitta fusca*), Red-breasted Merganser (*Mergus serrator*) and European Shag (*Phalacrocorax aristotelis*).

The **Scapa Flow proposed SPA (pSPA)** comprises a total area of 371km² located within Scapa Flow - an enclosed sea area, sheltered by Mainland Orkney to the north, Hoy, South Walls and Flotta to the west and south, and Burray and South Ronaldsay to the east. The Flow is linked to the Pentland Firth in the south through the Sound of Hoxa, and to the Atlantic Ocean in the west through Hoy Sound. The site also includes nearshore waters to the east of Orkney, extending from South Ronaldsay to Deerness, and including the sheltered shallow waters of Holm Sound, between Burray and East Mainland. Prior to construction of the Churchill Barriers in World War II, there were openings between

Scapa Flow and Holm Sound to the North Sea. The offshore elements of SDWQ lie within the boundary of the Scapa Flow pSPA. The area included within the pSPA supports populations of European importance of the following Annex 1 species: Great Northern Diver, Red-throated Diver, Black-throated Diver (*Gavia arctica*), and Slavonian Grebe. It also supports migratory populations of European importance of the following species: European Shag, Common Eider, Long-tailed Duck, Common Goldeneye (*Bucephala clangula*) and Red-breasted Merganser.

There is also one non-statutory designated site within 500m of the onshore areas of the SDWQ site - **Gaitnip Hill Local Nature Conservation Site** (LNCS) covers 120 hectares of moorland and grassland on Holm. The site includes a number of nationally important habitats and species, and is considered important for breeding birds of prey, including Hen Harrier, Short-eared Owl, and Merlin (*Falco columbarius*). It also supports a variety of nesting waders and passerines.

5.2.2 Habitats and species

The following list includes all terrestrial and intertidal habitats and species afforded legal protection, those included within the UK BAP and LBAP, and all bird species that are considered to have the potential to suffer negative effects from the proposed development:

- Coastal vegetated shingle;
- Otter (*Lutra lutra*);
- Great Northern Diver;
- Red-throated Diver;
- Black-throated Diver;
- Slavonian Grebe;
- European Shag;
- Common Eider;
- Long-tailed Duck;
- Common Goldeneye; and
- Red-breasted Merganser.

5.2.3 Marine Mammals

All species of dolphin, porpoise and whale are European Protected Species (EPS). The marine mammal species most often encountered in the waters around Orkney, and therefore the most likely to suffer negative effects from the proposed development are listed below. All appear on the UK BAP (other than Grey Seal) and the Orkney LBAP.

- Harbour Porpoise (*Phocoena phocoena*);
- Minke Whale (*Balaenoptera acutorostrata*);
- Bottle-nosed Dolphin (*Tursiops truncatus*);
- Risso's Dolphin (*Grampus griseus*);
- White-beaked Dolphin (*Lagenorhynchus albirostris*);
- Atlantic White-sided Dolphin (*Lagenorhynchus acutus*);
- Common Dolphin (*Delphinus delphis*);
- Killer Whale (*Orcinus orca*);
- Grey Seal (*Halichoerus grypus*); and
- Common Seal (*Phoca vitulina*).

5.2.4 Fish

The Orkney coastline is well known for its Sea Trout fishing and there are many commercial sea fish caught in the area. Sea Trout is a UK BAP species. There are no rivers designated for fish on Mainland Orkney but the development site may be on or close to a fish migratory path. Further baseline data on fish will be collated for the EIAR.

5.3 Potentially Significant Effects (Construction)

The following potential negative impacts on ecology could occur during the construction phase of the proposed development:

- Terrestrial habitat loss which will lead to a loss of potential foraging, roosting, commuting and nesting opportunities for a range of species;
- Accidental spills from vessels, plant and on-site storage of fuels and chemicals leading to pollution of habitats and potential harm to a range of species and habitats;
- Increased noise through construction activities (dredging, piling, blasting, plant movement, etc.) leading to disturbance and displacement of foraging, roosting or nesting species;
- Increased visual stimuli through construction activities (personnel and plant movement, etc.) leading to disturbance and displacement of foraging, roosting or nesting species;
- Increased, un-natural lighting leading to disturbance and displacement of foraging, roosting or nesting species;
- Presence of temporary new structures creating potential collision risk for a range of bird species;
- A potential change of hydrological flow which may alter the composition of the habitats present;
- Direct loss of intertidal and subtidal habitat over the footprint of the development;
- Underwater acoustic noise and shock during piling leading to altered behaviour, this could include lethal and sub lethal impacts on marine mammals and their prey species;
- Seabed excavation works during construction leading to disturbance of and potential loss of benthic communities and marine species, which in turn could lead to a reduction in or dispersal of prey items for a range of marine mammals and bird species;
- Temporary increase in suspended sediment and/or deposition from dredging and construction creating physical disturbance in the marine environment; and
- Increased vessel numbers causing disturbance in the marine environment.

5.4 Potentially Significant Effects (Operation)

The following potential negative impacts on ecology could occur during the operational phase of the proposed development:

- Accidental spills from vessels, plant and on-site storage of fuels and chemicals leading to pollution of habitats and potential harm to a range of species and habitats;
- Increased noise through operational activities (plant movement, etc.) leading to disturbance and displacement of foraging, roosting or nesting species;
- Increased visual stimuli through operational activities (personnel and plant movement, etc.) leading to disturbance and displacement of foraging, roosting or nesting species;
- Increased, un-natural lighting leading to disturbance and displacement of foraging, roosting or nesting species;
- Presence of new structures creating potential collision risk for a range of bird species;
- Dredging activity may lead to potential disturbance of and potential loss of benthic communities and marine species, which in turn could lead to a reduction in or dispersal of prey items for a range of marine mammals and bird species;
- Temporary increase in suspended sediment and/or deposition from dredging and construction creating physical disturbance in the marine environment; and
- Increased vessel numbers post construction causing disturbance in the marine environment.

5.5 Design and Mitigation

5.5.1 Terrestrial Habitats and Species

Habitat loss impacts on terrestrial habitat will be mitigated by design. Good practice mitigation measures will be recommended to minimise the impacts of construction and specific operation activities on terrestrial habitats and species. These will include a pre-construction otter survey.

5.5.2 Birds

The proposed area of terrestrial works is within grazing land and contains limited foraging opportunities for a low range of species.

The proposed area of the development within Scapa Flow has the potential to impact upon a wide range of protected species and those qualifying species of the Scapa Flow pSPA, particularly during the winter months when the birds are present.

To better understand the usage of the proposed site and to ensure any disturbance or displacement to nesting, foraging or roosting birds is minimised during construction and operation, a calendar year of wintering and breeding bird surveys is recommended to ascertain the locations of bird aggregations, numbers of birds present, and the species which frequent the area of proposed development.

