Scottish Isles Fibre Optic Cable Project

Orkney Routes

Historic Environment Baseline and Impact Appraisal

Technical Report

January 2022

ORCA, UHI Archaeology Institute, Orkney College UHI, East Road,
Kirkwall, KW15 1LX
www.orca-archaeology.org
t: [redacted] e: enquiries.orca@uhi.ac.uk

Scottish Isles Fibre Optic Cable Project

Orkney Routes

Historic Environment Baseline and Impact Appraisal Technical Report

Project No: 907

ORCA
UHI Archaeology Institute
Orkney College UHI
East Road
Kirkwall
KW15 1LX

Project Manager: [redacted]

Report Author: [redacted]

Report Figures: [redacted]

Client: Intertek

Cover image: View of landfall location, Westness, Rousay, Route 2.9

This document has been prepared in accordance with ORCA standard operating procedures and CIfA standards	
Authorised for Distribution by: [redacted]	Date: 14th January 2022

Title:	R100 Scottish Isles Fibre Optic Cable Project: Historic Environment Baseline and Impact Appraisal Technical Report. Orkney Routes
Author(s):	[redacted]
Derivation:	
Origination Date:	01 July 2021
Revised by:	[redacted]
Date of last revision:	14th January 2022
Version:	5.0
Status:	Final
Summary of Changes:	Minor revisions after Intertek review and to Section 6.2 removing reference to EMP and adding marine corridor references after BT/GM reviews, replacement of Figure for Route 2.11, revision of mitigations for routes 2.9 Westness landfall and Route 2.10 Shapinsay landfall after discussions with GMG 14/01/22
Circulation:	ORCA, Intertek, BT/Global Marine
Required Action:	Client Approval
File Name / Location:	ORCA_Projects_1905_907_Baseline&IA Orkney v5 tracked
Approval:	[redacted]

©ORCA 2021

Executive Summary

This document is a standalone historic environment baseline and impact appraisal technical document. This report identifies any sites of archaeological or historical importance within the marine cable routes and at their associated landfalls in the Orkney geographical area of the proposed fibre optic telecommunications cable project. The report appraises the potential impacts of the works on the historic environment and identifies mitigation and management strategies to address any identified issues and impacts concerning the archaeological and heritage resource. This document supports the Environmental Appraisal (MEA) submitted for the Marine Licence Application and planning permission.

Avoidance of known assets is the primary embedded mitigation, supported by undertaking desk-based, walkover and marine geophysical surveys in order to identify any historic environment assets that might be impacted, and thus reduce or eliminate that risk. There are marine assets in Route corridors 2.11 and 2.12 that require avoidance.

A Protocol for the accidental discovery of archaeological finds and remains (PAD) will be instated for the reporting of discoveries to the appropriate authorities for both the marine and the onshore works.

Various specific mitigations, including archaeological watching briefs, usually due to potential for submerged paleoenvironmental deposits in intertidal zones, or the potential for the discovery of sites in onshore dune systems are recommended at specific landfalls. Archaeological excavation of the cable trench and BMH at the Westness, Rousay landfall (Route 2.9) and at the Bay of Sandgarth, Shapinsay landfall (Route 2.10) is recommended due to medium-high potential for significant archaeology to be discovered at these locations

The mitigation and management strategies proposed will reduce or eliminate any significant impacts on historic environment assets at the landfalls or in the marine corridors. The implementation of these strategies result in there being no or negligible effects on most known historic environment assets, and a potential minor significance of effect on some known assets and on unknown historic assets that may be present.

©ORCA 2021

Contents

©ORCA 2021

1 Introduction

ORCA was commissioned by Intertek Energy and Water Consultancy Services (Intertek) on behalf of Global Marine Group (GMG) and BT to assess potential impacts on the onshore and marine historic environment by the proposed installation of seven inter-island fibre optic cables and their associated landfalls within the Orkney geographical area. This document specifically addresses those seven routes and landfalls, including the Orkney landfall and marine corridor in Orkney waters of Route 2.3, between Orkney and Shetland.

In general, the historic environment is considered to be the physical evidence for human activity, including objects, structures, landscapes and features, whether buried, above ground or underwater (*Our Place in Time*, Scottish Government 2014).

The marine historic environment is considered to encompass submerged landscapes 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, submerged aircraft wrecks, and all evidence of human exploitation of maritime resources such as shipwrecks, shipyards, harbours, piers, fish traps, ballast piles and anchorages. Marine historic assets are defined in the *Marine (Scotland) Act 2010*, section 73, paragraph 5) as:

- a vessel, vehicle or aircraft (or a part of a vessel, vehicle or aircraft),
- the remains of a vessel, vehicle or aircraft (or a part of such remains),
- an object contained in, or formerly contained in, a vessel, vehicle or aircraft,
- a building or other structure (or a part of a building or structure),
- a cave or excavation, or
- a deposit or artefact (whether or not formerly part of a cargo of a ship) or any other thing which evidences, or groups of things which evidence, previous human activity.

This document is a standalone historic environment baseline and impact appraisal technical document. This report identifies any sites of archaeological or historical importance that might be affected by the landfalls and marine corridors and identifies strategies for mitigating and managing any identified issues and impacts concerning the archaeological and heritage resource. This document supports the Environmental Appraisal (MEA) submitted for the Orkney Geographical Area Marine Licence Application and planning permission.

This report includes:

- A review of relevant historic environment legislation and policy;
- A review of key data sources to identify known sites in the marine corridors and landfall areas, and the potential for unidentified sites and areas;
- A review of the marine survey data from each marine corridor;
- A review of the cultural heritage sites identified during walkover surveys of the landfall area;
- A tabular presentation of the results of the DBA and walkover surveys (Appendix 1);
- An impact appraisal and mitigation strategies; and
- A tabular presentation of the results of the impact appraisal (Appendix 2).

©ORCA 2021

2 Context and Aims of the Report

This report identifies any potential historic environment issues or constraints; evaluates the suitability and acceptability of the marine corridor and landfall and comments upon the sensitivity of the planned route at landfall in order to support the MEA chapter. It aims to:

- Review existing databases on the historic environment in the marine cable corridors and landfall areas, including wrecks, onshore cultural heritage sites, submerged landscapes in the intertidal zone, and relative sea-level change;
- Identify known or likely sensitive historic environment assets in the marine cable corridors and landfall areas and the potential for unknown remains;
- Categorise sites in terms of importance (or sensitivity) and local, regional, national or international relative importance; and
- Recommend any further work and suggest any further assessment, mitigation or management strategies, identifying any potential issues, sensitivities or constraints.

The report uses the following terms for different aspects of the project:

Marine and intertidal cable corridor: 500m wide marine cable route corridor to MHWM;

Beach Man Hole (BMH) buffer study area: 500m radius area around the proposed BMH location (see Section 4.2 below);

Landfall corridor: 500m wide intertidal and onshore corridor at each landfall site and extending inland as appropriate to and beyond the BMH location; and

Walkover survey area: the area subjected to an archaeological walkover survey, the same as the Landfall corridor. Any additional areas walked are specifically mentioned in Section 4.4 below.

3 Legislative Framework and Policy Context

The Project is located within Scotland and Scottish and UK Territorial Waters. There are a number of international legally binding conventions, UK and Scottish legislation, policy frameworks and guidance to consider in relation to the historic environment, both marine and onshore, all of which include the requirement to address potential impacts on the historic environment. Relevant guidance and legislation relating to the historic environment and assessment of impacts on it are discussed below.

3.1 International legislation and policy

The following conventions promote the protection of underwater heritage, with provisions for appropriate recording and recovery if disturbance is unavoidable:

The *United Nations Convention of the Law of the Sea* (UNCLOS) was ratified by the UK in 1997. Article 303 stipulates that ‘states have a duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose’;

The Annex to the UNESCO *Convention on the Protection of the Underwater Cultural Heritage 2001* has been signed up to by the UK Government. As such, the rules of the Annex will be considered in deciding any license applications. Rule 1 of the Annex stipulates that ‘The protection of underwater cultural heritage through in situ preservation shall be considered as the first option. Accordingly, activities directed at underwater cultural heritage shall be

©ORCA 2021

authorised in a manner consistent with the protection of that heritage, and subject to that requirement may be authorised for the purpose of making a significant contribution to protection or knowledge or enhancement of underwater cultural heritage';

The *European Convention on the Protection of the Archaeological Heritage* (revised), known as the Valletta Convention, was ratified by the UK Government in 2000. This contains provisions for the protection of archaeological heritage both underwater and on land, preferably in situ, but with provisions for appropriate recording and recovery if disturbance is unavoidable; and

The *European Landscape Convention* (ratified by the UK government in 2006), promotes the protection, management and planning of landscapes, including the historical and cultural aspects of landscapes.

3.2 UK legislation and policy

Key UK legislation and policy includes:

The primary piece of UK legislation concerning archaeology is *The Ancient Monuments and Archaeological Areas Act 1979* (AMAAA), concerning sites that warrant statutory protection due to being of national importance and are Scheduled under the provisions of the Act. The Act is administered in Scotland by Historic Environment Scotland.

Such sites or areas may include any "monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it". A monument is defined within the Act as:

"any building, structure or work above or below the surface of the land, any cave or excavation; any site comprising the remains of any such building, structure or work or any cave or excavation; and any site comprising or comprising the remains of any vehicle, vessel or aircraft or other movable structure or part thereof" (Section 61 (7))", with the additional definition of "any thing, or group of things, that evidences previous human activity" derived from section 14 of the *Historic Environment (Amendment) (Scotland) Act 2011*;

The *Merchant Shipping Act 1995*; requires that all recovered wreck landed in the UK is reported to the Receiver of Wreck, whether recovered from within or outside UK waters and even if the finder is the owner;

Section 1 of *The Protection of Wrecks Act 1973*, which provides for wrecks to be designated because of historical, archaeological or artistic value, was repealed in Scotland on the 1st November 2013 and replaced by protection under the Marine (Scotland) Act 2010 (see 3.3 below);

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. Any aircraft lost while in military service is automatically protected under this Act;

The *Marine and Coastal Access Act 2009* devolves marine planning, licensing and conservation powers including 'the need to protect the environment' (section 69a), which in section 115(2) states is inclusive of 'any site Including any site comprising, or comprising the remains of, any vessel, aircraft or marine structure) which is of historic or archaeological interest', in Scottish inshore (0-12nm) and offshore waters (12-200nm) to the Scottish Ministers; and

The *UK Marine Policy Statement* (2011) states heritage assets should be conserved through marine planning in a manner appropriate and proportionate to their significance. Many heritage

©ORCA 2021

assets with archaeological interest are not currently designated as scheduled monuments or protected wreck sites but are demonstrably of equivalent significance. The absence of designation for such assets does not necessarily indicate lower significance and the marine planning authority should consider them subject to the same policy principles as designated heritage assets (include those outlined) based on information and advice from the relevant regulator and advisors.

3.3 Scottish legislation and policy

Relevant Scottish legislation and policy includes:

The *Town and Country Planning (Scotland) Act* (1997) and amendments, *Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997* and amendments, and *The Planning etc. (Scotland) Act 2006* are the primary legislation which govern both onshore development planning and development management in Scotland in relation to the historic environment. Planning authorities, prior to granting planning permission, consult with Historic Environment Scotland as a statutory consultee on any development proposals that may affect the site or setting of a Scheduled Monument, an A-Listed building, an Inventoried Garden or Designed Landscape, or an Inventoried Historic Battlefield. This means that the presence of such sites within the area of a proposed development and the protection of its setting are material considerations in the planning process.

The Town and Country Planning (General Permitted Development) (Scotland) Order 1992, and as amended, including by *The Town and Country Planning (General Permitted Development and Use Classes) (Scotland) Amendment Order 2020*, which came into force April 2021, allows for permitted development rights (PDR) on the grounds that other legal protections and good practice guidance should mitigate any potential negative impacts. PDR in areas designated for their cultural heritage (conservation areas; settings of listed buildings and scheduled monuments; historic gardens and designed landscapes) should be subject to prior notification / approval to assess potential impacts on archaeology and cultural heritage.

The *Historic Environment Policy Statement for Scotland* (HEPS) 2019 includes policies that decisions affecting any part of the historic environment should be informed by an inclusive understanding of its breadth and cultural significance; that detrimental impacts on the historic environment should be avoided, but where these are identified and unavoidable, these should be minimised, and steps should be taken to demonstrate that alternatives have been explored and mitigation measures put in place;

Historic Environment Scotland Designation Policy and Selection Guidance 2019 stands alongside HEPS 2019 and outlines the principles and criteria that underpin the designation of historic sites and places;

Scottish Planning Policy (SPP), revised in 2020, states that authorities should protect archaeological sites and monuments (and a range of other historic assets) as an important, finite and non-renewable resource and preserve them in situ wherever possible. Where preservation in situ is not possible, authorities should ensure that developers undertake appropriate excavation, recording, analysis, publication and archiving before and/or during development. If archaeological discoveries are made during any development, they should be reported to the authority to enable discussion on appropriate mitigation measures;

©ORCA 2021

The Scottish Government's *Planning Advice Note (PAN 2/2011) Planning and Archaeology 2011* states that for all developments, the principles of preservation in situ, or mitigation where necessary equally apply to sites on land or underwater;

The *Marine (Scotland) Act 2010* requires licensing activities in the marine environment to consider potential impacts on the marine environment including features of archaeological or historic interest and in Section 73 defines marine historic assets (see section 1.0 above). Historic Environment Scotland is a statutory consultee on any development proposals that may affect the site or setting of an Historic Marine Protected Area.

The Scottish Government's *Scotland's National Marine Plan: A Single Framework for Managing Our Seas* (March 2015) covers both Scottish inshore waters (out to 12nm) and offshore waters (12 to 200nm). It also applies to the exercise of both reserved and devolved functions. It contains policies and advice concerning the marine historic environment, including:

- Policy GEN6 Historic environment: Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance;
- As well as the designated marine heritage assets there are likely to be a number of undesignated sites of demonstrably equivalent significance, which are yet to be fully recorded or await discovery;
- It is recommended that Historic Marine Planning Partnerships and licensing authorities should seek to identify significant historic environment resources at the earliest stages of planning or development process and preserve them in situ wherever feasible. Adverse impacts should be avoided, or, if not possible, minimised and mitigated. Where this is not possible licensing authorities should require developers to record and advance understanding of the significance of the heritage asset before it is lost, in a manner proportionate to that significance. (Chapter 4.20-25);
- The use of the marine environment … recognises the protection and management needs of marine cultural heritage according to its significance. (High Level Marine Objective 18).

3.4 Local planning policy

The proposed cable corridor and landfall lies within the area of the pilot *Pentland Firth and Orkney Waters Marine Spatial Plan 2016* (PFOW MSP), which has been adopted as non-statutory planning guidance by Orkney Islands Council. It is a material consideration in the determination of relevant planning applications. General Policy 6: Historic Environment includes that development with potential to have an adverse effect on the significance of heritage assets will be expected to demonstrate that all reasonable measures will be taken to mitigate any loss of significance, and that any lost significance which cannot be mitigated is outweighed by social, economic, environmental, navigation or safety benefits.

The *Orkney Local Development Plan* (2017) along with The Orkney Local Plan's *Supplementary Guidance: Historic Environment and Cultural Heritage 2017*, contain similar principles to the PFOW MSP.

©ORCA 2021

4 Methodology

4.1 Codes of practice, professional guidance and standards documents

The following codes of practice, professional guidance and standards documents informed the work conducted for this report:

- The Chartered Institute for Archaeologists (CIfA) *Codes, Standards and Guidance* (various) https://www.archaeologists.net/codes/cifa;
- The *Historic Environment Policy Statement for Scotland* (HEPS) 2019, including the Annexes;
- *Historic Environment Scotland Designation Policy and Selection Guidance* 2019;
- Historic Environment Scotland's *Managing Change in the Historic Environment* guidance series;
- 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, 1914-1938. Archaeological Desk-Based Assessment* in 3 volumes. Salisbury: Wessex Archaeology;
- The Joint Nautical Archaeology Policy Committee and Crown Estate. (2006). *Maritime Cultural Heritage & Seabed Development: JNAPC Code of Practice for Seabed Development*. York: CBA;
- Plets, R., Dix, J., & Bates, R. (2013). *Marine Geophysics Data Acquisition, Processing and Interpretation: Guidance Notes*. Swindon: English Heritage Publishing.

4.2 Study Area

The marine study area comprised the 500m wide cable corridor that was subject to marine geophysical survey. The desk-based marine study corridor at least 1km wide in order to capture wrecks that have no precisely known location but could be in the 500m corridor.

The onshore study area comprised the onshore landfall corridor above MLWS and BMH location as provided in shapefiles to ORCA by Intertek with a 500m radius onshore study buffer area round the BMH to capture any potential issues in the immediate vicinity that could affect the installation (see Figures section).

Originally, the onshore buffer study area was designed to be a simple 500m radius around each BMH location. However, during the Project, BMH locations were changed as part of the iterative design process. A decision was made to not revise the search areas and repeat searches after the fourth change of BMH location, except for any large changes of more than 100m.

4.3 Desk-Based Assessment

The DBA was conducted to identify possible heritage assets within the BMH buffer study areas, and within a 1km wide marine corridor centred on each proposed cable route. It was completed in accordance with the relevant parts of the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for historic environment desk-based assessment* (updated 2020). Information on known heritage assets within the study areas was used to identify the potential for the presence of unknown sites that may be affected by the proposed development.

The University of the Highlands and Islands Archaeology Institute's Dr Scott Timpany provided the assessment of the potential for intertidal and submerged paleoenvironmental evidence, archaeological deposits and features.

The DBA by ORCA and SULA Diving reviewed the following key sources:

- The National Record of the Historic Environment via the Canmore and Pastmap online databases (https://canmore.org.uk/; https://pastmap.org.uk/ [accessed July/August 2021]);
- The Orkney Sites and Monuments Record (SMR) via the online Pastmap database;
- Statutory lists, registers and designated areas, including List of Scheduled Monuments, Listed Buildings, Inventories of Gardens & Designed Landscapes and Historic Battlefields, Designated Wrecks, Historic Marine Protected Areas and local authority Conservation Areas;
- UK Hydrographic Office (UKHO) wreck register and relevant nautical charts;
- Orkney 1st edition Ordnance Survey mapping (1882);
- Google Earth satellite imagery;
- Larn, R., & Larn, B., (1998);
- Whittaker, I.G., (1998); and
- Other readily available archaeological and historical reports, databases, websites and publications that were consulted for information about the study areas are cited in the report if used and listed in the reference section.