A suite of vantage point surveys over the winter months is also proposed in order to better understand the species present, their numbers, preferred areas within the Flow, and their behaviour in certain areas / water depths, etc.

5.5.3 Marine habitats, fish and mammals

Underwater noise modelling for construction activities will be carried out, focussing on the key species above (including fish species). Potential impacts on marine mammals and their prey will be designed out where possible. Any additional mitigation will be designed to be site and species specific, taking into account the additional noise producing activities occurring in Scapa Flow.

The Joint Nature Conservation Committee (JNCC) *Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (2010)*¹⁰ will be consulted to design a site specific mitigation protocol, if required.

Mitigation proposals will be agreed through discussion with NatureScot and Marine Scotland to ensure they provide the appropriate protection for marine mammals during construction and it may well be necessary to apply for an EPS licence from the licensing authority, Marine Scotland, prior to commencing construction works.

5.6 Inclusion and Exclusion from EIAR

5.6.1 Terrestrial Habitats and Species

Terrestrial habitats and species will be scoped out of the EIA process. Potential impacts will be mitigated by design and a pre-construction survey will be undertaken for otter (Refer to Section 5.5.1).

¹⁰ JNCC Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise (2010) available online: http://jncc.defra.gov.uk/pdf/JNCC_Guidelines_Piling%20protocol_August%202010.pdf

5.6.2 Birds

Low tide counts and vantage point surveys are currently being undertaken, as outlined in Section 5.5.2, and initial findings indicate that with the successful implementation of mitigation measures, it is considered unlikely that there would be any significant effects on the bird populations as a result of the proposed development. However, in line with NatureScot comments¹¹ on the Appropriate Assessment (AA) of the Draft Orkney Harbour Masterplan Phase 1¹², it is suggested that a Habitats Regulations Appraisal (HRA) is undertaken to assess any potential LSE on the qualifying species of the North Orkney pSPA and the Scapa Flow pSPA.

Bird species that nest and forage on the terrestrial habitats adjacent to the proposed development have not been considered for assessment within the EIAR as neither assemblage will suffer significant habitat loss or will lose important roosting or foraging grounds as a result of the proposed development.

The Orkney Mainland Moors SPA will not be included in the EIA, as the SDWQ site does not constitute optimal habitat for its qualifying species, and there is no likely significant effect (LSE) on the integrity of the designation as a result of the proposed development.

5.6.3 Marine habitats, fish and mammals

Marine mammals and their prey will be included in the EIA.

5.7 Assessment Methodology

The assessment of predicted impacts will be undertaken against a baseline and the significance of effects assessed using standard EIAR criteria (i.e. as developed by the Institute of Environmental Management and Assessment (IEMA)).

The methodology for the Ecological Impact Assessment (EclA) will follow the Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, Version 1.1 (CIEEM, 2018 (updated 2019)). The British Standard for Biodiversity: Code of Practice for Planning and Development (BS 42020:2013) cites the CIEEM EclA Guidelines as the acknowledged reference on ecological impact assessment. The guidelines are consistent with the British Standard, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.

The assessment will include all direct and indirect, lethal and non-lethal impacts on ecology that could reasonably occur during construction work and in operation of the development.

¹¹ Letter Ref CDM158120 dated 24/02/2020

¹² Draft Orkney Harbours Masterplan Phase 1, Habitats Regulation Appraisal Screening Assessment, Report No P2214_RN4683_Rev1, dated 19 July 2019.

6 ARCHAEOLOGY AND CULTURAL HERITAGE

6.1 Introduction

This chapter provides an overview of the existing archaeological and cultural heritage baseline in the immediate area of the proposed development. It identifies potential effects on this baseline by the proposed development during construction and operation. Any potentially significant effects that are predicted will be recommended for scoping into an impact assessment. An overview of appropriate methodology for the assessment of these potentially significant effects is identified. An overview of possible mitigation, avoidance or enhancement measures that could be implemented is also provided.

This chapter takes account of consultation responses to the Strategic Environmental Assessment (SEA), HRA and AA for the Orkney Harbours Masterplan Phase 1. Historic Environment Scotland (HES) noted the presence of HMS Royal Oak c. 1km northwest of the proposed development, and considered that:

- there is the potential for impacts on unknown maritime heritage assets;
- further survey work and mitigation may be required at project design stage to avoid impacts on two high archaeological potential geophysical anomalies in close proximity to the development noted in the Canmore database;
- there is a requirement to indicate whether dredging will be required, that the limited area for reclamation may require further survey at project stage, and once any dredge disposal sites are determined, impacts on relevant sites in their vicinity also need to be considered; and
- significant adverse impacts on the setting of assets in our remit in the vicinity of the proposals are unlikely.

In addition to the legislative context outlined in Section 1.4 above, key legislation and policy relevant to the historic environment includes:

- The Protection of Military Remains Act 1986 (PoMRA) has the principal concern to protect the sanctity of vessels and aircraft that are military maritime graves. HMS Royal Oak is protected under this Act, with a 200m radius exclusion zone around it. Any aircraft lost while in military service is automatically protected under this Act;
- The Historic Environment Policy Statement for Scotland (HEPS) 2019 includes policies that decisions affecting any part of the historic environment require understanding of its significance and consideration of avoiding or minimising detrimental impacts;
- Historic Environment Scotland Designation Policy and Selection Guidance 2019 stands alongside HEPS 2019 and outlines the principles and criteria that underpin the statutory designation of historic assets; and
- The Pentland Firth and Orkney Waters Marine Spatial Plan (PFOW MSP, 2016) and the Orkney Local Development Plan (2017) policies concerning the protection of and approaches to the historic environment.

6.2 Baseline Conditions

The key reference sources reviewed for the baseline overview were:

- The Historic Environment and Cultural Heritage section on the Marine Scotland Information website, <https://marine.gov.scot/themes/historic-environment-and-cultural-heritage> [accessed 16-17/01/2021];
- Statutory lists, registers and designated areas, including List of Designated Wrecks and Historic Marine Protected Areas;

- UK Hydrographic Office (UKHO) wreck register and relevant nautical charts; and
- The National Record of the Historic Environment via the Canmore and Pastmap online databases (<https://canmore.org.uk/>; <https://pastmap.org.uk/> [accessed January 2021]).

The importance of identified historic environment receptors has been evaluated to inform the assessment of potential effects for scoping in or out of an EIA. The level of importance assigned depends on a number of factors, including intrinsic, contextual and associative characteristics (HES Designation Policy and Selection Guidance 2019) and general guidelines used by statutory authorities and agencies such as the Scottish Government and HES.

The study area comprised a 1km radius from the centre of the proposed development (see Figure 6.1, Appendix A), although some assets out with this were considered in relation to potential effects on setting.