4.4 Walkover Survey

The walkover survey was executed in accordance with the relevant sections of the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for Archaeological Field Evaluation* (revised 2020). The landfall corridor areas were surveyed between 25th October and 2nd November 2021. The walkover survey areas were 500m wide at landfall and extended 200-500m inland, shown as a green-shaded area on the figures for the route (see Figures section 8). The walkover survey area at landfall was assumed to include all associated infrastructure, such as new tracks, laydown areas and cable trenches.

The walkover surveys were undertaken in a systematic manner, with transect width appropriate to the conditions (mostly grazed pasture, rough pasture, dunes and sandy shore) in wet and windy weather. Any visible archaeological and heritage features or sites identified were assigned an individual ORCA site number in the same sequence as the sites identified by DBA. They were located by handheld GPS and briefly recorded on proforma sheets and digital photographs and handheld GPS and evaluated. Sites identified during the DBA and on satellite imagery were also visited if within the walkover survey area and evaluated.

The sites and features from the DBA and walkover surveys are presented in Appendix 1, and a list of photographs taken during the walkover surveys is reproduced in Appendix 3. Photographic images can be supplied on request.

4.5 Marine Geophysics Data

As well as the marine corridor DBAs, SULA Diving were also commissioned to evaluate the marine remote sensing survey data (Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS), and Magnetometer (Mag)) obtained by survey company Fugro during 2021 on behalf of GMG. All geophysical survey images reviewed are listed route by route in Appendix 4.

©ORCA 2021

The marine geophysical survey corridors were 500m wide. The survey specifications exceeded those recommended for reconnaissance level surveys in Plets et al. (2013) and are outlined in Fugro's report for each Route:

- Fugro Report Ref 124376-R-015-(01) *Shetland - Sanday Results Report - 2.03*;
- Fugro Report Ref 124376-R-016-(01) *Eday – Westray Results Report - 2.05*;
- Fugro Report Ref 124376-R-018-(01) *Eday - Sanday Results Report - 2.06*;
- Fugro Report Ref 124376-R-006-(01) *Sanday – Stronsay Results Report - 2.07*;
- Fugro Report Ref 124376-R-008-(01) *Orkney Mainland – Rousay Results Report - 2.09*;
- Fugro Report Ref 124376-R-007-(01) *Orkney Mainland - Shapinsay Results Report - 2.10*;
- Fugro Report Ref 124376-R-005-(01) *Hoy – Flotta Results Report - 2.11*; and
- Fugro Report Ref 124376-R-010-(01) *Flotta – South Ronaldsay Results Report - 2.12*.

The marine archaeologist reviewed the contacts and anomalies identified by Fugro as anthropogenic or giving high magnetic responses, along with high quality images of the data to check anything that looked potentially anthropogenic.

4.6 Assessment of Importance

The historic environment assets that have been identified have been assigned a value so that their potential to act as a constraint in the marine cable corridors and at landfall can be evaluated. The level of an asset's importance reflects the level of potential constraint, modified by the application of standard mitigation measures. In line with good practice, a precautionary level of importance has been assigned until proven otherwise (e.g. it may prove that a wreck considered to be of high importance has completely disintegrated). It should be noted that a site that has not been statutorily designated can still be of high importance. Table 1 summarises the criteria used to grade the importance of the cultural heritage assets identified in the DBA.

The determination of the heritage value of historic environment assets is based on statutory designation and/or professional judgement against the characteristics and criteria expressed in:

- The *Historic Environment Policy Statement for Scotland* (HEPS) 2019, including the Annexes;
- Historic Environment Scotland *Designation Policy and Selection Guidance* 2019;
- Historic Environment Scotland's *Managing Change in the Historic Environment* guidance series;
- 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, 1914-1938. Archaeological Desk-Based Assessment* in 3 volumes. Salisbury: Wessex Archaeology; and
- The Chartered Institute for Archaeologists (CIfA) *Codes, Standards and Guidelines* (http://www.archaeologists.net/codes/ifa).

Table 1: Importance Criteria

©ORCA 2021

Importance of asset	Cultural heritage value
High (H)	• World Heritage Sites • Scheduled Monuments and sites proposed for scheduling • Category A Listed Buildings • Inventoried Gardens and Designed Landscapes • Interconnected groups of B-Listed buildings • Outstanding Conservation Areas • Historic Battlefields • Historic Marine Protected Areas and Designated Wrecks • Aircraft lost on military service • Undesignated wrecks, archaeological sites, areas and buildings of national and international importance (identified in the HER) due to preservation, association, rarity, intrinsic value, loss of life
Medium (M)	• Category B and Category C(S) Listed Buildings • Burial Grounds • Protected heritage landscapes • Conservation Areas • Undesignated archaeological sites, areas, buildings, wrecks and cargos of equivalent regional importance (identified in the HER), or of high local significance, due to preservation, association, rarity, intrinsic value, loss of life.
Low (L)	• Cultural heritage assets of poor preservation and/or poor survival of contextual associations • Cultural heritage assets of local value or interest for education or cultural appreciation • Undesignated archaeological sites, areas, buildings, wrecks and cargos of equivalent local importance (identified in the HER) due to limited intrinsic, contextual or associative characteristics, or that are still common. • Unlisted historic buildings and settlements with local characteristics.
Negligible (N)	• Sites of former archaeological features, lifted or salvaged wrecks • Unlisted buildings of very minor historic or architectural interest • Features with no remaining archaeological value • Single findspots • Sites of little or no known heritage importance
Uncertain	• Marine geophysical contacts and anomalies identified as potentially anthropogenic but could not be identified as or linked to a known marine asset • Sites and features that appear archaeological, but require further work to be able to identify their nature

©ORCA 2021

4.7 Assessment of Impacts

The magnitude of any potential adverse effects on historic environment receptors caused by the Project are determined using the criteria outlined in Table 2 below. It should be noted that these categories are guideline criteria, since assessments of magnitude are also matters of professional judgement.

Table 2: Example criteria for the assessment of impacts on historic assets

Magnitude of Effect	Direct Impacts	Indirect Impacts
High	Works would result in the complete loss of the site, or the loss of an area, features or evidence fundamental to the historic character and integrity of the site, loss of which would result in the complete loss of physical integrity.	The removal of, or a fundamental and irreversible change to, the relationship between a heritage asset and its relevant setting. Major change that removes or prevents appreciation, understanding or experience of a heritage asset and its key characteristics, or permanent change to or removal of surroundings of a less sensitive asset. A noticeable change to a key relationship between a heritage asset and a highly sensitive, valued or historically relevant setting over a wide area or an intensive change to a less sensitive or valued asset or setting over a limited area.
Medium	Works would result in the loss of an important part of the site or some important features and evidence, but not areas or features fundamental to its historic character and integrity. Loss would affect the integrity of the site, but key physical relationships would not be lost.	Noticeable change to a non-key relationship between a heritage asset and its relevant setting. Relationship, asset, or context tolerant of moderate levels of change. Small changes to the relationship between a heritage asset and its setting over a wide area or noticeable change over a limited area.
Low	Works would not affect the main features of the site. The historic integrity of the site would not be significantly affected.	Minor changes to the relationship between a heritage asset and its setting over a wide area or minor changes over a limited area. Relationship, asset, or setting considered tolerant of change.
Negligible	Works would be confined to a relatively small, peripheral and/or unimportant part of the site. The integrity of the site, or the quality of the surviving evidence would not be affected.	Changes to that cannot be discerned or perceived in relation to the heritage asset or environment.
Unknown	Groundbreaking works over features that have not been fully interpreted would reduce the chance of interpretation in the future. In the event of important features of high importance this would constitute impact of high magnitude; for sites of low importance it is less problematical. Nevertheless, it remains an issue where features have not been or could not be interpreted.	Changes to a setting, where it is uncertain how these contribute to our understanding, appreciation or experience of the site because the feature or asset itself could not or has not been understood or interpreted.
Positive	An enhancement to the baseline condition of the asset.	An enhancement to the baseline setting of the asset.

Indirect impacts have been scoped out of any further consideration in this report because the onshore cable and BMH will be undergrounded and the surface restored to its original appearance. Indirect impacts on marine heritage assets have also been scoped out of any

©ORCA 2021

further consideration in this report because the marine cable will be buried where possible, and where surface laid will be protected by concrete mattresses and rock bags, thus preventing abrasion from movement of the cable.

Magnitude of impact is combined with the historic importance or sensitivity of the receptor to produce an overall effect significance. In order to manage any impact on sites identified as of Uncertain importance, it has been assumed that they could be of high importance. As per the assessment of magnitude of impact, Table 3 is a guide and the final assessment of significance of effect will also require professional judgement. In this methodology, moderate and major effects are considered significant effects that may require control, management and mitigation (Table 4). However, it should be noted that impacts that lead to non-significant minor effects may still benefit from management or mitigation.

Table 3: Significance of effect matrix

Asset Importance or Sensitivity	Magnitude of Impact					
	High	**Medium**	**Low**	**Negligible**	**Uncertain**	**Positive**
High	Major	Major	Moderate	Minor	Uncertain/ Major	Positive
Medium	Major	Moderate	Minor	Minor	Uncertain/ Moderate	Positive
Low	Moderate	Minor	Minor	Negligible	Uncertain/ Minor	Positive
Negligible	Minor	Negligible	Negligible	Negligible	Uncertain/ Negligible	Positive
Uncertain	Uncertain/ Major	Uncertain/ Moderate	Uncertain/ Minor	Uncertain/ Negligible	Uncertain/ Negligible	Positive

Table 4: Definitions for Significance of effect

Effect	Significance	
Positive	Positive – to be encouraged	Positive
Major	Highly significant and requires immediate action. May be intolerable risk or significance	Significant impact under EIA Regulations
Moderate	Significant – requires additional control measures and/or management	
Minor	Not significant – however may require some management to ensure remains within acceptable levels	Insignificant impact under EIA Regulations
Negligible	Not Significant	

©ORCA 2021

5 Baseline

5.1 Statutory designations

No current marine historic environment statutory designations have been identified in any of the marine corridors. However, Route Corridor 2.12 contains a site (UB-116) that is proposed to be a constituent element in the proposed Scapa Flow Historic Marine Protected Area, along with two more outwith but close to the same corridor (S54 and HMS Strathgarry).

There are statutory historic environment designations present in five of the onshore BMH buffer study areas. These comprise two Scheduled Monuments (Eday, route 2-6; Hoy, route 2-11) and four Listed Buildings (Westray, route 2-5; Sanday, route 2-7; Rousay route 2-9).

It should be noted that Mainland landfall location for Route 2-9 is in the World Heritage Site (WHS) Sensitive Area, which is a designation that ensures potential effects of any development on the wider setting of the Heart of Neolithic Orkney WHS are considered.

5.2 Submerged Palaeo Landscapes

Relative sea-level (RSL) change in Orkney has been investigated by Bates et al. (2013) who have shown that RSL rose significantly following the last glacial period from c. -10m OD around 8500 cal BC to -2m OD at approximately 5500 cal BC. RSL rise is then seen to be more gradual between around 5500 to c.1200 cal BC rising from -2m OD to +1m OD and then potentially stabilizes to its present-day height (Bates et al. 2013).

Physical evidence for lower shorelines, former terrestrial land surfaces and the past environment of Orkney's landscape is reflected in the presence of intertidal peats across Orkney, many of which have been observed to contain remnants of prehistoric woodland surviving as submerged forest deposits as well as archaeological cultural materials (e.g. de la Vega-Leinert et al. 2000, 2012; Keatinge and Dickson, 1979; Timpany et al. 2017).

There is strong potential for cable landfalls located on shorelines or in sheltered bays with small stone or soft deposits to discover previously unrecorded intertidal peat deposits of high palaeoenvironmental and archaeological potential, with intertidal peats having been previously identified on six islands: Sanday, Stronsay and Westray (Traill, 1868, Traill-Dennison, 1893); Rousay, Eday and South Ronaldsay (Wilson et al. 1935); and Hoy (Bates et al. 2011).

5.3 Aircraft

No aircraft are known to be located in any of the corridors. A number of aircraft went missing without trace around Orkney and the chances of finding one within any of the corridors, although not likely, cannot be completely discounted. Any aircraft lost on military service would automatically fall under the Protection of Military Remains Act 1986.

5.4 Route 2.3 Orkney to Shetland: Sanday and Orkney Waters

5.4.1 Scuthvie Bay Landfall, Sanday, Orkney

A total of eighteen sites were identified in the BMH buffer study area (Figure HEA 2.3; Appendix 1, Table A1.1). Of these, three sites were identified during the walkover survey (Sites **S-SH 16, 17, 18**). A 100m x 100m area was added to the walkover south-east of the area, due to the BMH location having moved to within 50m of the SE boundary of the area.

The Prehistoric Period (c.9000 BC to c.AD 800)

©ORCA 2021

There are seven sites of, or potentially of, a prehistoric date. **Site S-Sh 1** is the putative site of a linear embankment regarded as a treb dyke and so could date from the Bronze Age. The embankment is much denuded and no longer visible on the surface, similarly the burnt mound (**Site S-Sh 15**) at Park. Burnt mounds can date from the Late Neolithic to the Iron Age, though the majority are Bronze Age in date. Also at Park are a number of low knolls (**Site S-Sh 14**), known locally as 'Picts Houses', where dressed stone and shell midden material have been exposed. Another embankment (**Site S-Sh 13**), of earth and stone, runs across the peninsula close to the two sites at Park and this may be a second treb dyke. The exposure of structural features and shell midden layers (**Site S-Sh 12**) through erosion of a near-by coastal section provides further evidence for settlement at Park. This site has not been investigated and it is possible the activity could be medieval in date, or even be multi-period.

The two remaining sites, **Site S-Sh 4** and **Site S-Sh 5**, are both recorded as prominent mounds, though the mound at Crue-Marron-Deme (**Site S-Sh 5**) was not identified during the walkover. These may be prehistoric in date, but it is also equally likely that these could be Norse/ medieval farm mounds.

A low, sub-oval mound (**Site S-Sh 18**), with two to three visible earthfast stones within it, was identified during the walkover survey. The form was characteristic of prehistoric features though, without further investigation, the possibility remains that this is a natural feature.

The Medieval Period (c.AD 800 to 1614)

In addition to the three sites noted above, a further three sites of potential medieval date were identified. At the Bay of Wheevi, a cleared intertidal passage 10m in length and 5m wide (**Site S-Sh 10**) leads to a shingle berm which may have accommodated a noust. Such structures can date anywhere between the Norse and Post-medieval periods.

Aberdeen's 1760 map of north Sanday depicts an 'old chapl' and an 'old church' (Marwick 1923) at two locations within the search area (**Site S-Sh 3** and **Site S-Sh 11**). No further details are known, but it is probable that these date from the medieval period. **Site S-Sh 11** is now occupied by farm buildings.

The Post-medieval Period (1614 to 1900)

Four sites of post-medieval date were identified (**Sites S-Sh 2**, **6**, **7** and **9**). Both **Site S-Sh 2** and **Site S-Sh 6** are farmsteads built in the traditional, local style and now unoccupied and in a state of disrepair. **Site S-Sh 7** is an example of a fish house, used for storing fish, with a later wind-powered electricity generator.

Site S-Sh 9 is heavily denuded, drystone structure with three integral orthostats. This is circular in plan, approximately 4.5m in diameter, and has been interpreted as a planticrub. It is possible that the structure may also be a gun emplacement and form part of the military installations in the area (**Site S-Sh 8**; see below).

The Modern Period (after 1900)

A single site (**Site S-Sh 8**) was identified for this period. Four small, ditched circles, a circular platform and the foundations of a building are visible on aerial photographs. Possible related features were seen during the walkover survey covering an area of approximately 70m by 70m. All of these features have been interpreted as military installations related to a nearby radar station dating from the Second World War.

A probable area of sand extraction was identified during the walkover survey (**Site S-Sh 16**). This measured 30m by 20m and appeared to be modern in date, but it is possible that this expands an area of earlier extraction activity dating from the post-medieval period.

Features of Uncertain Date

A corner section of walling (**S-Sh 17**), measuring 2m in total length and standing 0.3m high, was observed during the walkover survey. The walling was exposed within a grassy field and appeared to form part of a rectangular structure, but its character is unclear. No further structural elements were visible though these may be present below the surface.

Potential for undiscovered sites

There is potential for discovering sites no longer visible, such as the chapel sites (**Sites S-Sh 3** and **11)**, but none of these are in the intended area of works.

There is moderate potential for discovering sites or deposits covered by the sand dunes, sand blows and below the sands of the intertidal zone.

5.4.2 Sanday Marine and Intertidal Corridor

Shipwrecks

There are three known maritime sites close to but not within the corridor within 6km of landfall at Scuthvie Bay, including a geophysical contact from past surveys in the area, the nature of which is not known (Figure HEA 2.3: Unknown 1). HMS *Goldfinch* was a WW1 destroyer, stranded in fog and sold for scrap in 1920. Usually, some evidence of the scrapping process and vessel fragments remain on the seabed, and so the vessel has been assigned Low-medium importance. The *Fancy Nancy* was a modern vessel of negligible interest. There are a further two recorded 19th-century vessels with unverified locations, the French barque *Frederic Eugene* and the brig *Ann*, of Low and Medium importance respectively, that could be within the corridor (see Appendix 1, Table A1.2).

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) has identified no shipwrecks or manmade objects, only rocks, boulders and geological magnetic features. Any contacts marked as ‘debris’ by the survey were examined and considered to be rocks. There were slight revisions to the corridor (see Section 8, Figure 2.3b) but the actual cable route within the corridor was still within the survey data coverage. The review has therefore reduced the risk of any wrecks with unverified locations being present in the corridor to Low-Negligible.