6.2.1 Marine

There are no marine cultural heritage statutory designations within the study area, nor are there any assets that are in the proposal for the designation of Historic Marine Protected Area in Scapa Flow <https://www.gov.scot/publications/proposal-designate-two-historic-marine-protected-areas/pages/3/> [accessed 22/01/2021]. There are no UKHO charted wrecks, dead wrecks or non-sub contacts within the study area.

HMS Royal Oak is located 1.5km (0.87nm) to the northwest of the proposed development, marked by a large green buoy. It is a designated war grave of national importance and protected from any disturbance under PoMRA.

Hominids and humans have occupied the UK continental shelf (UKCS) at various times for more than 700,000 years but finds showing this are incredibly rare. Submerged landscapes are where human beings and early hominids previously lived or hunted on terrain which was at that time dry land, or where they exploited fish and shellfish on the coast which is now submerged.

Some 12,000 years ago, at the end of the last Ice Age, relative sea levels around Orkney may have been 30-40m lower than present only reaching current levels approximately 2,000 BC (Dawson & Wickham Jones, 2007; Dawson et al, 2017). There are known submerged paleoenvironmental remains in the shallow margins of Scapa Flow, such as the peats and tree trunks at Widewall Bay, South Ronaldsay (Timpany et al, 2017). It is unlikely that there are any submerged palaeoenvironmental deposits within the proposed development footprint, which is located on / at the edge of the rock platform along the coastal edge, but there may be potential in the muddy sediments that lie below the sand on the seabed 150m out from the shoreline.

Canmore has a number of ship losses listed as generic 'In Scapa Flow' and there is a low possibility that some vessels could be in the development area. A number of wartime aircraft went missing in Scapa Flow and there is a low possibility of finding one within the area, which although not likely, cannot be discounted. Any aircraft would automatically fall under PoMRA. There are still missing torpedoes from U47 and the Luftwaffe attacked ships anchored in Scapa Flow, but there are none recorded in the area of the proposed development.

A Multi-Beam Echo Sounder (MBES) survey was conducted in the area in 2010, from which two anomalies were identified that could be anthropogenic and potentially of high archaeological interest, and were therefore entered into the Canmore database (MBES Contacts 1 and 2). Subsequently, a sidescan sonar (SSS) survey of the area in 2020 identified potentially anthropogenic anomalies, which

were dived on (SULA Diving, 2020¹³). Four items of vessel debris were identified (Wreckage sites 1-4).

The marine historic environment assets with known locations are listed in Table 6.1 and shown on Figure 6.1.

Table 6-1: Overview of identified marine historic environment assets

Name	Canmore ID	Description	Date lost	Source	Importance
Wreckage 1	-	Heat exchanger, outer casing badly degraded. Piped very degraded. 4m from Wreckage 2.	Unknown	1	Low-Negligible
Wreckage 2	-	Heat exchanger, outer casing badly degraded. 4m from Wreckage 1.	Unknown	1	Low-Negligible
Wreckage 3	-	Debris that appears to be keel section of a steel vessel, filled with concrete ballast. Likely to relate to Wreckage 4	Unknown	1	Low-Negligible
Wreckage 4	-	Debris that appears to be lower bow section of a steel vessel, filled with concrete ballast. Likely to relate to Wreckage 3	Unknown	1	Low-Negligible
MBES Contact 1	330777	MBES anomaly presenting as oval mound 14.5m by 9.7m by 1.5m high, in 18m water depth. Considered of high archaeological potential.	N/A	2	Unknown
MBES Contact 2	330776	MBES anomaly presenting as oval mound 14.5m by 14m by 1.7m high in 25m water depth. Considered of high archaeological potential.	N/A	2	Unknown
Degaussing range	269584	World War Two degaussing range area.	N/A	2	Moderate

Source: 1 SULA Diving 2020; 2 Canmore

The pieces of wreckage that were identified by diving on the SSS survey contacts have been assessed as being of low-negligible historic value. This is because of their poor condition and cannot be identified as from any particular vessels, even though they are of 20th-century date, and may be the result of historic naval activity in Scapa Flow (SULA Diving, 2020).

The two MBES contacts may not have high potential for being archaeology, because they did not show in the 2020 SSS survey and are not really of the right proportions to be vessels. However, they cannot be discounted.

In World War Two, a deep-water degaussing range was laid near the Tongue of Gangsta, some 1 to 1.5km south of the proposed development (Figure 6.1; National Archives Kew, ADM 116-5790 Fleet Base Scapa Flow 1937-1946). The range was designed to demagnetize ships so they would not set off German magnetic mines. The area would have had a grid of copper cables laid over the seabed which the ship would pass over to be degaussed. This operation was run from the Backakelday degaussing shore station (Canmore 269584). The area of the range is indicated by the Prohibited Anchorage shown on Admiralty chart *Scapa Flow and Approaches (North Sheet) 1944*. It is possible that the copper grid survives below modern sediments, and would represent the remains of what was

¹³ SULA Diving. (2021). *Investigation of seabed wreckage off the Bay of Deepdale, Scapa Flow, Orkney*. Report for Department of Marine Services, Orkney Islands Council.

a significant operation during WW2, contributing to the collection of historic environment resources in Scapa Flow.

6.2.2 Onshore

There are no cultural heritage statutory designations within the proposed development area and apart from two C-listed farmsteads, there are none in the wider study area. There are no known historic environment assets within the onshore footprint of the proposed development. The onshore historic environment assets with known locations are listed in Table 6.2 and shown on Figure 6.1.

The known sites in the study area fall into three broad categories:

- Prehistoric - probably Bronze Age - burials and burnt mounds, which are likely to be of at least moderate importance;
- Post-medieval and 19th-century farmsteads, mostly of low importance, but two of which are C-Listed, and so should be considered of moderate importance; and
- WW2 military sites associated with the protection of the Scapa Flow Naval Base, many of which are considered of moderate importance because of their state of preservation and thus their contribution to the collection of historic environment resources in Orkney that evidence a conflict of international significance.

There is potential for unknown prehistoric remains to be found, reflected by the presence of cist burials and a burnt mound by the Burn of Gangsta (Sites 2375 and 2385), and barrows and a burnt mound north of Rashieburn (Site 2342).

It is likely that settlement remains from the Norse and medieval periods are likely to be at the sites of farmsteads with place names indicative of this, such as West Bu and Netherbutton, with a negligible risk that there are any such unknown remains within the development footprint. It is a similar case for post-medieval farmsteads and wartime remains.

Table 6-2: Overview of identified onshore historic environment assets

Name	Canmore ID	LB #	Type	Description	Period	Importance
RAF Netherbutton	314832		Military Housing	Wardens house for staff at the RAF Netherbutton station. Much altered and still occupied.	WW2	Low
RAF Netherbutton, Chain Home Radar Station	81727		Military Camp	Remains of Netherbutton Radar Station, military camp and anti-aircraft defences situated on both sides of the A961, visible as concrete bases and structures.	WW2	Moderate
Burn Of Button	269283		Engine House	Main generator house for RAF Netherbutton Radar Station. Brick and concrete building c.13m square set within earthen banks to protect from bomb blast.	WW2	Moderate
Rashieburn House and Steading	316861		Farmstead	Farmstead.	Post-medieval	Low
Netherbutton	179645	LB46383	Farmstead	C-Listed farmstead, boundary walls and gate piers.	19th-century	Moderate
Backakelday, Royal Navy Degaussing Range Station	269584		Naval	Royal Navy degaussing station. Personnel accommodated at West Bur farmsteading.	WW2	Moderate
Howa	179642, 256355, 256356, 256357	LB46381	Farmstead	C-Listed farmstead, including components of farmhouse, dwelling, byre, barn and kiln.	19 th -century	Moderate
West Bu	182634		Farmstead	Farmstead.	Post-medieval	Low
St Clair Farm	269282		Military Camp	Location of WW2 military camp, remains no longer extant.	WW2	Negligible
Turnpike, Midhouse Battery	292436		Barrage Balloon Site	Barrage balloon site, no longer extant.	WW2	Negligible
Turnpike, Midhouse Battery	296577		Searchlight	Location of searchlight emplacement, no longer extant.	WW2	Negligible

Name	Canmore ID	LB #	Type	Description	Period	Importance
Turnpike, Midhouse Battery	269491		Radar site	Platform for mobile radar unit. Still present	WW2	Low
Turnpike, Midhouse Battery	104559		Anti-aircraft Battery	Remains of the command and control block for Midhouse heavy anti-aircraft battery. Crew accommodation camp, gun-emplacements, light anti-aircraft position and most of associated buildings no longer extant.	WW2	Low
Gutterpool	182635		Farmstead	Courtyard farmstead.	Post-medieval	Low
The Five Hillocks, Rashieburn	2342		Barrows	A group of 8 mounds, one of which is a burnt mound.	Prehistoric (Bronze Age?)	Moderate
Burn Of Gangsta, burnt mound	2375		Burnt mound	Damaged mound of burnt stones and black earth. Typical location beside running water.	Prehistoric (Bronze Age?)	Moderate
Backakelday cists	2385		Burial cists	Two cist burials found, including skeleton and cremation, left in place.	Prehistoric (Bronze Age?)	Moderate

6.3 Potentially Significant Effects (Construction)

6.3.1 Marine

“Construction or infrastructure installation works have the potential for both direct and indirect impacts to historic assets located ... on the seabed, either as direct damage to historic features or through seabed disturbance, or secondary effects such as changes to coastal processes and sediment dynamics” (PFOW MSP 2016).

No work will be conducted in (as a legal requirement) or within 50m of the 200m exclusion zone around HMS *Royal Oak*. Therefore, there will be no direct impact on the vessel, and this is scoped out of the EIA.

The proposed development footprint has been finalised and avoidance of all identified marine heritage assets has been embedded in the project design. Therefore, direct impacts on these can be scoped out of an EIA. There will be a small amount of dredging and seabed or bedrock clearance down to - 20m CD for the pier footprint and berthing pockets in order to provide the deep water facility (see Figure 6.1) and the north end of this activity will be close to MBES Contact 1. Avoidance is the primary mitigation, however if this cannot be guaranteed because of the close proximity, then inclusion of this specific impact in an EIA may be required.

Although MBES and SSS surveys have been conducted over the area, reducing the likelihood of potential impacts, there is still the potential for significant impact on debris that was not identified by reviews of those surveys. Such debris could include wartime remains, like aircraft engines and UXO. This potential impact should be included in an EIA.

A magnetometer survey of the area (conducted at specifications for archaeological review, as in Plets et al 2013) and dropcam or diver inspection of any anomalies identified assessing the nature and significance of these anomalies, would complement the results of the MBES and SSS surveys and act as a final check against any significant seabed impact on unknown maritime heritage assets, as well as identifying if MBES Contact 1 is of archaeological interest and requires avoidance.

If this mitigation strategy is agreed prior to the EIA process then there would be no requirement to include impacts on unknown marine assets in that process, because the necessary mitigations to reduce/eliminate impacts would already be in place. This management of the risk is likely to be part of planning consent conditions.

Table 6-3: Potential impacts and mitigations for marine historic environment receptors

Impact	Description	Potential Significance (prior to mitigation)	Scoping	Mitigation
Geotechnical coring for construction engineering	Seabed disturbance resulting in loss or damage of submerged prehistoric deposits	Not Significant	Out	Geotechnical coring will be within the development footprint, which is on the rock platform along the coastal edge, and therefore will not impact deposits of paleoenvironmental interest.

Dredging / seabed clearance for construction	Seabed disturbance resulting in loss or damage to unknown heritage assets on the seabed	Significant	In (Unless mitigation agreed prior to EIA)	Magnetometer survey in the vicinity of the development footprint to complement the results of the MBES and SSS surveys.
Dredging / seabed clearance for construction	Seabed disturbance resulting in loss or damage to known heritage assets on the seabed. MBES Contact 1 is very close to the area for dredging/clearance	Potentially Significant	In (For MBES Contact 1, unless mitigation agreed prior to EIA)	Avoidance. There are no known heritage assets on the seabed within the construction and dredging footprint. Potential for impact on MBES Contact 1 could be addressed by magnetometer survey to investigate if it is of heritage value.
Deposition of dredged material	Compression of heritage assets on the seabed	Not Significant	Out	Dredged material will be used for infill of laydown area onshore. Material not suitable for this will be disposed of to a licensed disposal ground which will not have any archaeological assets present.
Deepened access channels out with development footprint	Seabed disturbance resulting in loss or damage to heritage assets on the seabed	Not Significant	Out	There will be no requirement to lower the seabed out with the construction footprint and berthing pocket.
Construction vessel anchoring	Seabed disturbance resulting in loss or damage to heritage assets on the seabed	Not Significant	Out	There will be no construction vessel anchoring.

6.3.2 Onshore

“Construction or infrastructure installation works have the potential for both direct and indirect impacts to historic assets located in coastal areas... either as direct damage to historic features or through secondary effects” (PFOW MSP 2016).

No known historic assets lie within the footprint of the onshore development as shown on Figure 6.1, and if the footprint (assumed to include laydown areas and constructions areas) is not changed then no known heritage assets will be directly impacted onshore, and can be scoped out of the EIA, as avoidance of any known onshore heritage assets (especially the assets beside the main road and new access road) is part of the embedded project design.