This route passes north of the WW1 Northern Barrage minefield. Many mines that were swept in 1919 or broke loose were sunk by gunfire. Although unlikely, there is a possibility that unexploded mines could be found along the cable corridor. However, review of the marine geophysical survey datasets from the corridor has not identified any.

Submerged deposits and features

There is moderate potential for discovering sites or deposits covered by the sand dunes, sand blows and below the sands of the intertidal zone, with intertidal peats having been previously identified on Sanday (Traill, 1868, Traill-Dennison, 1893).

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported.

As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the open waters further out, thus reducing the risk to Low-Negligible.

The geophysical survey data for the corridor has been reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites being present in the corridor is considered Negligible.

5.4.3 Route 2.3: Scuthvie Bay and Orkney Waters Baseline and Constraints Summary

No statutory historic environment designations are present in the onshore BMH buffer study area at Scuthvie Bay.

The red line boundary for planning application does not physically impact any known sites.

Known sites onshore, even if of Low importance, can be avoided. The proposed BMH location is 40m away from the nearest known sites of **S-Sh 8** and **9**. These comprise a series of WW2 military installations of Low importance, including a possibly adapted planticrub.

There is moderate potential for unknown sites to be buried in the sand dunes.

There are no known submerged peats or woodland at Scuthvie Bay, although there is moderate potential for such deposits to survive below the sands in the intertidal zone.

No marine historic environment statutory designations have been identified in the Sanday and Orkney Waters part of the marine corridor.

HMS Goldfinch is the closest wreck to the corridor and even though much of it has been salvaged for scrap, as a WW1 vessel it should be avoided. The two possible ship wreck sites that may be within the corridor could act as constraints if present. However, the geophysical survey data for the corridor has been reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites or sites with unverified locations being present in the corridor is considered Negligible.

There are no known submerged peats or woodland in the marine corridor.

5.5 Route 2.5: Westray to Eday

5.5.1 Whale Geo Landfall, Westray

A total of eleven sites were identified in the BMH buffer study area (Figure HEA 2.5; Appendix 1, Table A1.3). Of these, six sites were identified during the walkover survey (Sites W-E10 to 15). Some parts of this study area, and one known site (W-E 5), could not be visited during the walkover because of the presence of livestock. However, visibility from adjacent parts is considered sufficient for them to have been surveyed effectively.

The Prehistoric Period (c.9000 BC to c.AD 800)

There are two sites of probable prehistoric date. A pair of burnt mounds (**Site W-E 1**) stood close to the modern roadway but these have now been largely removed through ploughing. Burnt mounds can date from the Late Neolithic to the Iron Age, though their frequency peaks in the Bronze Age.

©ORCA 2021

Close by at Whitelet, the remains of a masonry structure and sub-circular earthwork enclosures (**Site W-E 2**) were exposed by coastal erosion. These were probably prehistoric in date, though they could also have possibly been medieval. Exposed in the 1990s, much of this site now appears to have been lost. The walkover survey identified a spread of horizontally-laid slabs in the coastal section (**Site W-E 14**). Though these had no obvious structural form, they may be related to the prehistoric features exposed in the 1990s.

The Medieval Period (c.AD 800 to 1614)

Two sites were identified of potential medieval date. **Site W-E 3** represents a group of three nousts at the head of the beach, and **Site W-E 4** comprises two clusters of four nousts in each. Though standing examples of these structures are generally post-medieval in date, they often stand on the site of Norse/medieval examples.

The Post-medieval Period (1614 to 1900)

Only one post-medieval was recorded in the NRHE data. **Site W-E 5** is the well-preserved masonry stump tower of an early 19th-century turret post windmill, which is designated as a Category C Listed Building. During the walkover survey, a number of former farmsteads were recorded. Two groups of buildings were ruinous (**Sites W-E 11** and **W-E 13**), with another, Helzie (**Site W-E 12**), having a pair of buildings renovated with modern roofing. A stone-built culvert (**Site W-E 10**) was seen running under the roadway to the shore and was considered to be associated with the Helzie farmstead.

The Modern Period (after 1900)

No sites from this period were identified.

5.5.2 Cusbay Landfall, Eday

A total of eleven sites were identified in the BMH buffer study area (Figure HEA 2.5; Appendix 1, Table A1.4). Of these, seven sites (**Sites W-E 16 to 22**) were identified during the walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

No sites from this period were identified.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

The features dating from this period entirely comprise farmsteads and related structures. All of the farmsteads and crofts (**Site W-E 6**, **W-E 7**, **W-E 16**, **W-E 19** and **W-E 22**) are shown on the First Edition 25-inch Ordnance Survey map (Orkney LXXX.15 (Eday) 1881). The smaller structures at Mucklehouse (**Site W-E 8**) and Gairhouse (**Site W-E 9**) are no longer visible in the landscape, neither is the well close to Mucklehouse (**Site W-E 7**). A stone-built structure (**Site W-E 18**) was considered to be related to Mucklehouse. A pair of enclosures (**Site W-E 20**) were also identified during the walkover survey. These enclosures run parallel to the shore between South House (**Site W-E 19**) and North Panhouse, close to a feature named Grotties Boat on the 1881 OS map.

Denuded elements of a dry-stone dyke (**Site W-E 17**) were seen running along the shore edge at various points, appearing to generally correspond with the Spring High Water Mark depicted on the 1881 OS map.

The Modern Period (after 1900)

Two irregular piles of stone (**Site W-E 21**) were identified during the walkover survey. These were located in a field to the east of the public highway, and were considered to be modern in date, being the result of clearance or were demolition debris.

5.5.3 Westray to Eday marine and intertidal cable corridor

Shipwrecks

There are no known maritime sites within the marine corridor, and two recorded losses with unverified locations that could be in the corridor (see Appendix 1, Table A1.5). These two vessels are of low importance, a wooden lugsail and a steel stream trawler from Peterhead, which foundered somewhere off Faray in 1887 and 1908 respectively.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) has identified no shipwrecks or manmade objects, only rocks, boulders and geological magnetic features. Any contacts marked as 'debris' by the survey were examined and considered to be rocks. The review has therefore reduced the risk of any wrecks with unverified locations being present in the corridor to Low-Negligible.

No reports can be found of any mine laying activity or sweeping activity or any bombing in this area.

Submerged deposits and features

The shoreline and intertidal zones at both landfalls are not conducive for the preservation of re sites or deposits, indicating that there is a Negligible risk of such discoveries.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1, Table A1.5. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites being present in the corridor is considered Negligible.

5.5.4 Route 2.5: Landfalls and Marine Baseline and Constraints Summary

One statutory historic environment designation was present in the onshore BMH buffer study area at Whale Geo. This was the C Listed masonry stump of a post-windmill (**Site W-E 5**).

The known sites onshore, even if of Low importance, can be avoided. The proposed BMH location Whale Geo is beside the culvert (W-E10) leading from Helzie farmstead (**W-E 12**) 25m away. The proposed BMH location at Cusbay is 35-45m away from the closest known sites (**W-E 19 and 20**), the former being an occupied farmstead.

There is low-negligible potential for unknown sites to be found onshore during works.

No marine historic environment statutory designations have been identified in the Westray-Eday marine corridor.

Review of the marine geophysical surveys has reduced the risk of the presence of unknown shipwrecks or aircraft to Negligible.

There are no known submerged peats or woodland in the marine corridor or in the intertidal zones at either landfall. There is negligible potential for such deposits to survive at either landfall in the intertidal zone.

5.6 Route 2.6: Eday to Sanday

5.6.1 Bay of London Landfall, Eday

A total of eight sites were identified in the BMH buffer study area (Figure HEA 2.6; Appendix 1, Table A1.6). Of these, one site (**E-S 7**) was identified during a walkover survey undertaken by ORCA in March 2021 (Bell 2021) with another additional site (**E-S 12**) being identified during the current programme of walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

Only one site has been identified with any certainty as being of prehistoric date. A circular mound (**Site E-S 6**) on the north side of the Bay, 14m in diameter, is a designated as a Scheduled Monument and considered to be a Bronze Age burial mound.

A series of eight small mounds (**Site E-S 7**) were identified on the south side of the Bay during the walkover survey. The evidence for prehistoric activity in much of the immediate area means that these could potentially be of prehistoric date. These mounds, however, have no diagnostic features and, without intrusive investigation, it is also possible that the mounds are the result of more recent activity, such as the clearing of drainage channels visible across much of the hillside.

A further site on the south side is recorded as a prehistoric, sub-circular enclosure or hut circle (**Site E-S 3**). The site was heavily disturbed during works in the 1970s and no evidence for its presence was seen during the walkover survey.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

Three sites of post-medieval date were identified, two of which were former farmsteads. At Cauldhame (**Site E-S 4**) one of the two buildings shown on the First Edition OS map remains. The flagstone roof remains intact and the masonry is of local red sandstone. A low earthen bank (**Site E-S 12**) identified during the walkover was considered to be associated with the Cauldhame farmstead. The farmstead (**Site E-S 5**) on the north side of the Bay of London is in a more ruinous state. The unroofed buildings are sub-divided and there is a corn-drying kiln attached. These are built using predominately red sandstone. The enclosure is sub-divided using upright flagstones.

Site **E-S 2** comprises the former line of the roadway, now diverted and designated as the B9063, which originally ran across the inter-tidal zone of the Bay of London. Onshore, the former roadway is still in current use as an unmetalled trackway. Across the sand and shingle of the

bay, the line of the road is marked by a linear, dry stone-built structure running along the road's edge. This extends for approximately 75m from the south shore.

The Modern Period (after 1900)

A single site dates from this period, the operational London Airport (**Site E-S 1**) located alongside the B9063 highway.

5.6.2 Staney Ayre Landfall, Sanday

A total of four sites were identified in the BMH buffer study area (Figure HEA 2.6; Appendix 1, Table A1.7). Of these, two sites (**Sites E-S 9** and **10**) identified during a walkover survey undertaken by ORCA in March 2021 (Bell 2021). No further sites were identified during the current programme of walkover survey at this location.

The Prehistoric Period (c.9000 BC to c.AD 800)

The Ordnance Survey trig point on the Gump of Spurness stands upon a mound containing earth-fast stones (**Site E-S 10**), and is similar in appearance to a heavily denuded barrow or cairn. A platform, approximately 8m by 8m is visible on the north side of the mound with a low, sub-circular mound, approximately 6m in diameter, on its northeast edge. All three features were considered to be of potential prehistoric date and any possible barrow would likely to be Bronze Age.

The Medieval Period (c.AD 800 to 1614)

The field dyke recorded in the NRHE database was seen as a low ridge (**Site E-S 8**) running approximately north-south on the hillside west of the B9070. This may form part of the pre-enclosure, farming landscape and would be of a medieval or early post-medieval date.

The Post-medieval Period (1614 to 1900)

Site E-S 9 comprises a possible earthen platform, measuring 18m by 14m, located on the coastal (west) hillside above Staney Ayre and identified during the walkover survey. This appears to have been constructed by 'cut-and-fill' into the hillside and was considered to be a post-medieval house platform.

The Modern Period (after 1900)

No sites from this period were identified.

Features of Uncertain Date

On the west slope of the Gump of Spurness is an earthen, sub-rectangular enclosure (**Site E-S 11**) measuring 140m by 100m in plan. The banks are 20m wide and there are indications that these are surrounded by a ditch up to 15m. No intrusive investigations have been undertaken at the site and no artefacts have been recorded as being recovered in the vicinity. The date and nature of the feature, therefore, remains indeterminate.

5.6.3 Eday to Sanday marine and intertidal cable corridor

Shipwrecks

There are no known maritime sites within the marine corridor, and no recorded losses with unverified locations that could be in the corridor.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) has identified no shipwrecks or manmade objects, only rocks, boulders and

geological magnetic features. The review has therefore reduced the risk of any wrecks with unverified locations being present in the corridor to Negligible.

No reports can be found of any mine laying activity or sweeping activity or any bombing in this area.

Submerged deposits and features

There are no known submerged peats or woodland in the marine corridor. The Bay of London is a shallow sandy bay, and therefore there is Moderate potential for palaeoenvironmental deposits to survive below the surface sediments. The intertidal zone at Staney Ayre is not conducive for such survival.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, although none has been identified for this corridor. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites being present in the corridor is considered Negligible.

5.6.4 Route 2.6: Landfalls and Marine Baseline and Constraints Summary

One statutory historic environment designation was present in the onshore BMH buffer study area. **Site E-S 6** is a Bronze Age burial mound on the north side of the Bay.

Known sites onshore, even if of Low importance, can be avoided. The proposed BMH location at Staney Ayre is 100m away from the closest known site (**E-S11**). At the Bay of London, excluding the airstrip, the proposed BMH location is 25m away from the closest known site (**E-S2**) and 100m from the nearest known prehistoric site of **E-S3**.

There is moderate potential for unknown sites to be buried in the sands around and in the Bay of London.

There is moderate potential for submerged peats or woodland to survive below the sands in the intertidal zone at the Bay of London, although currently, no such deposits are known. The intertidal zone at Staney Ayre is not conducive for such survival.

No marine historic environment statutory designations have been identified in the Eday-Sanday marine corridor.

Review of the marine geophysical surveys has reduced the risk of the presence of unknown shipwrecks or aircraft to Negligible.

There are no known submerged peats or woodland in the marine corridor.

5.7 Route 2.7: Stronsay to Sanday

5.7.1 Links Ness Landfall, Stronsay

A total of six sites were identified in the BMH buffer study area (Figure HEA 2.7; Appendix 1, Table A1.9). Of these, two sites (**S-S 23 and 24**) were identified during the walkover survey.

©ORCA 2021

The extent of the survey was limited by the presence of large numbers of seal pups across the beaches and fields at Red Banks and Links Ness.

The Prehistoric Period (c.9000 BC to c.AD 800)

No sites from this period were identified.

The Medieval Period (c.AD 800 to 1614)

On the north coast of the peninsula, the remains of three masonry walls and a possible floor (**Site S-S 3**) were exposed by coastal erosion. Material recovered from the coastal section during the 1980s include animal bone, marine shells and medieval pottery. The feature has been interpreted as representing the edge of a medieval settlement, but the possibility remains that it occupies the site of an earlier settlement.

The Post-medieval Period (1614 to 1900)

The farmstead at Links Ness (**Site S-S 1**) appears to have been constructed in the late nineteenth century with three buildings and an enclosure being shown on the Second Edition Ordnance Survey map (Orkney XCII.2 (Stronsay) 1900), but none of these are depicted on the First Edition (1881).

The bay to the south of the farm may have been a base for commercial fishing (Lamb 1984). Here, a 1.5m wide jetty (**Site S-S 2**) extending from the rocks has been constructed of boulders. There is a possible second pier further to the southwest (**S-S 4**). This is marked as 'Pier of Skerra' on the First and Second Editions, and as 'Pier of Stursy' on subsequent OS maps, and there is a reference to a former pier by Marwick (1927). Although the associated feature appears to be a natural rock formation, such features were often used around the coast as piers and landing places, sometimes enhanced, sometimes not.

The Modern Period (after 1900)

A ruinous, concrete slipway (**Site S-S 23**) was identified during the walkover survey on the north coast of Links Ness. This is not shown on the Ordnance Survey mapping sources. Close to this, a ruinous, structure (**Site S-S 24**) comprising flagstone constituents with a concrete matrix was identified at the edge of the eroding coastal section. The function of this structure is unclear.

5.7.2 Bay of Stove Landfall, Sanday

A total of eighteen sites were identified in the BMH buffer study area (Figure HEA 2.7; Appendix 1, Table A1.10). Of these, two sites (**S-S 14 and 15**) were identified during a walkover survey undertaken by ORCA in March 2021 (Bell 2021) and another seven (**S-S 16 to 22**) were identified during the current programme of walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

Approximately 315m north of the Bay of Stove, in a flat, low-lying area prone to waterlogging stands a mound of burnt stones (**Site S-S 6**), 1m in height. This has been interpreted as a burnt mound of prehistoric date.

Close to the northwest corner of the Bay, a chambered tomb (**Site S-S 7**) was discovered in 1912, from which artefacts, including at least eight stone lamps, were recovered. The artefacts were subsequently destroyed and no trace of the tomb is visible.

Extensive traces of prehistoric settlement have been identified on the east edge of the Bay. Coastal erosion exposed a possible ditch section (**Site S-S 12**), sealed by a layer of aeolian

sand. This is probably related to more extensive traces of settlement (**Site S-S 13**) further to the south. These extend for 45m along the coast and comprise drystone walling, floor surfaces and stone structural features, all sealed below aeolian sands. Material eroding from the coastal section include flint flakes and a mace head of Neolithic date, and areas of dry-stone masonry were noted during the walkover survey (**Site S-S 19**). Fieldwalking further inland has shown the presence of further intensive scatters of material indicating further settlement remains, and a trial trench recovered sherds of Neolithic grooved ware pottery.

In addition, during the early twentieth century, many artefacts, from Neolithic flints to Norse steatite, have been recovered around the bay, indicating multi-period inhabitation. These have been assigned an essentially arbitrary location (**S-S 9**) in order register them in the national databases.

The Medieval Period (c.AD 800 to 1614)

With the exception of the scattered artefacts from **Site S-S 9** noted above, no archaeological features of definite medieval date have been identified.

The Post-medieval Period (1614 to 1900)

The Bay of Stove is the location of Stove Farm (**Site S-S 8**), an early example of a highly capitalised and industrialised estate farm, and was probably the largest steading in Orkney. A farmstead had existed on the site since at least the eighteenth century, with the present buildings being constructed c.1857. The farm complex is Category B Listed, including the main farmhouse, which is two stories high, a steam-powered threshing barn and a byre with granary. There are also numerous ancillary timber-framed buildings. During the 1870s the land surrounding the buildings was formalised and squared. A flat, raised area (**Site S-S 15**), measuring approximately 75m by 30m, which is fairly prominent within a waterlogged area of reed vegetation immediately to the north of Stove Farm, may be related to the remodelling of the landscape or other activities at the farm. The flat-topped mound is fairly prominent within the field, though it is still subject to waterlogging. The farmworkers at Stove were accommodated in a row of specially built cottages (**Site S-S 10**) on the east edge of the Bay, and they are also category B-Listed. Two drystone dykes (**Site S-S 17** and **S-S 20**) are associated with the farm, as is a small pier constructed of stone and concrete (**Site S-S 21**). A small, rectangular structure (**Site S-S 22**) stands against dyke **S-S 17**.

Also on the east side of the Bay, is a platform (**Site S-S 5**), measuring approximately 8m by 5m, cut into the hillside with a slight embankment on its downslope (east) side. A probable enclosure, measuring approximately 13m by 13m, is butted against the west side of the platform, extending northwards as far as the stone-built field boundary wall. The enclosure was defined by a low embankment (less than 0.3m high) containing a number of earth-fast stones. A denuded trackway, defined by a hollow-way flanked by low embankments, extended from the southeast corner of the platform. This followed a curvilinear route to connect with the unmetalled track running to the workers' cottages. The site was interpreted as the location of one of the smaller crofts which existed prior to the remodelling of the landscape around Stove Farm in the late nineteenth century. It should be noted that the Canmore entry describes only a walled enclosure depicted on the First Edition OS map, located on the north side of the field boundary wall, and makes no reference to these remains recorded during the walkover survey.

Another earthen platform (**Site S-S 14**), measuring approximately 48m by 29m, is located further to the north. The platform forms a slight rise in the ground surface and is likely to be the site of

a former, small croft, though it is possible that it may also be related to the numerous prehistoric features and settlements present in the surrounding landscape.

The site of an Episcopal chapel (**Site S-S 11**), built in 1714 and demolished in 1830, lies to the west of Stove Farm and is believed to have been the private chapel of the Sinclair family at Stove. There may have been an earlier chapel on the site also. The site is now occupied by farm buildings.

Modern

Near to prehistoric dry-stone masonry (**Site S-S 19**) a further spread of stone visible in the coastal slope was, however, considered to be modern in date (**Site S-S 16**).

5.7.3 Stronsay to Sanday marine cable corridor

Shipwrecks

There is one possible maritime site with a known location in the corridor (Object 1), which is a geophysical anomaly of unknown nature identified by past surveys in the area. There are four recorded losses with unverified locations that could be in the corridor. These comprise two late 19th-century Norwegian barques of Low importance; a Norwegian brig of Moderate importance, the *Henry*, which went down with seven crew in 1870; and a Swedish frigate, the *Sebla*, that was wrecked in 1711, and would be considered of potentially High importance if found.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) has identified no shipwrecks or manmade objects (including Object 1), only rocks, boulders and geological magnetic features. Any contacts marked as 'debris' by the survey were examined and considered to be rocks. Linear features noted in the SSS and Mag survey data were identified as cables, and are described in the Fugro report (Fugro-BT R100 Route 2.07 Results Report). The review has therefore reduced the risk of any wrecks with unverified locations being present in the corridor to Low-Negligible.

No reports can be found of any mine laying activity or sweeping activity or any bombing in this area.

Submerged deposits and features

There are no known submerged peats or woodland in the marine corridor. The Bay of Stove is a shallow, muddy, sandy bay, and therefore there is Moderate potential for palaeoenvironmental deposits to survive below the surface sediments, especially with the known sites (such as **Site S-S13**) visible in the coastal edge. Links Ness has a shallow sandy shoreline, meaning that it is possible that prehistoric deposits survive below the surface sediments.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1, Table A1.11. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been

reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites being present in the corridor is considered Negligible.

5.7.4 Route 2.7: Landfalls and Marine Baseline and Constraints Summary

Two related statutory historic environment designations were present in the onshore BMH buffer study area at Stove, Sanday. These comprised the Category B Listed buildings forming Stove farm (**Site S-S8**), along with the B-Listed farm workers cottages (**Site S-S 10**).

Known sites onshore, even if of Low importance, can be avoided, with care and micro-siting. The proposed BMH location at Stove is beside the pier (**S-S21**) associated with the B-Listed farm.

Many artefacts, from Neolithic flints to Norse steatite, have been recovered around the Bay of Stove, indicating (along with the prehistoric sites on the eastern side of the bay) multi-period inhabitation at this location. There is moderate potential for such unknown remains to still be buried around the Bay of Stove.

There is moderate potential for submerged peats or woodland to survive below the mud and sands in the intertidal zone at the Bay of Stove, although currently, no such deposits are known.

There are no statutory historic environment designations in the onshore landfall study area at Links Ness, Stronsay.

Known sites onshore, even if of Low importance, can be avoided. The proposed BMH location is beside a ruinous, concrete slipway (**Site S-S 23**) and a ruinous stone and concrete structure (**Site S-S 24**).

The presence of a coastally eroding medieval site (S-S3), lying some 200m to the east indicates moderate potential for discoveries of unknown sites to be found onshore during works.

There is low-moderate potential for submerged peats or woodland to survive below the sands in the intertidal zone at Links Ness, although no such deposits are currently known.

No marine historic environment statutory designations have been identified in the Stronsay-Sanday marine corridor.

Review of the marine geophysical surveys did not identify Object 1 (an anomaly from earlier surveys) and has reduced the risk of the presence of unknown shipwrecks or aircraft to Negligible.

There are no known submerged peats or woodland in the marine corridor.

5.8 Route 2.9: West Mainland to Rousay

5.8.1 Sands of Evie Landfall, West Mainland

A total of eleven sites were identified in the BMH buffer study area (Figure HEA 2.9; Appendix 1, Table A1.12). Of these, three sites were identified during the walkover survey (**Sites M-R 14 to 16**)

The Prehistoric Period (c.9000 BC to c.AD 800)

The BMH buffer study area lies entirely within the ‘Heart Of Neolithic Orkney’ World Heritage Site (WHS) Sensitive Area (**Site M-R 8**). It should be noted that Mainland landfall location is in the World Heritage Site (WHS) Sensitive Area (M-R8), which is a designation that ensures

potential effects of any development on the wider archaeological landscape setting of the Heart of Neolithic Orkney WHS are considered.

Photographs in the James Hewat Craw Collection (NRHE collection 551 132/2) show a crouched burial (**Site M-R 1**), discovered in 1932, in the Sands of Evie. The precise location of the burial is unknown and no material is known to have been recovered from the burial.

A fragment of a Pictish symbol stone was recovered from the Sands of Evie (**Site M-R 7**) in 1967, but no associated site is known. The fragment is now in Tankerness Museum, Kirkwall, and is an example of a Class I stone bearing a mirror symbol dating from the sixth to eighth century AD.

The Medieval Period (c.AD 800 to 1614)

The medieval chapel and burial ground dedicated to St Nicolas (**Site M-R 2**) are located approximately 200m from the shoreline. The chapel, which was the old parish church in Evie, is no longer present above ground, but the burial ground is still extant.

The Post-medieval Period (1614 to 1900)

The landfall used to be the site of the crossing to Rousay that was used prior to the route being moved to the pier at Tingwall because of the new pier built at Trumland, Rousay in the 1870s. The following sites are associated with this crossing. These sites comprise the stone pier and storehouse (M-R5 and M-R4), along with a pair of winches (M-R6). A dry-stone pier (**Site M-R 5**) was constructed at the Sands of Evie during the eighteenth century and this still extends into the sea for at least 50m beyond the Mean High Water Mark. A single-storey, drystone-built storehouse (**Site M-R** 4), probably of a similar date, stands close to the landward end of the pier. The storehouse is recorded as having being completely cleared internally and the roof is now of corrugated iron construction. A pair of winches for drawing up boats (**Site M-R 6**) are located above the shoreline, to the east of the pier and storehouse. A line of four, heavily denuded nousts (**Site M-R 16**) were identified during the walkover survey and these appeared to be directly associated with the winches. A further noust (**Site M-R 14**) was recorded to the west of the pier and appears to still be in use.

The Modern Period (after 1900)

During the Second World War, as part of the wider defences for Scapa Flow, a decoy bunker (**Site M-R 3**) was erected close to the Mean High Water Mark. The bunker had been removed by 1967 and the site is now occupied by a public convenience.

5.8.2 Westness Landfall, Rousay

A total of five sites were identified in the BMH buffer study area (Figure HEA 2.9; Appendix 1, Table A1.13). No further sites identified during the walkover survey. Some parts of this survey area, and one known site (**M-R 12**), could not be visited during the walkover because of the presence of livestock. However, visibility from adjacent parts is considered sufficient for them to have been surveyed effectively.

The Prehistoric Period (c.9000 BC to c.AD 800)

A mound (**Site M-R 12**), measuring 12m by 10m, was excavated in the 1930s and seen to contain a sub-oval chamber from which burnt human bone and charcoal was recovered. The feature was interpreted as a Neolithic chambered barrow, but it has been suggested that its

irregular shape may be indicative of a domestic, rather than a funerary, function. The feature now appears as a sub-circular earthen bank approximately 6m in diameter.

A circular mound (**Site M-R 11**) lies approximately 150m to the northwest. This has been interpreted as a Bronze Age barrow, but no intrusive excavations have been undertaken and the mound has now been almost completely denuded by ploughing.

The Medieval Period (c.AD 800 to 1614)

In 1963, a burial in a stone chamber was discovered above the shore at Westness farm. This was the grave of a Viking woman and her baby (**Site M-R 9**), with two oval brooches, a silver-gilt ringed pin (of 8th-century type), beads, a weaving batten, bronze straps, the remains of a bronze bowl and a pair of wool combs being recovered. Another possible disturbed burial was seen 3m away, which could indicate a larger Viking cemetery (Kaland 1993: 314).

The Post-medieval Period (1614 to 1900)

Westness House (Site M-R 13) was originally the principal house of the Westness Estate. The current house, which is still occupied, was built c.1792 to replace the one burned down by Captain Moodie of Melsetter in 1746 whilst quelling the Orcadian Jacobites, and is a Category B Listed Building.

The nearby Westness Farm comprises a vernacular farmhouse and other farm buildings (Site M-R 10) is shown on the First Edition Ordnance Survey map (Orkney LXXXIX.8 (Rousay) 1880) and is currently in use. The farm is associated with Westness House, and is likely to be the latest in a series of farmsteads at the Westness, first recorded as a high-status Norse site in the *Orkneyinga Saga*.

Modern

No sites from this period were identified, apart from modern additions to the farm.

5.8.3 West Mainland to Rousay marine and intertidal cable corridor

Shipwrecks

There are no known maritime sites within the marine corridor and one recorded loss with an unverified location that could be in the corridor (the *Fortune*, which sank in 1746) and would be considered of Medium importance if found. Another vessel, the cutter *Elizabeth*, drifted ashore in 1869 but was refloated and so no longer present.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) has identified no shipwrecks or manmade objects, only rocks, boulders and geological magnetic features. Any contacts marked as ‘debris’ by the survey were examined and considered to be bedrock. The review has therefore reduced the risk of any wrecks with unverified locations being present in the corridor to Low-Negligible.

No reports can be found of any mine laying activity or sweeping activity or any bombing in this area.

Submerged deposits and features

There is potential for prehistoric deposits to be present below the surface sediments at the Sands of Evie, with small peat ‘pebbles’ having been observed at the Sands, indicating the presence of a submerged peat deposit.

Whilst the Rousay landfall is not in a sandy bay, it has been shown that archaeological deposits survive below even the storm beach deposits along this coastline, with the excavations at Swandro 900m to the northwest (Dockrill 2019), and intertidal peats at the Bay of Moaness 500m northwest. Intertidal peat containing submerged forest deposits have been identified at Geo of Vassey, 2.6km southeast along the Rousay coast (Wilson et al. 1935) but have not been studied.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1, Table A1.14. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites being present in the corridor is considered Negligible.

5.8.4 Route 2.9: Landfalls and Marine Baseline and Constraints Summary

The BMH buffer study area at the Sands of Evie, West Mainland lies entirely within the 'Heart Of Neolithic Orkney' World Heritage Site (WHS) Sensitive Area (**Site M-R 8**). This is a designation that ensures potential effects of any development on the wider archaeological landscape setting of the Heart of Neolithic Orkney WHS are considered.

Known sites onshore, even if of Low importance, can be avoided with care and micro-siting. The proposed BMH location is beside the stone pier and storehouse (**Sites M-R 5** and **M-R 4**).

There is moderate potential for unknown sites to be buried in the Sands of Evie (evidenced by discoveries such as **Sites M-R 1** and **M-R 7**).

There is moderate potential for submerged peats to be present in the intertidal zone, evidenced by small peat 'pebbles' having been observed at the Sands.

One statutory historic environment designation was present in the onshore buffer study area at Westness, Rousay. This was the Category B Listed building of Westness House and gardens (**Site M-R 13**), which will be avoided.

The closest known sites to the BMH location are only 10-20m from it, comprising the farm (**Site M-R10**) and the putative location of the Viking burial (**Site M-R9**), where **more burials may be present**.

No marine historic environment statutory designations have been identified in the Mainland-Rousay marine corridor.

Review of the marine geophysical surveys has reduced the risk of the presence of unknown shipwrecks or aircraft to Negligible.

There are no known submerged peats or woodland in the marine corridor.

©ORCA 2021

5.9 Route 2.10: Mainland to Shapinsay

5.9.1 Sand of Heatherhouse Landfall, Mainland

A total of two sites were identified in the original onshore buffer study area (Figure HEA 2.10; Appendix 1, Table A1.15). No further sites were identified during the walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

No sites from this period were identified.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

Two crofts are depicted on the First Edition Ordnance Survey map (Orkney CIX.2 (St Andrews), 1881). The croft to the west (Site M-S 1) lies outwith the revised onshore BMH buffer study area. The croft to the east at Heatherhouse (**Site M-S 2**) comprised four buildings and three enclosures. A fragment of standing wall possibly related to this croft was observed close to the coastal edge during the walkover survey. The rest is subsumed beneath the modern farm here.

Modern

No sites of archaeological interest from this period were identified.

5.9.2 Bay of Sandgarth Landfall, Shapinsay

A total of six sites were identified in the BMH buffer study area (Figure HEA 2.10; Appendix 1, Table A1.16). Of these, one site (**M-S 8**) was identified during a walkover survey undertaken by ORCA in March 2021 (Bell 2021). No additional sites were identified during the current programme of walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

Site M-S 5 is a burnt mound, which is now invisible in the landscape due to ploughing. Burnt mounds can date from the Late Neolithic to the Iron Age, though the majority are Bronze Age in date.

Close to the burnt mound, the walkover survey identified a pair of turf covered sub-circular earthworks (**Site M-S 8**). The larger of the two measured 20m by 13m with a large quantity of earth-fast stones being present and an exposed cellular feature was identified on the south side of the mound. The second earthwork measured 6m in diameter, with large quantities of earth-fast stone again being visible. These features were too large to be associated with kelp-burning activities (Site M-S6). The area immediately to the north of the earthworks undulated significantly and it is possible that there could be further features in the windblown sands.

The Medieval Period (c.AD 800 to 1614)

Two features of possible Medieval date were identified, which could equally be Post-Medieval. On the east side of the Bay of Sandgarth is a possible landing place (**Site M-S 7**) comprising a 7m-wide quarried gap aligned with a cleared platform through the rocks and boulders on the

foreshore. On the west side of the Bay is a pair of truncated nousts (**Site M-S 3**) constructed of earth and stone and clearly at risk from coastal erosion. These may also be Post-medieval.

The Post-medieval Period (1614 to 1900)

Close to the pair of nousts is a roofless structure (**Site M-S 4**) depicted on the First Edition Ordnance Survey (Orkney CIII.6 (Shapinsay), 1881) and which is still extant.

At the head of the Bay is a series of kelp-burning pits (**Site M-S 6**) and heavily denuded stone-built structures which may be drying walls. These structures were not identified during the walkover survey but the area was covered by thick vegetation and these features may have been obscured from view.

Modern

No sites of archaeological interest from this period were identified.

5.9.3 Mainland to Shapinsay marine and intertidal cable corridor

Shipwrecks

There are no known maritime sites within the marine corridor and four recorded losses with an unverified location that could be in the corridor (see Appendix 1, Table 1.17). One is a yacht (*Village Belle*) of negligible importance lost in 1929, and the *Fucsia*, despite being lost in 1854 would be of low importance if found, being a schooner with a cargo of coal. Both the *Swift*, a sloop lost in 1825, and an unknown ferry from Eday lost in 1844 are of Uncertain importance because nothing known of their cargo or build.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) has identified no shipwrecks or manmade objects, only rocks, boulders and geological magnetic features. Any contacts marked as ‘debris’ by the survey were examined and considered to be bedrock. The review has therefore reduced the risk any wrecks with unverified locations being present in the corridor to Low-Negligible.

In WW1, a number of UC class U-boats laid mines in the Shapinsay Sound. One mine line laid by UC-55 accounted for the damage to the bow of HMS *Albacore* over 1km to the west of the proposed route corridor and a line laid by UC-40 over 2km to the east accounted for SS *Swiftsure*. A study of all the KTBs (logbooks) of U Boats active off Kirkwall show no mines laid along the proposed route corridor.

Submerged deposits and features

Landfall in Shapinsay is in a shallow sandy bay, with windblown sands along the shoreline and inland, meaning that it is possible that prehistoric deposits survive below the surface sediments.

Landfall is through the Sands of Heatherhouse, a shallow sandy shoreline, meaning that it is possible that prehistoric deposits survive below the surface sediments.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1, Table A1.17. However, wrecks stranded at or close to shore were usually

salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been reviewed, and nothing of interest noted. Thus, the potential risk of unidentified sites being present in the corridor is considered Negligible.

5.9.4 Route 2.10: Landfalls and Marine Baseline and Constraints Summary

There are no statutory historic environment designations present in the onshore BMH study area at either landfall.

At the Sand of Heatherhouse, all known sites can be avoided, with the closest known site to the BMH being the occupied farm of Heatherhouse, 200m west (Site M-S2).

There is low-moderate potential for submerged peats or woodland to survive below the sands in the intertidal zone at Heatherhouse, although no such deposits are currently known.

At the Bay of Sandgarth, the landfall corridor and BMH location are at **Site M-S6** (evidence of the kelping industry) and may also impact the potentially prehistoric **Site M-S8**, due to its unknown extent.