Table 6-4: Potential impacts and mitigations for onshore historic environment receptors

Impact	Description	Potential Significance (prior to mitigation)	Scoping	Mitigation
Ground excavation and clearance for construction footprint	Ground-breaking disturbance resulting in loss or damage to unknown heritage assets	Significant	In (Unless mitigation agreed prior to EIA)	Walkover survey, Intrusive evaluation, Watching brief.
Ground excavation and clearance for construction footprint	Ground-breaking disturbance resulting in loss or damage to known heritage assets	Not Significant	Out	There are no known heritage assets within the onshore development footprint.
Deposition of excavated material from construction	Disturbance resulting in loss or damage to known and unknown heritage assets	Not Significant	Out	No material will be deposited out with development footprint. If unsuitable for deposition here, it will be taken to a licensed disposal facility.

There is potential for significant effects on unknown prehistoric heritage assets, which should be scoped in to an EIA, and a negligible likelihood for any impacts on unknown medieval, post-medieval and modern assets, which are scoped out. Mitigation strategies prior to and during construction could reduce or eliminate such effects. Such strategies would include a walkover survey as part of the EIA in order to identify if any remains are visible, intrusive archaeological evaluations prior to construction and an archaeological watching brief during construction could reduce or eliminate such effects. If such strategies are agreed prior to the EIA process then there would be no requirement to include impacts on unknown prehistoric heritage assets in an EIA process, because the necessary mitigations to reduce/eliminate impacts would already be in place. Management of the risk is likely to be part of planning consent conditions.

6.4 Potentially Significant Effects (Operation)

“Inappropriate development has the potential to affect the setting of historic assets located in both coastal and marine areas” (PFOW MSP 2016).

There are potentially significant direct and indirect effects of the proposed development on both marine and onshore heritage assets during the operation of the proposed development. A worst-case scenario has been assumed, summarised in Table 6.5.

Scouring of seabed deposits by propellor wash from large vessels has the potential to impact heritage assets on the seabed. A magnetometer survey of the area (conducted at specifications for archaeological review, as in Plets et al 2013) and dropcam or diver inspection of any anomalies identified assessing the nature and significance of these anomalies, would complement the results of the MBES and SSS surveys and act as a check against significant seabed impact on unknown

maritime heritage assets. Guidelines for vessels on approach, manoeuvring and departure, and regular monitoring of and reporting on the relevant area of seabed during operation of the facility would further mitigate any impact. Regular monitoring by SSS is likely to be a standard part of the operating procedures in order to ensure the approach is kept free of debris.

If this mitigation strategy is agreed prior to the EIA process then there would be no requirement to include impacts on unknown marine assets in that process, because the necessary mitigations to reduce/eliminate impacts would already be in place. This management of the risk is likely to be part of planning consent conditions.

Table 6-5: Potential impacts and mitigations for historic environment receptors

Impact	Description	Potential Impact (prior to mitigation)	Scoping	Mitigation
Scouring of seabed from propeller wash	Scouring of seabed deposits to expose and damage heritage assets and submerged prehistoric deposits	Significant	In (Unless mitigation agreed prior to EIA)	Guidelines for vessels on approach, manoeuvring and departure. Magnetometer survey of the approach, followed by regular monitoring and reporting.
Anchoring of maintenance and inspection vessels out with development footprint	Seabed disturbance resulting in loss or damage to heritage assets on the seabed	Not Significant	Out	There will be no anchorage out with the berth pockets or in designated anchorage areas.
Effect of the built installation on the setting of heritage assets	Size and visibility of the development, including night-time visibility, may affect the understanding, appreciation and experience of a historic asset, and thus a historic asset's cultural significance.	Significant	In	To be determined
Effect of accessing the built installation on the setting of heritage assets	Size, frequency and visibility, including night-time visibility, of the visiting vessels may affect the understanding, appreciation and experience of a historic asset, and thus a historic asset's cultural significance.	Significant	In	To be determined

Cumulative effect	Possible Scapa Pier development potentially adding to effects identified.	Significant	In	To be determined
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The creation of a large brightly-lit quay projecting into Scapa Flow could have a significant effect on the setting of heritage assets, as could the use of the facility by large vessels. Effects that should be included in an assessment include those on the maritime approach to Scapa Bay where Kirkwall Cathedral has acted as a dominant seamark, the visibility of the marker for HMS *Royal Oak*, especially from viewpoints such as the Royal Oak Remembrance Garden and Memorial at Scapa, as well as the listed buildings in the study area.

There is the potential for a significant cumulative effect on heritage assets, especially on marine receptors, and on the setting of assets from the proposed development at Scapa Pier, and will be included in an EIA.

6.5 Assessment Methodology

On the basis of the potentially significant impacts identified, it is proposed that an EIA of the proposed development is undertaken. For potential impacts scoped in, the assessment will be conducted based on analysis of existing desk-based sources, field survey data that already exists for the vicinity (SULA Diving 2020) and any new data collected specifically for the project, such as seabed magnetometry at suitable specifications for archaeological review (Plets et al 2013), dropcam images, and walkover survey. Suitable visualisations for the assessment of effects on setting should also be created. This will provide the basis for a robust EIA, and for the statutory authorities to be satisfied that they are making an informed decision

The importance of marine and onshore historic environment receptors would be evaluated to inform the assessment. The level of importance assigned depends on a number of factors, including intrinsic, contextual and associative characteristics (HES Designation Policy and Selection Guidance 2019 and Annexes) and general guidelines used by statutory authorities and agencies such as the Scottish Government and HES. These are:

- Historic Environment Scotland Designation Policy and Selection Guidance 2019;
- English Heritage. (2012). *Ships and Boats: Prehistory to Present*. Designation Selection Guide. Swindon: English Heritage; and
- Wessex Archaeology. (2011). *Assessing Boats and Ships 1860-1913, 1914-1938, 1939-1950*. Archaeological Desk-Based Assessment in 3 volumes. Salisbury: Wessex Archaeology.

Where avoidance of impact cannot be embedded in the project design, assessment of the significance of direct impact will be made in the EIA, based on standard guidance (ClfA 2014 and as revised¹⁴; HES 2016¹⁵; HES & SNH 2018¹⁶). The preparation of marine and onshore heritage Written Schemes of Investigation and Protocols for Accidental Discoveries could be produced as part of the EIA to avoid or mitigate accidental impacts and manage any accidental discoveries of archaeological interest. These would be based on standard professional guidelines. An evidence-based approach will be used to design suitable mitigation strategies in consultation with MS-LOT, HES, OICHA and OIC.

¹⁴ ClfA. (2014). *Standard and guidance for historic environment desk-based assessment*. Reading: Chartered Institute for Archaeologists.

¹⁵ HES. (2016). *Managing Change in the Historic Environment: Setting*. Edinburgh:HES

¹⁶ HES & SNH. (2018). *Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland*. v5. Edinburgh:HES; Inverness: SNH [now naturescot].