There is moderate potential for unknown sites to be buried in the windblown sands around the Bay of Sandgarth.

There is moderate potential for submerged peats or woodland to survive below the sands in the intertidal zone at the Bay of Sandgarth, although no such deposits are currently known.

No marine historic environment statutory designations have been identified in the Mainland-Shapinsay marine corridor.

Review of the marine geophysical surveys has reduced the risk of the presence of unknown shipwrecks or aircraft to Low-Negligible.

There are no known submerged peats or woodland in the marine corridor.

5.10 Route 2.11: Hoy to Flotta

5.10.1 Crockness Landfall, Hoy

A total of seven sites were identified in the BMH buffer study area (Figure HEA 2.11; Appendix 1, Table A1.18). Of these, two sites (**Sites H-F 8 and 9**) were identified during the walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

No sites from this period were identified.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

The Crockness Tower (**Site H-F 1**) is a Martello tower constructed in 1813-15, at the same time as the one at Hackness, to protect the Longhope anchorage, and appears to have been surrounded by at least one, possibly two, circular ditches. The Crockness Tower is not shown on early Ordnance Survey maps as it was considered to be of military importance. The site is designated as a Scheduled Monument.

There are two former crofts within the search area, both on the south coast at Crockness. One of these, **Site H-F 2**, is considered to be of a nineteenth-century date and comprises a dwelling house and outbuilding with corn-drying kiln, all of which are now ruinous. The second, **Site H-F 5**, comprises four conjoined structures forming a long range with a fifth structure identified as a boat house on the First Edition Ordnance Survey map (Orkney CXIX.14 (Walls & Flotta) 1881). Along with the occupied, restored dwelling the walkover survey identified three ruinous buildings on the site. Two of these were outbuildings, with the third being the boathouse. Also observed were the remains of three nousts and a pier.

A linear feature (Site H-F 3) visible on aerial photographs has been interpreted as a former field boundary. The feature, however, does not appear on historic Ordnance Survey maps and may represent a fairly early post-medieval, or even medieval, feature. It was not identified during the walkover survey.

The Modern Period (after 1900)

Forming part of the Scapa Flow military infrastructure erected during the First World War is a telegraph hut (**Site H-F 4**), concrete-built, and an associated boat house. Both structures remain largely intact, though the boathouse appears to have been modified.

The walkover also identified a modern culvert (**Site H-F 8**).

Features of Uncertain Date

At the southeast corner of Crockness, a feature was noted in the intertidal zone (**Site H-F 9**). This was a sub-circular tidal pool formed by a bank of beach cobbles, with an upright stone and a timber post upon the bank. It is unclear to what extent the feature the result of tidal action, has been deliberately constructed or artificially enhanced. It appears to have been used as a mooring place, and may have also been used as a fish trap.

5.10.2 Weddel Landfall, Flotta

A total of four sites were identified in the BMH buffer study area (Figure HEA 2.11; Appendix 1, Table A1.19). Two of these sites (**Sites H-F 10** and **11**) were identified during the walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

No sites from this period were identified.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

Two roofless structures or enclosures (**Site H-F 6**) are shown on the First Edition Ordnance Survey map (Orkney CXIX.14 (Walls & Flotta) 1881), but these are no longer visible.

The Modern Period (after 1900)

A landing strip (**Site H-F 7**) runs parallel to the coast at Weddel. The runway has a tarmac surface and the terminal stands at the north end of the airfield. There are a number of associated trackways around the runway resulting in the airfield covering most of the landfall survey area.

West of the public highway, the concrete base of a small structure (**Site H-F 11**) was observed during the walkover survey. This may be related to the airfield, though it could also be related to the wartime defences on the island.

Much of this side of West Hill was covered by extensive peat cuttings (**Site H-F 10**). These appeared to be of modern date, but it is highly likely that relict peat cuttings of an earlier date are present.

5.10.3 Hoy to Flotta marine and intertidal cable corridor

Shipwrecks

There are two known maritime sites within the marine corridor, four recorded losses with an unverified location that could be in the corridor, and a German destroyer (V45) that was in the corridor but was refloated and towed away (Figure HEA 2.11; Appendix 1, Table A1.20). The Unidentified object in the corridor appears to be a natural mound of no historic interest. HMD *Rose Valley* foundered after a collision in 1943 while carrying a cargo of torpedoes. The vessel itself was a seconded wooden drifter, and of local interest. All the torpedoes were recovered. The four vessels that could be in the corridor are all of Low importance due to their vessel type and cargoes such as salt, herring and wheat. The *Helen* was lost in 1800 en route from Liverpool to the Baltic, whilst the regional trading schooners *Sir William Cumming*, the *Isabella Wilson* and the *Barbara* were lost in 1844, 1877 and 1911 respectively.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) clearly showed the wreck of the Rose Valley in the survey data (Figure HEA 2.11b), and identified a more accurate position for the wreck that was passed on to the UKHO by Fugro. A new previously uncharted contact was visible in the SSS, MBES and Mag data that had the appearance of a small ship's boiler or cylindrical mooring buoy, with some possibly associated debris nearby to the ENE (Figure HEA 2.11b). The Unidentified Object (Figure HEA 2.11) noted by previous surveys was shown to be a natural feature. The Mag survey also showed the Hoy to Flotta water pipes, and a band of geology. Although the latter could mask smaller ferrous items, the review has reduced the risk of any other wrecks with unverified locations or substantial debris being present in the corridor to Low-Negligible.

No reports can be found of any mine laying activity or sweeping activity or any bombing in this area.

Submerged deposits and features

There are no known submerged peats or woodland in the marine corridor. Apart from the intertidal feature (**Site H-F 9**) described above, the landfalls are not conducive for the survival of submerged deposits.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1, Table A1.20. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been

reviewed, and items identified. Thus, the potential risk of further unidentified sites being present in the corridor is considered Low-Negligible.

5.10.4 Route 2.11: Landfalls and Marine Baseline and Constraints Summary

One statutory historic environment designation was present in the onshore BMH buffer study area at Crockness, Hoy. This was the Scheduled Monument of Crockness Martello Tower and its ditched enclosure (**Site H-F 1**). which will be avoided.

This is the closest known site to the BMH location, which is adjacent to the monument. The next closest is **Site H-F 8**, some 80m away and potentially **Site H-F 3**, a linear feature seen on aerial photographs (not on the ground), which could run close to the BMH.

There are no known statutory historic environment designations present in the onshore BMH buffer study area at Weddel, Flotta.

The closest known site to the BMH location at Weddel, Flotta, (**H-F11**) is 50m north of the BMH location and can easily be avoided.

There are no known submerged peats or woodland in the intertidal zones at either landfall, and the conditions here not conducive for their survival. There is also low-negligible potential for unknown sites to be present onshore at either of the BMH locations.

No marine historic environment statutory designations have been identified in the Hoy-Flotta marine corridor.

There are two known sites within the marine corridor, both of which can be avoided. These are the remains of the HMD *Rose Valley*, and the identification from the geophysical surveys of a small ship's boiler and nearby debris of unknown importance (Section 8, Figure HEA 2.11b).

Review of the marine geophysical surveys has identified sites and therefore reduced the risk of the presence of further unknown shipwrecks or aircraft to Low-Negligible.

There are no known submerged peats or woodland in the marine corridor.

5.11 Route 2.12: Flotta to South Ronaldsay

5.11.1 Pan Hope Landfall, Flotta

A total of seventeen sites were identified in the BMH buffer study area (Figure HEA 2.12; Appendix 1, Table A1.21). Of these, nine sites (**Sites F-SR 22-30**) were identified during the walkover survey. Some parts of this study area, and one known site (**F-SR 30**), could not be visited during the walkover because of the presence of livestock, however visibility from adjacent parts is considered sufficient for them to have been surveyed effectively.

The Prehistoric Period (c.9000 BC to c.AD 800)

No sites from this period were identified.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

A pier (Site F-SR 1) is shown at Pan on the First Edition Ordnance Survey map (Orkney CXIX.12 (Flotta) 1881). A concrete pier now stands at the site, and is probably a replacement for the original pier as it stands slightly east of the structure shown on the 1881 map. It is in poor

condition but is still in use along with a concrete slipway beside it. The settlement at Pan (**Site F-SR 20**) is shown as comprising one long, rectangular and one L-shaped building, with the group of buildings also being marked as the location of the post office. These buildings are now unoccupied, in various states of preservation, with indications of some remodelling and repair at multiple times. Many fixtures, fittings and original architectural features were seen to survive. One part retains its flagstone roof and the interior contains furniture, books, crockery and other personal possessions. A well (**Site F-SR 25**) to the east of Pan has been capped with concrete, though elements of the stone lining are still visible. Along the shoreline to the west of Pan, a small section of roughly coursed, drystone wall (**Site F-SR 28**) was identified during the walkover survey. This was interpreted as revetting for a slipway or access route to the beach.

The site of Newpan (**Site F-SR 21**) stands 150m to the southwest and is shown to comprise four buildings, one of which is square in plan and is set a little away from the others on the shore edge, and two wells. These were seen on the walkover survey to be dilapidated, with the square building being quite ruinous. The remaining buildings are still upstanding with one retaining most of its replacement roof, and a number of internal timber fittings are still present throughout. One corner contains a stone inscribed with '1874' visible on the exterior wall surface. There are also the remains of an associated jetty, and the shoreline has been revetted.

Between Pan and Newpan, a small enclosure (**Site F-SR 22**) is marked on the 1881 OS map, which is then depicted as a small, roofed structure on late twentieth-century mapping. This is now a pile of demolition debris. A similar enclosure/structure (**Site F-SR 23**) close by to the north still retains upstanding elements of three of its exterior walls. A small enclosure (**Site F-SR 5**) is also depicted on the 1881 OS map, to the south of Newpan. This no longer visible in the landscape.

There are two further farmsteads within the search area shown on the First Edition OS map. The Quoyness farmstead (**Site F-SR 4**) is depicted as comprising three buildings and an enclosure. During the walkover survey it was noted that one of these buildings retained its flagstone roof along with a number of timber fixtures and fittings. Another of the buildings is a barn which contained a horse-engine. This is now ruinous and overgrown but the gearing for the engine is still visible.

A small roofed structure with an adjacent enclosure (**Site F-SR 2**) stands on the north shoreline and is linked to Quoyness farmstead by a trackway. The building is no longer visible in the landscape.

Between Quoyness and Pan stands Little Quoyness (**Site F-SR 30**) comprising two roofed structures. These are still upstanding and retain their flagstone roofing.

The Modern Period (after 1900)

To the north of the Quoyness farmstead are the remains of a substantial stone-built pier and a building (**Site F-SR 2**). The pier does not appear on the OS maps until the 1970s (ND3794 A-Series 1:2500, 1974), but probably dates from the early twentieth century. The building is built of breeze blocks and stands next to a small, stone-built structure open to the seaward side and with an adjacent wall. The stone features may be the remains of the earlier whilst the later building is probably associated with the military structures (See **Site F-SR 3** below). There are also the remnants of additional small concrete features just above the foreshore and the shore has been bounded with a line of flagstones

Close to the south are the remains of two brick- and concrete-built structures (**Site F-SR 3**). These are considered to be military structures, probably used as observation posts as they overlook the entrance to Pan Hope. Further potential military or defensive structures were seen in the walkover survey area. These comprised a line if three concrete pillars running down the beach at right angles to the shore (**Site F-SR 26**), a spread of concrete blocks at the head of the beach (**Site F-SR 27**), and a small concrete platform adjacent to a small sub-rectangular pit located close to low cliffs (**Site F-SR 29**).

A submerged, linear feature (**Site F-SR 3**) has been identified on aerial photographs. This is one of the submerged pipelines running to the Flotta oil terminal.

Features of Uncertain Date

A small, sub-oval grassy mound (**Site F-SR 24**) was identified during the walkover survey. This was located in a boggy area to the south of Pan and is probably related to field drainage. Without further investigation, however, it is not possible to determine if this is a feature of an earlier date.

5.11.2 Dam of Hoxa Landfall, South Ronaldsay

A total of fifteen sites were identified in the BMH bufferl study area (Figure HEA 2.12; Appendix 1, Table A1.22). Of these, three sites (**Sites H-F 31 to 33**) were identified during the walkover survey.

The Prehistoric Period (c.9000 BC to c.AD 800)

There were a number of prehistoric features identified in the study area. A Neolithic chambered tomb (Site F-SR 19), known locally as 'The Wart', was excavated c.1870 and human bones mixed with charcoal were removed. The mound is approximately 9.5m in diameter within a circular ditch. Part of the feature was removed during the construction of a water tower on the south side.

On the west side of the Dam of Hoxa is 'The Howe', an Iron Age broch (**Site F-SR 9**), forming a prominent mound in the landscape, reputed to be burial place of Earl Thorfinn Torf-Einarsson. It was investigated by antiquarians in 1825 and 1848 but many of its features have been destroyed or covered by attempts at conservation in the mid-nineteenth century through the use of mortared masonry. There are some indications of further structures around The Howe which may be related to settlement around the broch, though some of these are clearly more recent. Further evidence for settlement associated with the broch lies at 'Little Howe of Hoxa' (**Site F-SR 10**) which was partially investigated by Petrie in 1871. The remains appear to stretch over an area approximately 19m in diameter with evidence for walling and intra-mural galleries.

On the east side of the Dam of Hoxa is a sub-circular enclosure (Site F-SR 15), 30m in diameter, which occupies a small promontory. The feature has been interpreted as being prehistoric in date and comprises two sub-circular earth and stone ramparts with a ditch between. These have been subject to stone robbing in the past and part of the feature along the shoreline has been further denuded by the construction of a sea wall.

The Medieval Period (c.AD 800 to 1614)

No sites from this period were identified.

The Post-medieval Period (1614 to 1900)

The majority of the Post-medieval sites identified are crofts or farmsteads. The croft at Little Howe (**Site F-SR 8**) is shown on the First Edition Ordnance Survey map (Orkney CXX.10 (with

inset CXX.9) (South Ronaldsay) 1881) and is still extant though the building is now roofless and somewhat dilapidated. The nearby farmstead at Howe (**Site F-SR 12**) is also shown on the First Edition OS map (Orkney CXX.14 (South Ronaldsay) 1881). The buildings are still in use with the exception of two structures on the north edge which are now roofless and ruinous. A slipway is associated with the farm.

The Longhouse farmstead (Site F-SR 13) originally comprised three conjoining structures forming a range with a corn drying kiln at the north, and a number of enclosures to the east (Orkney CXX.14 (South Ronaldsay)1881). The single range has now been converted into a modern cottage, with a modern roof. The kiln remains intact.

The Swartiquoy farmstead (**Site F-SR 16**) comprised three buildings with two adjacent enclosures (Orkney CXX.10 (with inset CXX.9) (South Ronaldsay) 1881), but all of these appear to have been subsumed by the modern farmstead. The slipway is a modern addition and did not form part of the original layout. A possible boathouse (**Site F-SR 14**) is shown, however, on the Second Edition OS map (Orkney CXX.9 & 10 (South Ronaldsay) 1902) a little further north along the shoreline. This had been subject to damage by coastal erosion and was demolished in 2014-2015.

A building and an enclosure at Heatherbell (**Site F-SR 18**) are depicted on the First Edition Ordnance Survey map (Orkney CXX.14 (South Ronaldsay)1881). These are not shown on subsequent OS maps and are no longer extant.

A linear earthen bank to the northeast of Swartiquoy marking the boundary between rough pasture and the foreshore (**F-SR 17**). This has been interpreted as an agricultural feature of post-medieval date.

The Modern Period (after 1900)

A single modern feature, dating specifically from the Second World War, was identified in the study area. A camp used by Corps of Royal Electrical and Mechanical Engineers (**Site F-SR 11**) was located on the north side of the current B9043 highway. A number of foundations and hut bases survived until the 1990s but much of the site has been redeveloped as a public amenity area.

During the walkover survey, a modern, stone-built structure (**Site F-SR 32**) was seen at the base of the coastal slope at Longhouse. This appeared to be a recent, uncompleted construction.

Features of Uncertain Date

During the walkover survey a spread of stone material (**Site F-SR 31**) was noted on the coastal slope just above the beach. This appeared to be tumble from the land above, probably from drystone dyke construction rather than from a substantial structure or dwelling.

5.11.3 Flotta to South Ronaldsay marine and intertidal cable corridor

Shipwrecks

The Flotta Terminal oil pipeline (**F-SR6**) runs along the northern edge of the marine corridor, and shows clearly in the marine geophysical survey datasets (Figure HEA 2.12b). There are four known maritime sites within the marine corridor (Figure HEA 2.12), and one recorded loss with an unverified location (the *Sykes*, wrecked in Pan Hope in 1788) that could be in the corridor and would be considered of Medium importance if found (see Appendix 1, Table A1.23).

©ORCA 2021

There are two verified wrecks near the Flotta landfall in Pan Hope, the nature date and importance of which is unknown (Unknown 4 and 5). Unknown 6 almost certainly relates to the wreckage of the U Boat UB 116. All 36 crew were lost on the UB 116 in 1917 when it was sunk by a remote-controlled mine. The torpedoes onboard were set off by controlled explosion in the early 1970s, followed by salvage activities. The remains on the seabed are included as a component part of the proposed Scapa Flow Historic Marine Protected Area, as are the SMS S54 and HMS *Strathgarry*, which lie south of the corridor.

Review of the geophysical survey datasets from the corridor (SSS, MBES and Mag, see Appendix 4) clearly showed the wreck of the SM UB-116 and associated debris scattered around, including confirmation that Unknown 6 is part of the debris scatter in the SSS and MBES data (Figure HEA 2.12b). The review also identified what are likely to be the remains of the wreck Unknown 5 (Fugro ref: 212_VK_SSS_0001), 79m southeast of the more roughly charted position (Figure HEA 2.12b)..

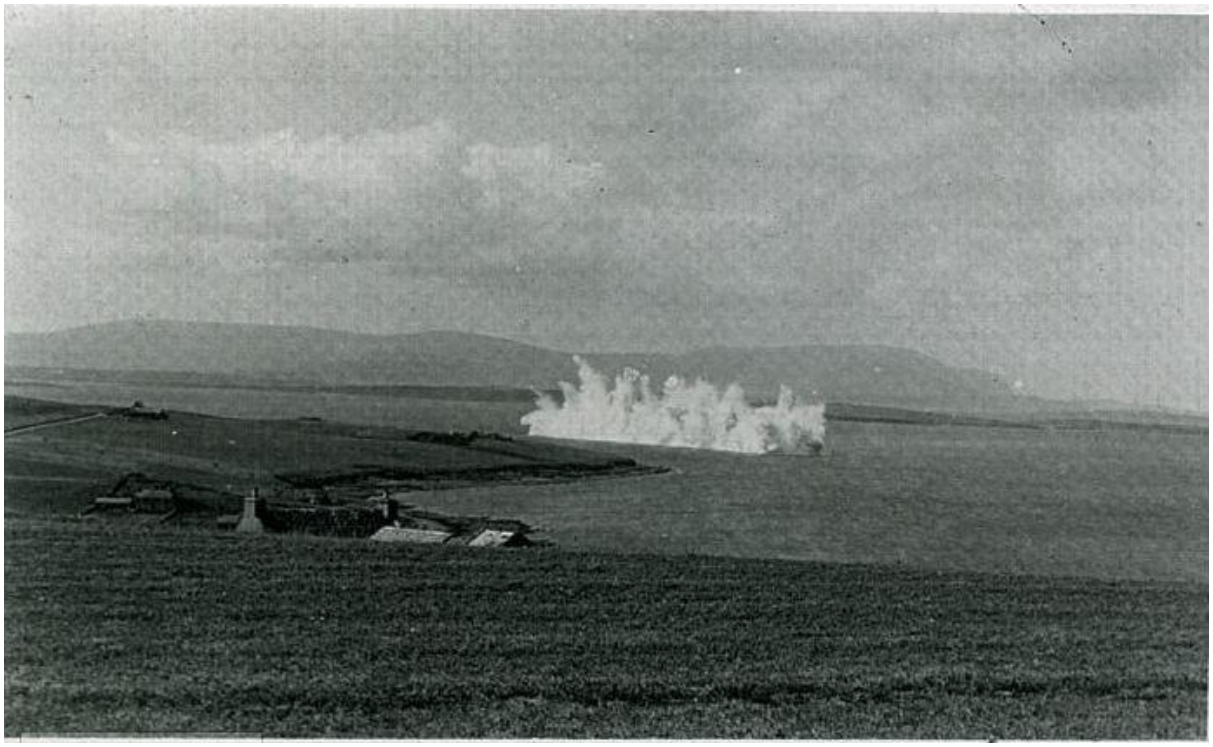
Anti-submarine and anti-destroyer boom defences and remotely operated mine lines were put across Hoxa Sound in both WW1 and WW2 (see Stell 2010: 22), shown on Admiralty charts ADM 137/1074, and the corridor crosses these. Whilst the boom defences were dismantled, there are likely to be remains on the seabed as there are elsewhere in Scapa Flow. One of the mine lines was activated to sink UB-116. At the end of WW1 all of these mines were set off but it is not known if all detonated. UB 116 is now regularly dived and there are no reports of any torpedoes being seen.

There are a large number of isolated contacts and anomalies seen in the SSS and Mag data of which some are boulders but others may relate to mine anchors and anchors for boom nets, which would be expected in an area rich with cables and mine loops that were deployed here in both World Wars. The weights are square concrete blocks or iron or steel clump weights. An ROV survey along the route would determine if the contacts were rocks or anchors but they are of no real historic value and would not suffer from the proximity of the cable.

There are also some linear contacts that could relate to boom net, mine lines or detection loops, both of which were used heavily in the area during both World Wars. A linear feature made up of a number of depressions in the seabed was noted on both the SSS and MBES (Figure HEA 2.12b) and in the Fugro report (124376-R-010- Flotta - South Ronaldsay Results Report - 2.12, Fig 3.13).

These depressions are most likely the result of the WW2 remote minefields being detonated at the end of the war. The photo below shows the mines going off in the very area of these depressions. Although the photo shows two lines of mines there is only one line of depressions bet one mine line would have been set deep and the second shallower so this would be the result of the deep field.

©ORCA 2021



WW2 mine line being exploded off Hoxa. Courtesy of Bobby Forbes collection, held by SULA Diving.

Submerged deposits and features

There are no known submerged deposits at the Dam of Hoxa, but submerged peat and tree stumps are present below the surface sands at Sand of Wright, 400m away on the south side of the isthmus, and work at another coastal barrier lagoon (Bay of Carness near Kirkwall) has shown that palaeoenvironmental evidence can survive at this type of location (De la Vega-Leinert et al. 2012)

The shoreline at Pan Hope is not conducive to such survival.

Potential for undiscovered marine sites

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. As such, there is a moderate to high probability for unknown, unrecorded vessels to have sunk in the marine study area, as well as those losses which have been recorded but not found, listed in Appendix 1, Table A1.23. However, wrecks stranded at or close to shore were usually salvaged, and wooden wrecks are unlikely to survive in the deeper waters further out, especially with the fast tidal flows between islands. The geophysical survey data for the corridor has been reviewed, and thus reduced the risk of any other any wrecks with unverified locations or substantial debris being present in the corridor to Low-Negligible.

5.11.4 Route 2.12: Landfalls and Marine Baseline and Constraints Summary

There are no statutory historic environment designations present in the onshore BMH buffer study areas at Pan Hope or the Dam of Hoxa.

Known sites onshore, even if of Low importance, can be avoided. The ruined farmstead at Pan (Site F-SR20) and the dilapidated concrete pier (Site F-SR1) are at the proposed BMH location

©ORCA 2021

at Pan Hope. These can be managed by micro-siting to avoid them. There is an occupied house Site F-SR13 close to the proposed BMH location at Dam of Hoxa, which can easily be avoided.

There is low-negligible potential for unknown sites to be buried onshore at either of the landfalls and BMH locations.

There are no known submerged peats or woodland in the intertidal zones, but there is moderate potential for deposits to survive in the intertidal zone and under the storm beach at the Dam of Hoxa.

No marine historic environment statutory designations exist as yet in the Flotta-South Ronaldsay marine corridor. However, it is expected that UB-116 within the corridor will be included as a constituent part of the proposed Scapa Flow Historic Marine Protected Area. This site and that of Unknown 5 can be avoided by the cable, with the use of an exclusion zone.

Review of the marine geophysical surveys has reduced the risk of the presence of further substantial debris, unknown shipwrecks or aircraft in the corridor to Low-Negligible.

There are no known submerged peats or woodland in the marine corridor.

©ORCA 2021

6 Assessment of Impacts and Effects

6.1 Impact

The following potential impacts on historic environment assets have been identified:

- During construction and installation of the proposed cables, direct impacts to known and unknown cultural material and potentially anthropogenic geophysical anomalies on the seabed could be caused by vessel activities, seabed preparation and boulder clearance, resulting in the removal of marine cultural heritage or removal of material that forms the context of a site. Rock or mattress placement for cable protection could also impact by compressing any cultural material on which it is placed.
- During construction and installation of the proposed cables, direct impacts to known and unknown cultural material on the seabed could be caused by vessel activities, trenching and jetting. The target cable burial depth is up to 1m below the seabed offshore, and 2m between the BMH to Low Water Mark (LWM).
- At landfall, preparatory clearance works on the surface, and the creation of temporary construction compounds, equipment laydown areas and access routes could impact historic environment assets;
- At landfall, the trenching for laying of underground cables and the excavation of the BMH, as well as the surface activities described above could also penetrate the surface and impact archaeological sites and unknown assets buried in or below coastal deposits, especially dunes and beach sands;
- Where landfall is through a sloping sandy beach or a storm beach, there is a moderate risk of impacting paleoenvironmental and archaeological deposits below the surface cover. If such deposits, especially peats, are present below the surface, then they are likely to contain important information concerning the past environment of Orkney, changing sea levels and human interaction with the environment; and
- The project design means that on completion of the cable burial to the BMH location, the ground profile will be restored, and all machinery and equipment removed from site. Thus any change to setting will be very short term and, in line with standard guidance (HES 2016), is considered to have negligible effect on the setting of any asset. This potential impact is therefore scoped out.
- Significant potential impacts on the historic environment were only predicted during the construction and installation phase. None were predicted for the subsequent operations, maintenance and decommissioning phases, because no new ground or seabed will be broken.

A review of the pressures to be included in the Appraisal has excluded the following impacts from further consideration in relation to the historic environment:

- The project design means that on completion of the cable burial to the BMH location, the ground profile will be restored, and all machinery and equipment removed from site. Thus any change to setting will be very short term and, in line with standard guidance (HES 2016), is considered to have negligible effect on the setting of any asset. This potential impact is therefore scoped out.
- Significant potential impacts on the historic environment were only predicted during the construction and installation phase. None were predicted for the subsequent operations, maintenance and decommissioning phases, because no new ground or seabed will be broken.

- Changes in bathymetry: given that each cable will be trenched and backfilled along the majority of their lengths coupled with the small footprint of each cable where trenching is not possible, i.e. where rock bags are utilised, the effect of the proposed cables on changes to bathymetry is negligible;
- Physical change to another seabed type: given that intrusion into the seabed, or disturbance on the surface of the seabed are the likely causes of any physical damage to historic environment assets, changes to another seabed type were not considered relevant; and
- Local water flow changes: given that each cable will be trenched and backfilled along the majority of their lengths, coupled with the use of rock bags/mattresses on small sections where trenching is not possible, water flow changes or cable movement creating scouring effects on the seabed thus impacting assets on the seabed will be negligible, especially because rockbags/mattresses are designed to eliminate scouring effects.

6.2 Mitigation and Management

Mitigation and management measures were developed by assessing the impacts likely from the development that could be significant by the criteria outlined in Section 4.6 above, or ensuring impacts were kept non-significant (see Appendix 2 for tabular assessment). Embedded mitigations are outlined below, followed by route-specific mitigations, presented in table summaries.

6.2.1 Embedded Mitigations

The **desk-based survey, the walkover surveys and the marine geophysical surveys** were embedded in the Project design, in order to identify any historic environment assets that might be impacted, and thus reduce or eliminate that risk.

Avoidance of known assets is the primary mitigation, embedded in the Project design. All identified known sites have been or will be avoided, or will have a specific mitigation assigned (see specific route mitigation tables below).

In order to prevent **accidental impacts** on sites near to the cable landfall, the BMH location and the marine cable route, site contractors will be informed of these locations and some may have **exclusion zones** put around them (see specific route mitigation tables below).

In order to manage the risk of the **accidental discovery** of any significant archaeological remains during marine and onshore preparation and construction works, the site contractor will be informed of the locations of all known cultural heritage assets to avoid. A Written Scheme of Investigation (WSI) will be produced and a **Protocol** for the accidental discovery of archaeological finds and remains (PAD) will be instated for the reporting of discoveries to the appropriate authorities. The WSI and PAD will include reference to the requirement for production an archaeological finds management plan for proper recording and analysis of any unexpected finds, and to the requirement for site inductions and toolbox talks, so that personnel are made aware of the potential for unknown remains, and the procedures for reporting them.

©ORCA 2021

6.2.2 Route 2.3: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites S-Sh 8, 9 and 12	Scuthvie Bay landfall	**Avoidance with exclusion zone of 20m**. The proposed BMH location is 40m away from the nearest known sites of S-Sh 8 and 9. These comprise a series of WW2 military installations of Low importance, including a possibly adapted planticrub. The coastally eroding exposure of structural features and shell midden layers (Site S-Sh 12) should also be avoided with an exclusion zone of 20m, because its full extent is not known. This is recommended as a simple precautionary measure when heavy plant is moving to and from the proposed operations corridor. No exclusion zone overlasp with the proposed operations corridor.
Site S-Sh 12 & Unknown sites in dunes Moderate potential for significant unknown archaeological sites in dunes	Scuthvie Bay landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench from the intertidal zone to the BMH, in order to manage the risk of impacting archaeological sites buried in the dunes. The exposure of structural features and shell midden layers (Site S-Sh 12) through erosion of a near-by coastal section show there is moderate potential for such an impact. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Deposits below beach & in intertidal zone Moderate potential for such deposits	Scuthvie Bay landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench in the intertidal zone and at the beach, in order to manage the risk of impacting submerged palaeoenvironmental deposits below the beach. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Marine sites	Route 2.3 marine cable corridor	**Avoidance** of known sites, especially HMS *Goldfinch*. **Marine PAD**

©ORCA 2021

6.2.3 Route 2.5: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites	Whale Geo Westray & Cusbay Eday landfalls	**Avoidance of known sites; reinstatement of any culverts or drystone dykes**.
Low/Negligible potential for significant unknown archaeological sites onshore	Whale Geo Westray & Cusbay Eday landfalls	Potential for discovery of unknown sites is considered low-negligible, therefore **embedded mitigations only**
Low/Negligible potential for deposits below beach & in intertidal zone	Whale Geo Westray & Cusbay Eday landfalls	Potential for discovery of unknown sites is considered low-negligible, therefore **embedded mitigations only**
Marine sites (none identified)	Route 2.5 marine cable corridor	**Marine PAD**

6.2.4 Route 2.6: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites	Bay of London Eday & Staney Ayre Sanday landfalls	**Avoidance of known sites**.
Unknown sites in sands Moderate potential for significant unknown archaeological sites in sands around bay	Bay of London landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench from the intertidal zone to the BMH, in order to manage the risk of impacting archaeological sites buried in the sands. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation.

©ORCA 2021

Sites & Potential	Location	Mitigation
		Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Deposits below beach & in intertidal zone Moderate potential for such deposits	Bay of London landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench in the intertidal zone and at the beach, in order to manage the risk of impacting submerged palaeoenvironmental deposits below the beach. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Marine sites (none identified)	Route 2.6 marine cable corridor	**Marine PAD**

6.2.5 Route 2.7: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites	Bay of Stove Sanday landfall	**Avoidance of known sites, especially the B-Listed constituents of Stove Farmstead, with 5m exclusion zone around these**. This is recommended as a precautionary measure when heavy plant is moving to and from the proposed operations corridor, which does not overlap with the proposed exclusion zone.
Unknown sites onshore Moderate potential for significant unknown archaeological sites	Bay of Stove landfall & Links Ness landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench and the BMH, in order to manage the risk of impacting unknown archaeological sites. Moderate potential with evidence of Neolithic to Norse habitation at Stove, and coastally eroding medieval site at Links Ness. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental

©ORCA 2021

Sites & Potential	Location	Mitigation
		analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Deposits below beach & in intertidal zone Moderate potential for such deposits	Bay of Stove landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench in the intertidal zone and at the beach, in order to manage the risk of impacting submerged palaeoenvironmental deposits below the beach. The conditions at the shallow muddy Bay of Stove indicates there is moderate potential for this, not so at Links Ness. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Marine sites (none identified)	Route 2.7 marine cable corridor	**Marine PAD**

6.2.6 Route 2.9: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites	Sands of Evie West Mainland landfall	**Avoidance of known sites, especially** the **stone pier and storehouse (M-R5 and M-R4), with 2-5m exclusion zone around these upstanding buildings** to prevent damage to structure or foundations. These are of local interest and are essentially at the BMH location. Avoid with exclusion zone to prevent damage to structure or foundations. **Full standing building recording** if not possible to avoid, and it is unlikely permission for demolition would be granted.
Known Sites	Westness Rousay landfall	**Avoidance of known sites**. **The Category B Listed building of Westness House and gardens** (**Site M-R 13**), will be avoided, including boundary walls around the grounds. The closest known sites to the BMH location are only 10-20m from it, comprising the farm (**Site M-R10**) and the putative location of the Viking burial (**Site M-R9**), where more burials may be present (see below).

©ORCA 2021

Sites & Potential	Location	Mitigation
Unknown sites onshore Moderate potential for significant unknown archaeological sites	Sands of Evie West Mainland landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench below MHWM, in order to manage the risk of impacting unknown archaeological sites. Moderate potential shown by evidence of prehistoric or early historic burial and sculptural fragments at the Sands (Sites M-R1 and M-R7). This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy.
Unknown sites onshore Moderate-High potential for significant unknown archaeological sites, especially Norse period burials at Westness	Westness Rousay landfall	It is recommended that above the MHWM the **trench and BMH are excavated archaeologically** due to the potential for the discovery of Norse period burials, demonstrated by the putative location of the Viking burial (**Site M-R9**), and the observation at the time that more burials may be present (see below). There is no point in attempting to move the BMH location because the whole landfall corridor width at this shoreline is equally sensitive, and would result in the same recommendation. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. If burials are present, the trenches will require extending to excavate the full burial to conform to guidance on the treatment of human remains, unless the cable can be laid over rather than through them. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the excavation identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Deposits below beach & in intertidal zone Moderate potential for such deposits	Sands of Evie & Westness landfalls	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench in the intertidal zone and at the beach, in order to manage the risk of impacting submerged palaeoenvironmental deposits below the beach. There is moderate potential for submerged peats to be present in the intertidal zone, evidenced by small peat 'pebbles' having been observed at the Sands of Evie, and by remains identified even below storm beaches along this part of the Rousay coastline. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental

©ORCA 2021

Sites & Potential	Location	Mitigation
		analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Marine sites (none identified)	Route 2.9 marine cable corridor	**Marine PAD**

6.2.7 Route 2.10: Specific Mitigations

No mitigations are necessary at the Sand of Heatherhouse, Mainland, landfall.

Sites & Potential	Location	Mitigation
Known Sites	Bay of Sandgarth, Shapinsay landfall	At the Bay of Sandgarth, the landfall and BMH location are at the edge of the kelping remains Site M-S6 and the potentially prehistoric Site M-S8, due to its unknown extent. However, the precise location of the BMH is at the south end of the farm track that terminates at the beach, which has cut through Sites M-S6 and M-S8. It **is therefore possible to avoid the visible remains sites** by locating the BMH at the south end of the farm track.
Unknown sites onshore Moderate-High potential for significant unknown archaeological sites	Bay of Sandgarth, Shapinsay landfall	**It is recommended that** that an **archaeological watching brief** is conducted during the excavation of the cable trench and BMH due to the potential for the discovery of evidence of the kelping industry and of potentially prehistoric remains relating to by Sites M-S6 and Site M-S8 below the end of the farm track. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy.