7 SEASCAPE/LANDSCAPE AND VISUAL

7.1 Introduction

This section addresses the potential significant adverse effects of the proposed development on the seascape, landscape, and visual resources of the site and surrounding area. Landscape and visual resources are defined respectively within paragraph 3.21 of the Guidelines for Landscape and Visual Impact Assessment (GLVIA)¹⁷ as:

“...the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape” and “...the people who will be affected by changes in views or visual amenity at different places”.

Considering the coastal location of the site, the coastal (or seascape) character is also an important factor to consider. As defined by NatureScot¹⁸ (formerly SNH), coastal character is made up of physical characteristics of the hinterland, coastline and sea, as well as visual aspects and perceptions.

To help determine the need for, and to ascertain the potential scope of a Seascape/Landscape and Visual Impact Assessment (SLVIA) as part of an EIA, an appraisal has been undertaken, informed by a site visit, to identify the following:

- The landscape/coastal character of the site and surrounding area;
- The coverage of any landscape designations across the site and surrounding area;
- Important views and viewpoints towards the site from the surrounding landscape/seascape;
- Any potentially significant landscape/coastal and visual effects during construction and post-completion; and
- Recommendations for mitigating any potentially significant adverse effects.

7.2 Baseline Conditions

The purpose of this baseline assessment is to identify the existing landscape, coastal and visual resource of the site and surrounding area, against which any potential significant effects of the proposed development would be predicted. Although significant effects are unlikely to be experienced beyond 5 km from the site, the assessment of the following receptors have been identified within an indicative study area of 15 km:

- The site and its setting;
- Landscape character;
- Coastal character;
- Landscape designations; and
- Key views and visual receptors.

7.2.1 The Site and Its Setting

The site is situated on the coastline of the Bay of Deepdale, approximately 8km to the south of Kirkwall at its closest point. It is accessed via a rough farm track that leads in a south-westerly direction over several fields of open pasture from the nearby A961. The site occupies an undeveloped section of exposed coastline that comprises mostly gravel beach and exposed rock that overall,

¹⁷ Landscape Institute and the Institute of Environmental Management and Assessment (2013). *The Guidelines for Landscape and Visual Impact Assessment, version 3.*

¹⁸ Scottish Natural Heritage (2017). *Guidance Note: on Coastal Character Assessment.*

exhibits a strong semi-natural coastal character. The Burn of Deepdale drains into the bay immediately to the north of the site and a nearby small rocky promontory forms a degree of localised containment to the south. The surrounding landscape to the north, east and south has a prevailing open rural character with a pattern of scattered farmsteads and dwellings. To the west, the isles of Flotta and Hoy provide a relatively distant backdrop to the expanse of Scapa Flow.

7.2.2 Landscape Character

As detailed in the Landscape Character Assessment¹⁹ (LCA), the site of the proposed development is located within the *Inclined Coastal Pasture* Landscape Character Type (LCT). This LCT consists of gently sloping agricultural land falling to the coast, and includes bay coastlines which lack the topographic enclosure of the *Enclosed Bays* LCT. They occur as long coastal strips on Orkney Mainland, Hoy, South Ronaldsay, Rousay, and Eday, and in smaller tracts on Burray and Stronsay. Its key characteristics are:

- Gentle slopes falling to the coast which include unenclosed bay coastlines;
- A mix of improved and rough pastures with a variety of semi-natural habitats including small amounts of tree and shrub cover;
- Rectilinear field patterns often with strong orientation to coastline;
- Mixture of small-scale clusters of resettled crofts and less developed geometric landscape of estate farms;
- Occasional large houses and farms with tree frameworks;
- Roads running parallel to coast, usually inland, giving access to the coastal fringe and higher pastures;
- Rich coastal archaeology, particularly evident at the coast;
- Restricted views inland dominated by an open, sometimes hilly skyline; and
- Extensive views out to sea over fields which appear to merge with the sea.

7.2.3 Coastal Character

As detailed in the *Orkney and North Caithness Coastal Character Assessment*²⁰, the site of the proposed development is located within the *Hemp Stack to Bay of Deepdale* coastal character area (CCA) and is described as follows:

Location and extent: This coast extends from Hemp Stack in the north-west to the Bay of Deepdale in the south-east;

Maritime influence: The influence of Scapa Flow and its maritime character including changeable light conditions, tidal movements, and boat traffic especially oil tankers is strongest from along the cliff edge. The War Grave of HMS Royal Oak is visible marked by buoy. The simple, narrow, coastal edge comprises cliff face, some rock and shingle, and breaking waves. A characteristic 'crimped' effect is clearly visible along the cliff line with localised indentations, points, ravines, stacks, and waterfalls.

Character of coastal edge: This exposed stretch of isolated coastline is characterised by relatively high, rugged cliffs overlooking an animated expanse of flow which is seldom calm. The high cliff edge itself experiences a sense of exposure and close proximity to the dynamic sea, enhanced by onshore winds, with open views along the coastline to the north and south and across Scapa Flow to distant, silhouetted landmasses including Hoy, Fara, Cava, Flotta, Burray and South Ronaldsay. Views through the Sound of Hoxa to 'open sea' are also obtained.

¹⁹ Scottish Natural Heritage (2018). *National programme of Landscape Character Assessment* (LCT 302).

²⁰ Scottish Natural Heritage (2016). *Orkney and North Caithness Coastal Character Assessment*.

Character of immediate hinterland: Elevated, hinterland falls to the west over steep, convex slopes interrupting views of the coastline and creating a sense of shelter and distance from the sea, i.e. a limited opportunity to easily experience the smells and sounds of the sea. Pasture and arable land, rough grassland, and dark heath flank the cliff tops and extend east over plateau towards the A961. The simple, open landscape character of hinterland results in vertical elements such as telegraph poles and fence lines appearing prominent. Access to the coast is limited to boat or remote cliff top footpaths.

Extent of human influence: Settlement is sparse and largely outwith the immediate exposed hinterland, along the A961 to the east with isolated farmsteads on exposed plateau.

Views: Views from the A961 are substantially interrupted by convex slopes and the nature of the ridgeline landscape.

7.2.4 Landscape Designations

There are 40 National Scenic Areas (NSAs) in Scotland, with their outstanding scenery, represent Scotland's finest landscapes. The Planning etc. (Scotland) Act 2006 gives a statutory basis to NSAs and describes them as an area "*of outstanding scenic value in a national context.*" The purpose of the NSA designation is both to identify our finest scenery and to ensure it is protected from inappropriate development.

There are no landscape designations in close proximity to the site although the *Hoy and West Mainland* NSA is located approximately 11 km to the west.

Hoy and West Mainland NSA Special Qualities

As described by NatureScot (formerly SNH)²¹, the NSA exhibits the following Special Qualities:

- A palimpsest of geology, topography, archaeology and land use;
- An archaeological landscape of World Heritage Status;
- The spectacular coastal scenery;
- Sandstone and flagstone as an essence of Orkney;
- A long-settled and productive land and sea;
- The contrast between the fertile farmland and the unimproved moorland;
- A landscape of contrasting curves and lines;
- Land and water in constantly changing combinations under the open sky;
- The high hills of Hoy;
- The townscape of Stromness, its setting and its link with the sea; and
- The traditional buildings and crofting patterns of Rackwick.

7.2.5 Key Views and Visual Receptors

Important views from the site are focused across Scapa Flow to distant, silhouetted landmasses including Hoy, Fara, Cava, Flotta, Burray and South Ronaldsay.

Nearby visual receptors are largely restricted to agricultural workers, residents of several nearby scattered dwellings, occasional recreational users (coastal and inland) and road users along the A967. From the sea, boat users would also experience views towards the site.

²¹ Scottish Natural Heritage (2010). *The Special Qualities of the National Scenic Areas.*

7.3 Potentially Significant Effects (Construction)

In the locality, the construction of the proposed development would be very noticeable and effects would primarily result from activity associated with piling, ground excavations and the construction of laydown areas and piers. This is likely to include views of a crane, construction infrastructure, storage of materials, with noise, activity and movement of large vehicles. As such, the construction phase is likely to significantly affect the views of some nearby residents, road users and recreational users.

In considering the undeveloped and prevailing semi-natural character of the coastal edge and open rural character of the hinterland, construction activity would also notably detract from many of the landscape and coastal characteristics and consequently, effects on coastal character are also very likely to be significant.

7.4 Potentially Significant Effects (Operation)

In considering the preceding assessment of Baseline Conditions, this section identifies any potential significant effects predicted during the operational phase.

7.4.1 Landscape and Coastal Character

Once operational, the proposed development would result in an increase in vessel activity across parts of Scapa Flow with the laydown areas used for storage with associated noise, activity and movement of large vehicles. Although boat traffic and oil tankers are characteristic to Scapa Flow, the following effects are likely to be significant:

- Development would compromise the simple, narrow, coastal edge and notably contrast with its undeveloped and semi-natural appearance;
- Development would interrupt the pattern of the characteristic 'crimped' effect that is clearly visible along the cliff line with localised indentations, points, ravines, stacks, and waterfalls; and
- Development would contrast with the prevailing open rural hinterland and its sparsely settled nature.

7.4.2 Landscape Designations

Considering the relatively long distance from the site to the NSA, it is unlikely that any significant effects on NSA Special Qualities would be experienced.

7.4.3 Visual Receptors

Although no detailed analysis of the zone of theoretical visibility has been undertaken at this stage, it is evident that apart from relatively long views across open sea, landward views to and from the site are relatively localised due to the convex nature of the intervening sloping landform.

However, from several nearby dwellings, a short section of the A961 and some nearby accessible coastal areas, the proposed development would appear quite prominent, especially from the sea. In the locality therefore, it would create a major visual focus, tend to affect a large proportion of the view with uncharacteristic elements or pattern introduced. Although parts of the proposed development are likely to be screened from the A961, some significant visual effects are likely to be experienced in the local area.

7.5 Design and Mitigation

Where any significant landscape, coastal and visual effects are identified as part of the SLVIA process, recommendations for mitigation which could be implemented in order to avoid, reduce or remedy adverse effects will be identified. As part of this, some design aims will be suggested to help ensure that as far as possible, the proposed development minimises its impact and integrates positively with its sensitive coastal setting.

7.6 Inclusion or Exclusion from EIA

Based on the findings of this appraisal and the associated likely potential for some significant effects during construction and post-completion, it is recommended that a full Seascape, Landscape and Visual Impact Assessment (SLVIA) is undertaken as part of an EIA.

7.7 Assessment Methodology

To be undertaken by a Chartered Member of Landscape Institute, the approach to the SLVIA will follow the *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*²² and other current best practice guidance where relevant.

Foremost, the SLVIA aims to identify, predict and evaluate any likely significant effects during the construction and operational phases of the proposed development, on the landscape, seascape and visual resources of the site, its setting and the wider study area. Where any significant adverse effects are identified, mitigation measures are considered, and where possible, embedded within the design of the proposed development.

As an overview, the objectives of the SLVIA are to:

- provide a summary description of the scoping and consultation responses relating to landscape, coastal and visual issues;
- describe the assessment methodology and significance criteria used to inform the assessment process;
- identify the main landscape-related policy, legislation and guidance;
- identify and assess the landscape, coastal and visual baseline conditions;
- identify and evaluate the potential landscape, coastal and visual effects, including direct, indirect and cumulative, based on the worst-case parameters as currently known;
- identify broad design principles for subsequent project development and other mitigation measures that may be appropriate to address likely residual significant effects; and
- evaluate any residual effects remaining, following the implementation of any further mitigation measures suggested.

²² Landscape Institute and the Institute of Environmental Management and Assessment (2013). *The Guidelines for Landscape and Visual Impact Assessment, version 3*.

8 AIRBORNE NOISE

8.1 Introduction

The noise assessment will consider the potential for noise generated by the development to impact existing residential receptors during the construction and operational phases. The effects of construction noise on marine life shall be considered as part of the ecological scope of works as discussed in Section 5.5.3.

8.2 Baseline Conditions

The site of the proposed SDWQ is located in a rural location overlooking the shipping channels of Scapa Flow approximately 4km south of Scapa Pier. The noise environment at the site is considered to be characterised by natural sounds (i.e. waves, wind, birds) punctuated with man-made sound from mainly shipping movements and potentially distant road traffic noise from the A961.

The closest residential receptors to the proposed SDWQ are a pair of guesthouses located approximately 650m to the east of the proposed development and approximately 350m to the south of the proposed access road, with partial line of sight to the quay and laydown area, and full line of sight to the new access road. Also noted is a collection of farmhouses approximately 1km to the south-east with partial line of sight to the quay, laydown area and access road. There are several residential receptors approximately 1km – 1.3km to the east, adjacent to the A961, with line of sight of the new access road. Some of these properties may also have partial line of sight to the quay and laydown area.

8.3 Potentially Significant Effects (Construction)

The noise from certain construction activities has the potential to impact existing noise sensitive receptors. Construction activities are temporary in nature, with the degree of impact during each phasing stage depending upon;

- The nature of construction activities being carried out; this includes the type and size of machinery / plant involved, combinations of activities occurring simultaneously and HGV routes in and around the site;
- Location of construction activities relative to the closest noise sensitive receptors;
- Duration of proposed activities;
- Construction site operating times; and
- Extent of noise mitigation measures in place.

Noise generating activities during the construction phase are understood to include;

- Construction of new access road;
- Excavation of current landform and reclamation of shore to form laydown area;
- Formation of bunds around eastern, and parts of the north and southern perimeters of proposed laydown area using reclaimed materials;
- Dredging of area around proposed quay;
- Piling of structure for quay wall;
- Infilling of material to form reclaimed land;
- Delivery and tipping of materials; and
- HGV and plant movements in and around the site.

The majority of construction works are anticipated to be carried out between the hours of 07:00 to 19:00hrs Monday to Friday and 07:00 to 13:00hrs on Saturdays. Construction activities scheduled to occur outside of these periods have a greater potential to impact on residential receptors due them occurring during more sensitive periods, and when background noise levels are lower.

8.4 Potentially Significant Effects (Operation)

During the operational phase, new proposed noise generating activities have the potential to increase the day and night-time existing baseline noise levels at surrounding noise sensitive receptors. Due to their proximity to the Bay of Deepdale, noise sensitive receptors at the guesthouses to the east and the farmhouses to the south have the greatest potential for an increase in current noise levels due to operational activities at the quay and laydown area. It is noted that the existing topography and proposed bunds surrounding the laydown area are likely to break the line of sight at these properties and mitigate any increase in noise levels.

The majority of marine assets and supplies will be brought to and from the site primarily by sea, with HGVs being used to move materials overland occasionally as required. As the majority of loading / unloading activities will occur during the daytime, night-time movements are not considered to be likely. The majority of traffic accessing the site via the A961 and new access road will be site workers, including those involved in offshore wind farm assembly, predominantly during the daytime hours. Road traffic noise, including increase in road traffic associated with the operational phase is therefore not considered likely to be significant.

Noise generating activities which shall be carried out during the operational phase include;

- Deep-water 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 HGV movements within quay and laydown area; and
- Loading / unloading of HGVs.

Should the storage and supply hub for future marine fuels be constructed on the site, additional consideration would be required for associated operations, including additional LGV/HGV movements and industrial plant.

8.5 Inclusion or Exclusion from EIA

An operational noise assessment shall be carried out as part of the EIA.

As mentioned in Section 2.2.4, it is intended that the contract for construction of the facility will be awarded as a design and build. Therefore until the preferred Contractor is identified the exact construction methodologies cannot be confirmed at this stage in the development process. The construction noise assessment will be deferred until this point when information on assumed schedules and associated plant shall be used in the assessment, informed by discussions with the lead Contractor. A construction phase noise assessment would inform the proposed CEMP for the Works and would be agreed with OIC and MSLOT prior to commencement.

The baseline data collected as part of the operational assessment shall also be used to inform the construction noise assessment (post planning consent).

8.6 Assessment Methodology

8.6.1 Baseline Noise Monitoring

It is proposed to carry out existing baseline noise monitoring, the results of which shall be used alongside calculated predicted levels in the assessment of construction and operational activities.

The existing baseline noise monitoring shall comprise of the following stages;

- Measurement of existing baseline environment at a sample of 2 or 3 areas considered to be representative of the most exposed noise sensitive receptors surrounding the site. The location of the proposed monitoring locations will be confirmed through consultation with OIC;
- The monitoring shall be carried out during week days and nights, and repeated at each position on more than one date; and
- The monitoring is likely to incorporate a mixture of attended and unattended monitoring, allowing subjective observations to be noted at each position and considered period.

8.6.2 Operational Noise

Operational noise shall be predicted and assessed at the most exposed residential receptors following guidance provided in the Scottish Government Publication *TAN 2011: Technical Advice Note: Assessment of Noise*, and *BS4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound*.

Baseline noise surveys pre-construction shall be carried out to determine the existing noise climate (Refer to Section 8.6.1).

It is recognised that operational activities are likely to vary considerably from day to day; therefore a reasonable worst-case scenario of concurrent noise generating operational activities will be used. Predicted increases in levels above baseline shall be assessed in order to determine the significance of effects. The results of the assessment can be used to inform operational noise mitigation measures to be employed at the site and if required, to inform the heights of the proposed bunds surrounding the laydown area.

The operational noise assessment shall comprise of the following stages;

- Review of proposed operational activities, locations and noise data;
- Prediction of operational noise from proposed development using CadnaA 3D noise modelling software at the location of the most exposed sensitive receptors;
- Carry out an assessment of change in noise levels as a result of site operations, in accordance with the TAN associated with PAN 1/2011 (using principles defined in BS4142), comparing existing operations (before) to existing and proposed operations (after); and
- If required, make recommendations on mitigation measures to reduce any operational noise impact at existing residential receptors and to inform operational noise management plan.

9 CONCLUSIONS

The conclusions of the detailed scoping appraisals identified that the topic areas listed below are considered to merit a full impact assessment and thereby documented within an EIAR.

- Airborne Noise (Operational phase only);
- Archaeology and Cultural Heritage (The impacts on heritage assets for both phases and potential for cumulative effects with Scapa Pier development);
- Ecology (Marine mammals and their prey during the construction phase only);
- Seascape, Landscape and Visual (both phases); and
- Water Environment and Coastal Processes (Qualitative assessment for coastal processes and water quality for both phases).

In addition to the above, a Habitats Regulations Appraisal (HRA) will be undertaken to assess any potential LSE on the qualifying species of the North Orkney pSPA and the Scapa Flow pSPA.

On the basis of professional judgement and the findings of the scoping appraisal, full EIA's are not considered necessary for the following topics, however supporting statements and information will be provided for each topic within the introductory chapters of the EIAR:

- Accidents and Natural Disasters (both phases);
- Airborne Noise (Construction phase deferred until later in the development process);
- Air Quality (both phases);
- Climate Change (both phases);
- Ecology (Both phases apart from the risk associated with marine mammals and their prey during the construction phase);
- Population and Human Health (both phases); and
- Water Environment and Coastal Processes (Flood risk for both phases).

The Highland Council Guidance Note – Construction Environmental Management Process for Large Scale Projects²³ sets out a robust Environmental Management Process that incorporates the findings of the ES as well as other requirements from consents, licenses, legislation and best practise. It is proposed that a Construction Environmental Management Document and Plans (CEMD and CEMPs) be developed in accordance with this Guidance Note so as to provide site specific practical mitigation measures to ensure that during the construction phase the environment is protected. The CEMD and associated CEMP's 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 and associated CEMPs, ensuring that all agreed measures are applied and adhered to.

Note: The CEMD and associated CEMPs would be finalised on receipt of Planning / Marine Consent and would aid discharge of planning/marine license conditions. It would also form part of the tender documents during the contracting phase of the development.

²³ The Highland Council Guidance Note – Construction Environmental Management Process for Large Scale Projects, dated August 2010.

APPENDICES

A DRAWINGS