©ORCA 2021

Sites & Potential	Location	Mitigation
Deposits below beach & in intertidal zone Moderate potential for such deposits	Bay of Sandgarth, Shapinsay landfall	It is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench in the intertidal zone, in order to manage the risk of impacting submerged palaeoenvironmental deposits. The conditions at the shallow sandy Bay of Sandgarth indicates there is moderate potential for this, not so at Heatherhouse. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.
Marine sites (none identified)	Route 2.10 marine cable corridor	**Marine PAD**

6.2.8 Route 2.11: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites	Crockness, Hoy landfall	**Avoidance** of the Scheduled Monument of Crockness Martello Tower and its ditched enclosure (Site H-F 1) with **10m exclusion zone around scheduled boundary.** Site H-F 3, a linear feature seen on aerial photographs (not on the ground), could run close to the BMH. **Plot on the ground from aerial photos so can be avoided**. Watching brief as alternative that an **archaeological watching brief** is conducted during the excavation of the cable trench and BMH
Unknown sites onshore	Crockness, Hoy and Weddel Flotta landfalls	Potential for discovery of unknown sites is considered low-negligible, therefore **embedded mitigations only**
Deposits below beach & in intertidal zone	Crockness, Hoy and Weddel Flotta landfalls	Potential for discovery of unknown sites is considered low-negligible, therefore **embedded mitigations only**

©ORCA 2021

Sites & Potential	Location	Mitigation
Marine sites HMD Rose Valley Small ship's boiler and debris	Route 2.11 marine cable corridor	**Avoidance** of HMD *Rose Valley* with **exclusion zone of 40m** **Avoidance** small ship's boiler and associated debris with **20m exclusion zone** **Marine PAD**

6.2.9 Route 2.12: Specific Mitigations

Sites & Potential	Location	Mitigation
Known Sites	Pan Hope Flotta & Dam of Hoxa South Ronaldsay landfalls	**Avoidance** The ruined farmstead at Pan (Site F-SR20) and the dilapidated concrete pier (Site F-SR1) are at the proposed BMH location at Pan Hope. These can be managed by micro-siting to avoid them. There is an occupied house Site F-SR13 close to the proposed BMH location at Dam of Hoxa, which can easily be avoided.
Unknown sites onshore	Pan Hope Flotta & Dam of Hoxa South Ronaldsay landfalls	Potential for discovery of unknown sites is considered low-negligible, therefore **embedded mitigations only**
Deposits below beach & in intertidal zone	Dam of Hoxa South Ronaldsay landfall	There is potential for discovery of submerged deposits in the intertidal zone and below the storm beach at Dam of Hoxa, not so at Pan Hope. Therefore, it is recommended that an **archaeological watching brief** is conducted during the excavation of the cable trench through the intertidal zone and storm beach at the Dam of Hoxa, in order to manage the risk of impacting submerged palaeoenvironmental deposits. This work will allow for opportunity for appropriate recording and excavation of any unknown sub-surface archaeological features. If necessary, works may be called to a temporary halt where appropriate to retrieve any archaeological and environmental data, artefacts, and any other appropriate remains including carbonised deposits suitable for radiocarbon dating and environmental analysis. Procurement of radiocarbon dates would only be carried out if any appropriate material was retrieved, with specialist analysis of any appropriate material and reporting on the work forming part of this mitigation. Should the watching brief identify significant archaeological remains, discussions will be held between the developer, contractor and the Orkney Islands Council Planning Archaeologist to develop an appropriate strategy, which may include diverting the route around the site.

©ORCA 2021

Sites & Potential	Location	Mitigation
Marine sites UB116 & Unknown 6 Unknown 5 Weights, mine anchors and anchors for boom nets	Route 2.12 marine cable corridor	**Avoidance** of UB116 & Unknown 6 with **exclusion zone of 50m** **Avoidance** Unknown 5 with **30m exclusion zone** **Marine PAD** An **ROV survey** along the route would determine if the contacts were rocks or anchors. Weights and anchors from wartime defences are of no real historic value and would not suffer from the proximity of the cable. Therefore if ROV survey not required for cable-laying purposes, no need to conduct one for archaeological purposes.

©ORCA 2021

6.3 Effect

The mitigation and management strategies outlined in Section 6.2 above will reduce or eliminate any significant impacts on historic environment assets in the marine corridors and at landfall in the Orkney geographical area (see Appendix 2 for tabular assessment). The implementation of these strategies result in there being no or negligible effects on most known historic environment assets, and a potential minor significance of effect on some known and any unknown assets or deposits at landfall, as summarised in Table 5.

Table 5: Summary of Effects

Receptor	Importance	Potential Impact	Mitigation / Management	Significance of Effect
Known marine historic environment assets	Low-High		DBA and marine geophysical survey datasets review conducted. Avoidance, with exclusion zones. Marine PAD	None / Negligible / Minor
Unknown marine assets	Low-High		DBA and marine geophysical survey datasets review conducted. Marine PAD	Minor
Known onshore historic environment assets	Low – High	Abrasion/disturbance/ penetration of intertidal and onshore ground deposits	DBA and walkover survey conducted. Avoidance. Construction and ancillary works will avoid known assets, with exclusion zones imposed around any assets. Project contractors will be informed of sensitive locations of any sites nearby. Archaeological watching brief close to some known sites. Archaeological excavation of trench and BMH where landfall is at a known site. On completion of the cable burial the beach and onshore profile will be restored.	None / Negligible / Minor
Unknown intertidal and onshore assets	Low – High	Abrasion/disturbance/ penetration of intertidal and onshore ground	Walkover survey conducted to identify any unknown assets visible on the surface. Archaeological watching brief. Archaeological excavation of trench and BMH where likelihood of impact is high. Archaeologically monitor intertidal landfall and cable trenches so that any sediments with paleoenvironmental potential are noted, sampled, analysed and reported. Implementation of WSI and PAD On completion of the cable burial the beach and onshore profile will be restored.	Minor
Unknown cultural material	Low – High	Abrasion/disturbance/ penetration of seabed, intertidal and onshore ground	Implementation of onshore and marine PADs	Minor

7 Bibliography

Bates, M.R., Nayling, N., Bates, R., Dawson, S., Huws, D. and Wickham-Jones, C. 2013. 'A Multi-Disciplinary Approach to the Archaeological Investigation of a Bedrock-Dominated Shallow-Marine Landscape: an example from the Bay of Firth, Orkney, UK.' *The International Journal of Nautical Archaeology* 42:24-43.

Bell, S. 2021. *SHEPD Cable Replacement Wayleaves. Eday, Sanday and Westray, Orkney. Walkover Survey Data Structure Report*. Unpublished ORCA Archaeology Report (Project 896).

CIfA (Chartered Institute of Field Archaeologists). 2014a. *Standards and guidance for historic environment desk-based assessment. Updated 2020.* Accessed at: CIfAS&GDBA_4.pdf (archaeologists.net).

CIfA. 2014b. *Standards and guidance for archaeological field evaluation.* Updated 2020. Accessed at: CIfAS&GFieldevaluation_3.pdf (archaeologists.net)

de la Vega-Leinert, A.C., Keen, D.H. and Jones, R.L., Wells, J.M. and Smith, D.E. 2000. 'Mid-Holocene environmental changes in the bay of Skaill, Mainland Orkney, Scotland: an integrated geomorphological, sedimentological and stratigraphical study.' *Journal of Quaternary Science*. 15(5):509-528.

de la Vega Leinert, A.C., Smith, D.E. and Jones, R.L., 2012. 'Holocene coastal barrier development at Bay of Carness, Mainland Island, Orkney, Scotland.' *Scottish Geographical Journal*, 128(2):119-147.

Heath/Ferguson private wreck database, which contains material not published by Ferguson (see Ferguson, 2002) and has been added to by Heath and Ferguson as new discoveries of wreck sites have been made.

Historic Environment Scotland (HES). 2016. *Managing Change in the Historic Environment guidance series: Setting*. (Updated 2020.) Edinburgh: HES.

Kaland, S. 1993. 'The settlement of Westness, Rousay', in Batey, C E, Jesch, J and Morris, C D, *The Viking age in Caithness, Orkney and the North Atlantic*. Page(s): 308-11. Edinburgh: Edinburgh University Press.

Keatinge, T.H. and Dickson, J.H. 1979. 'Mid-Flandrian changes in vegetation on Mainland Orkney.' *New Phytologist* 82:585-612.

Lamb, R. 1984. *The archaeological sites and monuments of Eday and Stronsay, Orkney Islands Area.* The archaeological sites and monuments of Scotland series no 23. Edinburgh: RCAHMS.

Larn, R., & Larn, B., (1998). *The Ship Wreck Index of Great Britain & Ireland Vol.4 Scotland*. London: Lloyds Register of Shipping;

Marwick, H. 1923. 'Antiquarian notes on Sanday', *Proc Orkney Antiq Soc*, vol. 1, 1922-3: p 26.

Marwick, H. 1927. *The archaeological sites and monuments of Eday and Stronsay, Orkney Islands Area, The archaeological sites and monuments of Scotland series no 23*. Edinburgh: 30

Plets, R., Dix, J., & Bates, R. (2013). *Marine Geophysics Data Acquisition, Processing and Interpretation: Guidance Notes*. Swindon: English Heritage Publishing.

Ridley, G. 1992. *Dive Scotland Vol III: The Northern Isles and East Coast*. Middlesex: Underwater World Publications.

Stell, G. 2010. *Orkney at War: Defending Scapa Flow. Vol 1 World War I*. Kirkwall: The Orcadian.

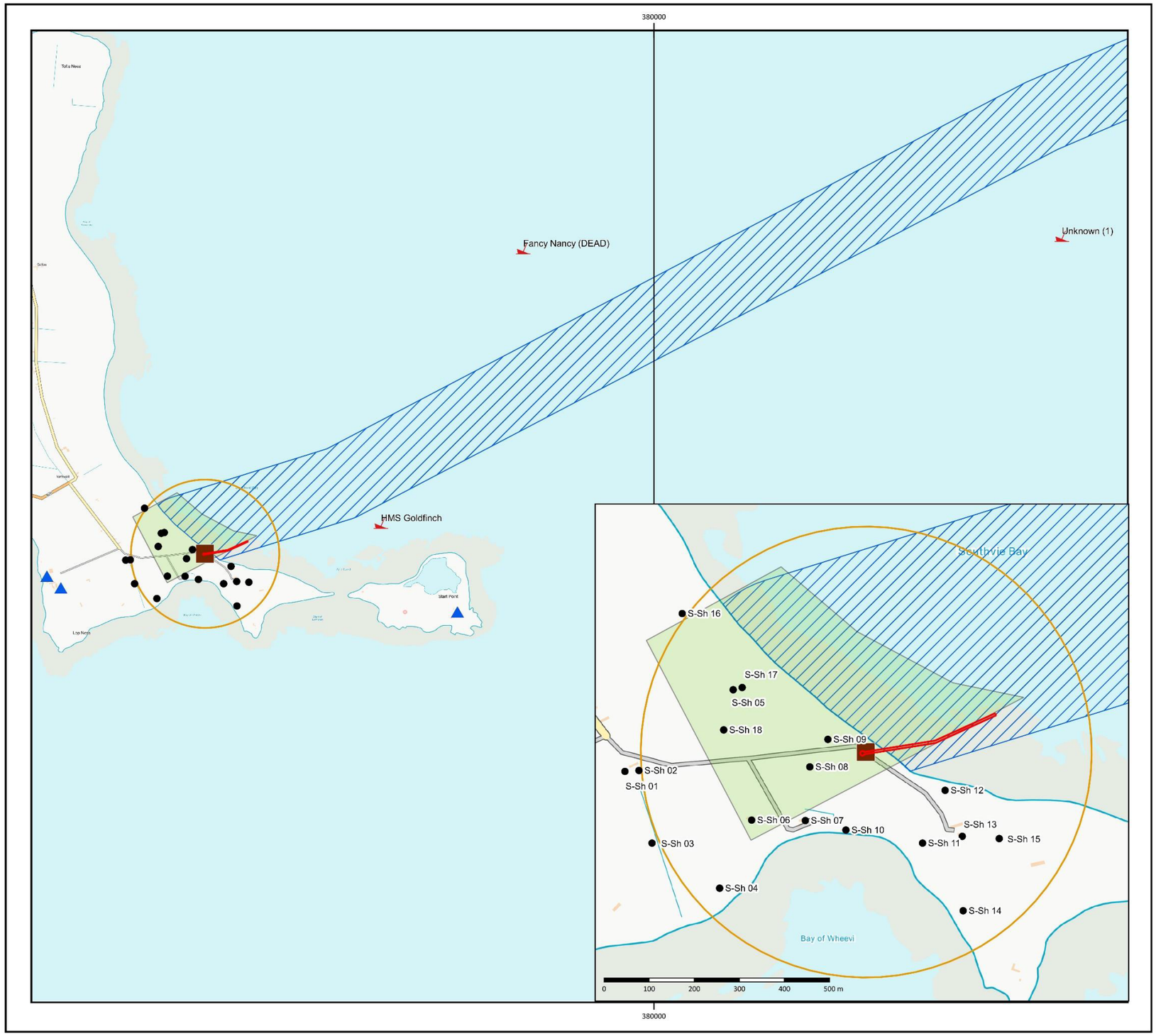
Timpany, S., Crone, A., Hamilton, D. and Sharpe, M., 2017. 'Revealed by Waves: A Stratigraphic, Palaeoecological, and Dendrochronological Investigation of a Prehistoric Oak Timber and Intertidal Peats, Bay of Ireland, West Mainland, Orkney.' *The Journal of Island and Coastal Archaeology*, 12(4):515-539.

Traill, W. 1868. 'On submarine forest and remains of indigenous wood in Orkney.' *Transactions of the Botanical Society of Edinburgh* 9:146-154.

Traill Dennison, W. 1893. 'On the encroachments of the sea and the subsidence of land, as seen in the Island of Sanday.' *Saga Book of the Viking Club* 1:74-89.

Whittaker, I.G., (1998). *Off Scotland: a comprehensive record of maritime and aviation losses in Scottish waters*. Edinburgh: C-Anne Publishing;

8 Figures



SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.3 Shetland - Sanday

Drawing No: 907 Route 2_3 Scuthvie Bay	**A**

Legend

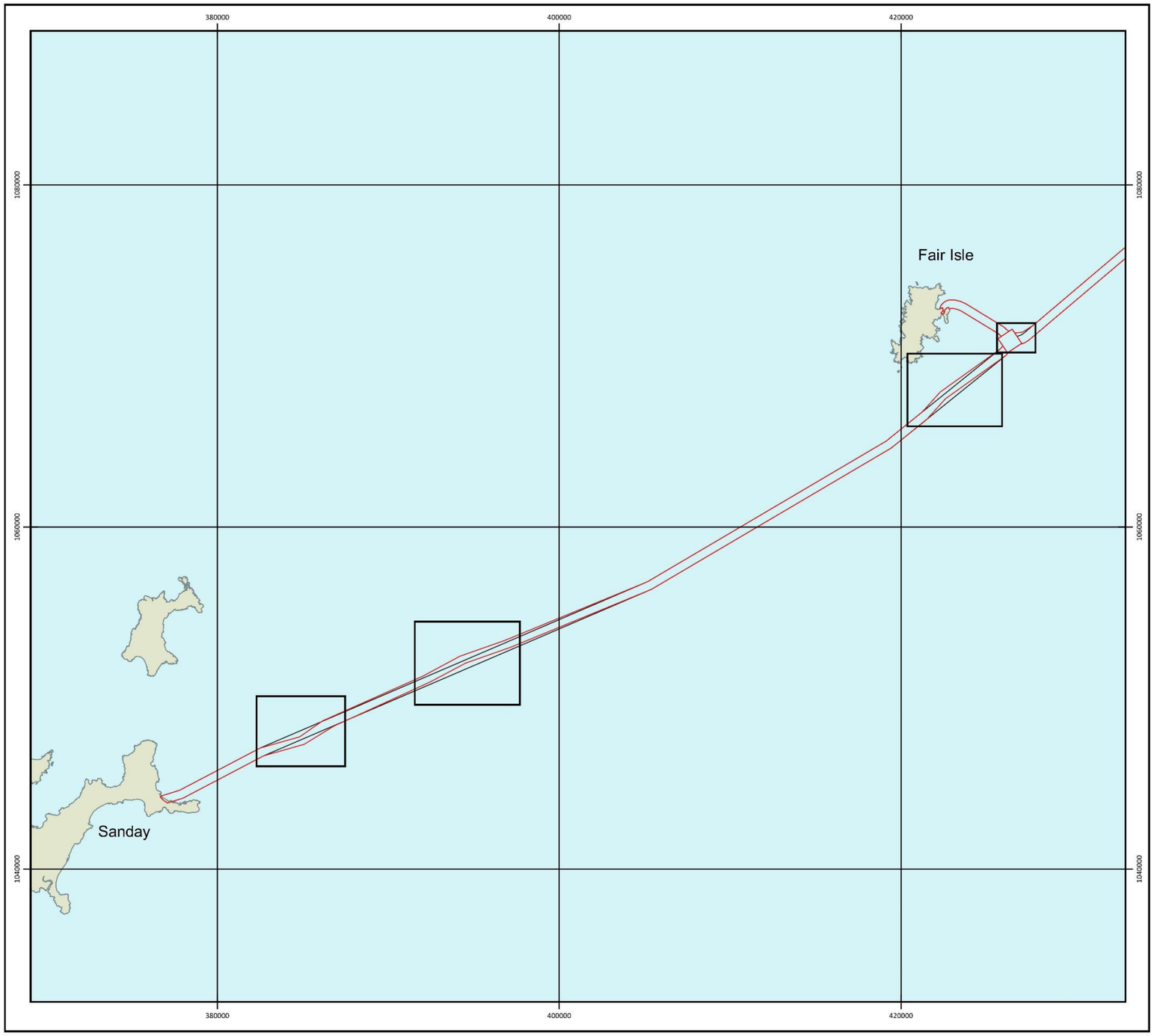
- Wrecks with Verified Locations
- ORCA Sites
- B Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- Onshore Planning Boundaries_v3
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4

NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021
All rights reserved.



SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

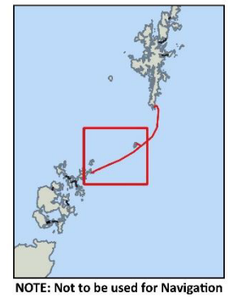
HEA 2.03b Sanday - Shetland

Drawing No: 907 Route 2_3 Variations	A

Legend

N W E S

Areas of deviation between original and revised route for corridor 2.03



NOTE: Not to be used for Navigation

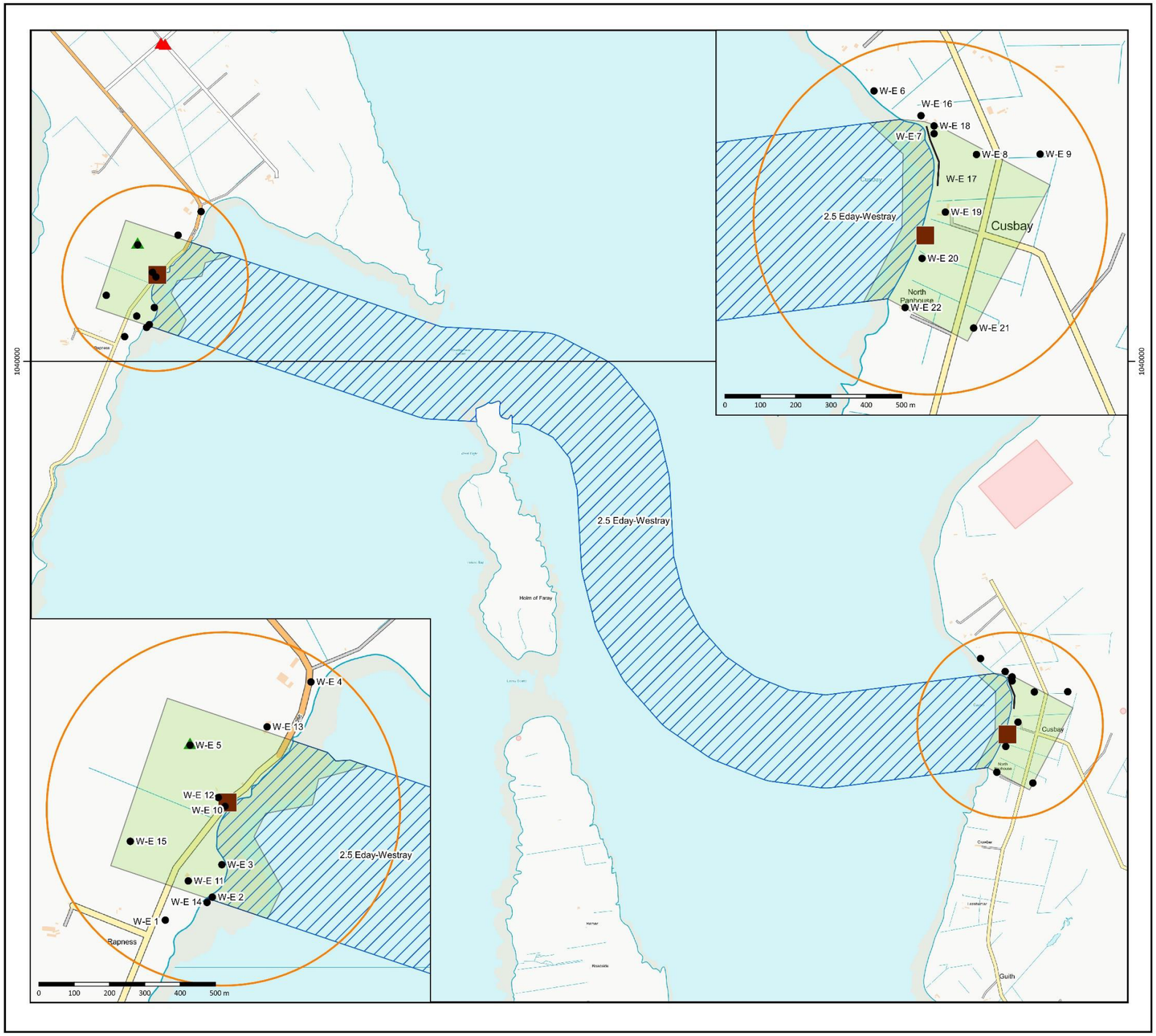
Date	05/November/
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Marine Surveys.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 2 4 6 8 10 km

© Metoc Ltd, 2021
All rights reserved.

©ORCA 2021



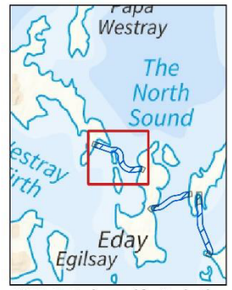
SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.5 Eday - Westray

Drawing No: 907 Route 2_5	**A**

Legend

- ORCA Sites
- ORCA Linear Sites
- A
- C Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4



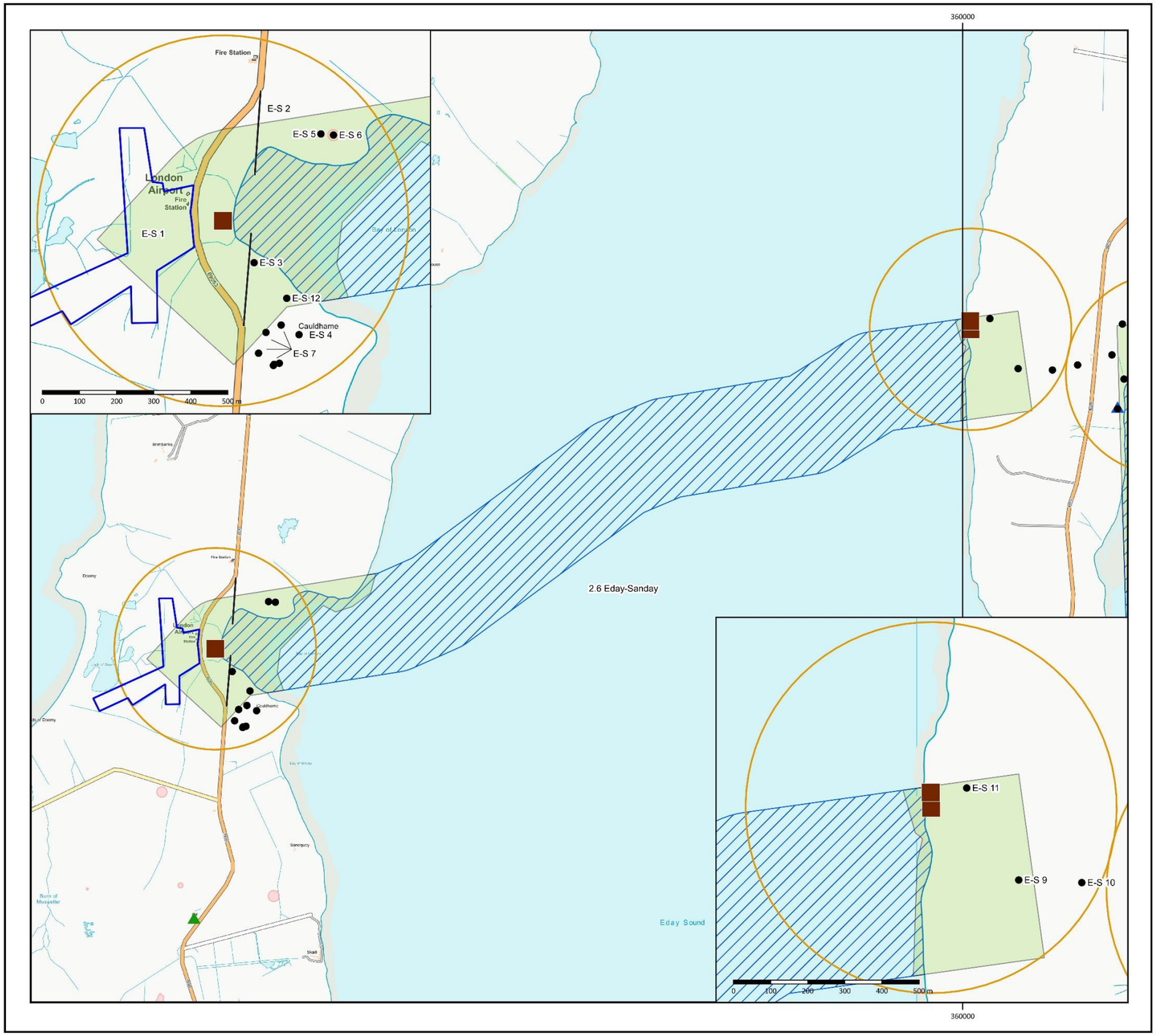
NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021
All rights reserved.



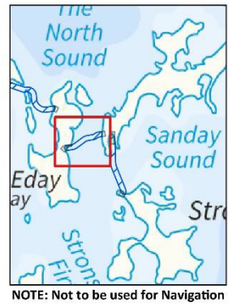
SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.6 Eday - Sanday

Drawing No: 907 Route 2_6	**A**

Legend

- ORCA Sites
- ORCA Linear Sites
- 907 Area Sites
- B Category Listed Building
- C Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4



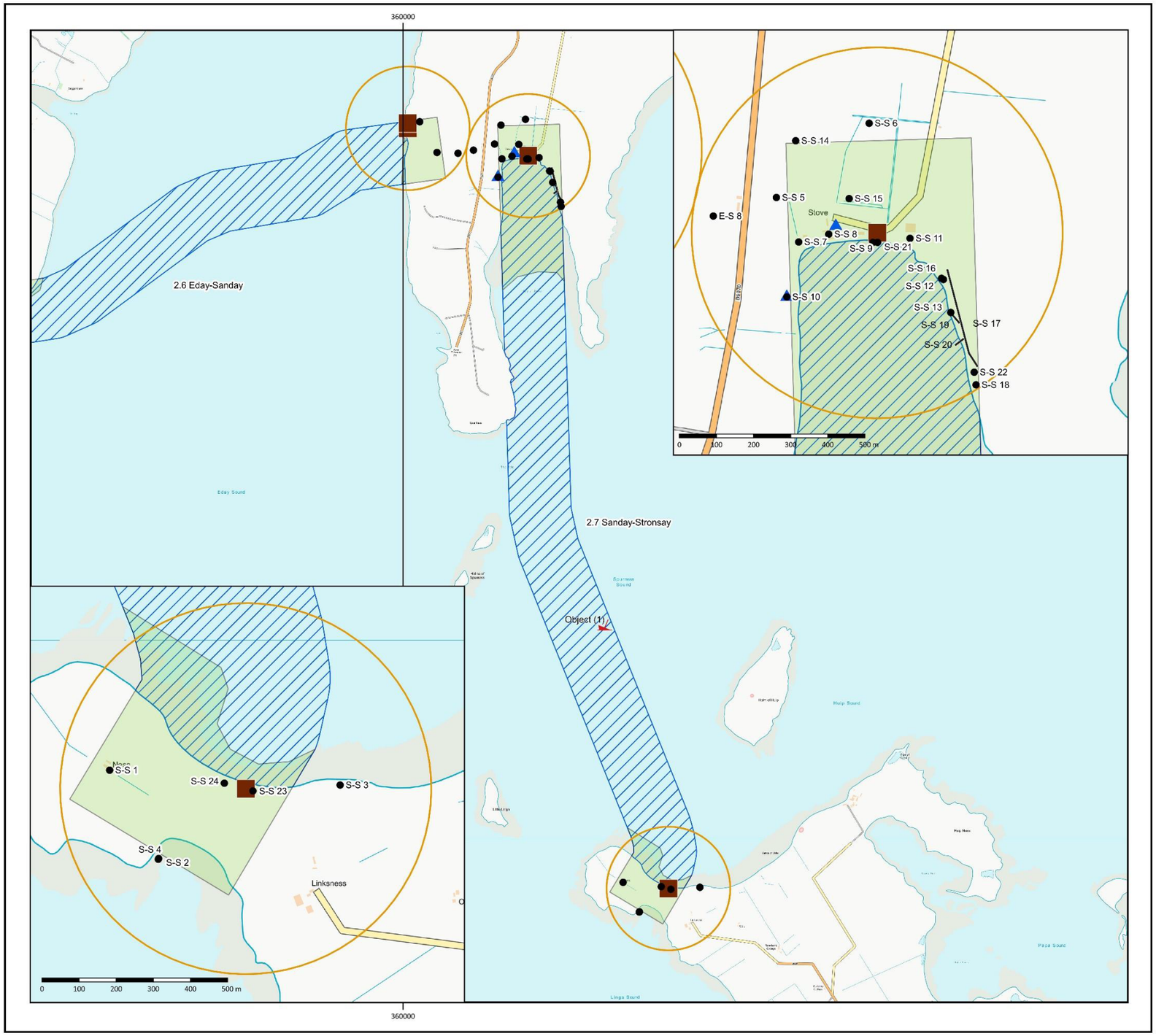
NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021
All rights reserved.



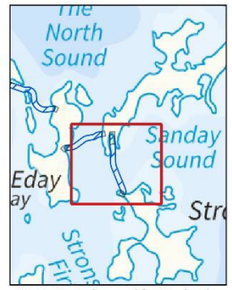
SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.7 Sanday - Stronsay

Drawing No: 907 Route 2_7	A

Legend

- Wrecks with Verified Locations
- ORCA Linear Sites
- B Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4



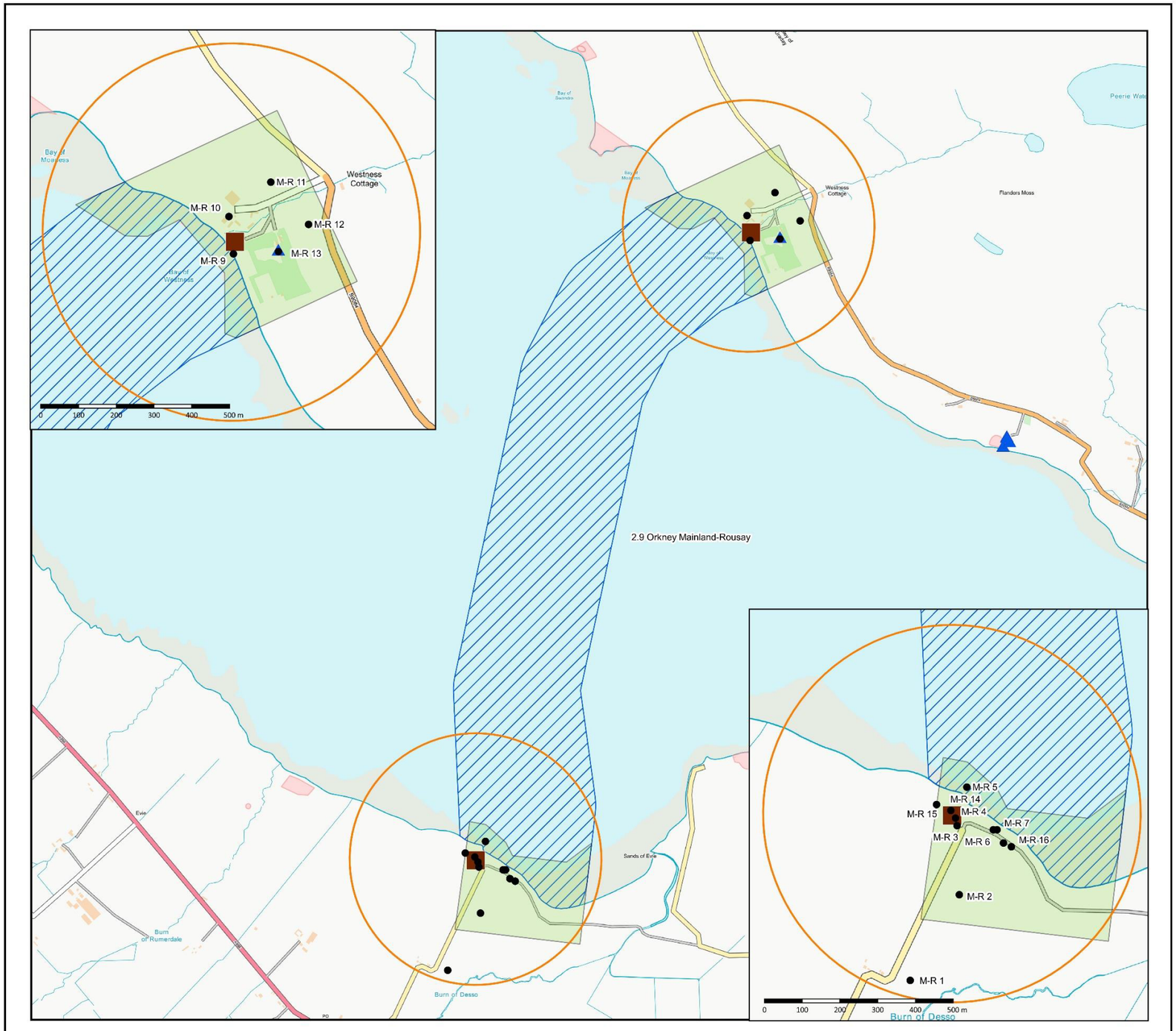
NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021
All rights reserved.



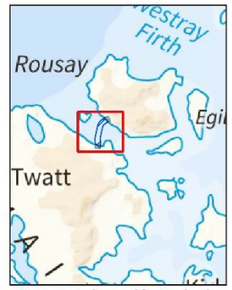
SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.9 Mainland - Rousay

Drawing No: 907 Route 2_9	**A**

Legend

- ORCA Sites
- B Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4



NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021 All rights reserved.

SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.10 Mainland - Shapinsay

Drawing No: 907 Route 2_10	**A**

Legend

N W E S

- ORCA Sites
- B Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4

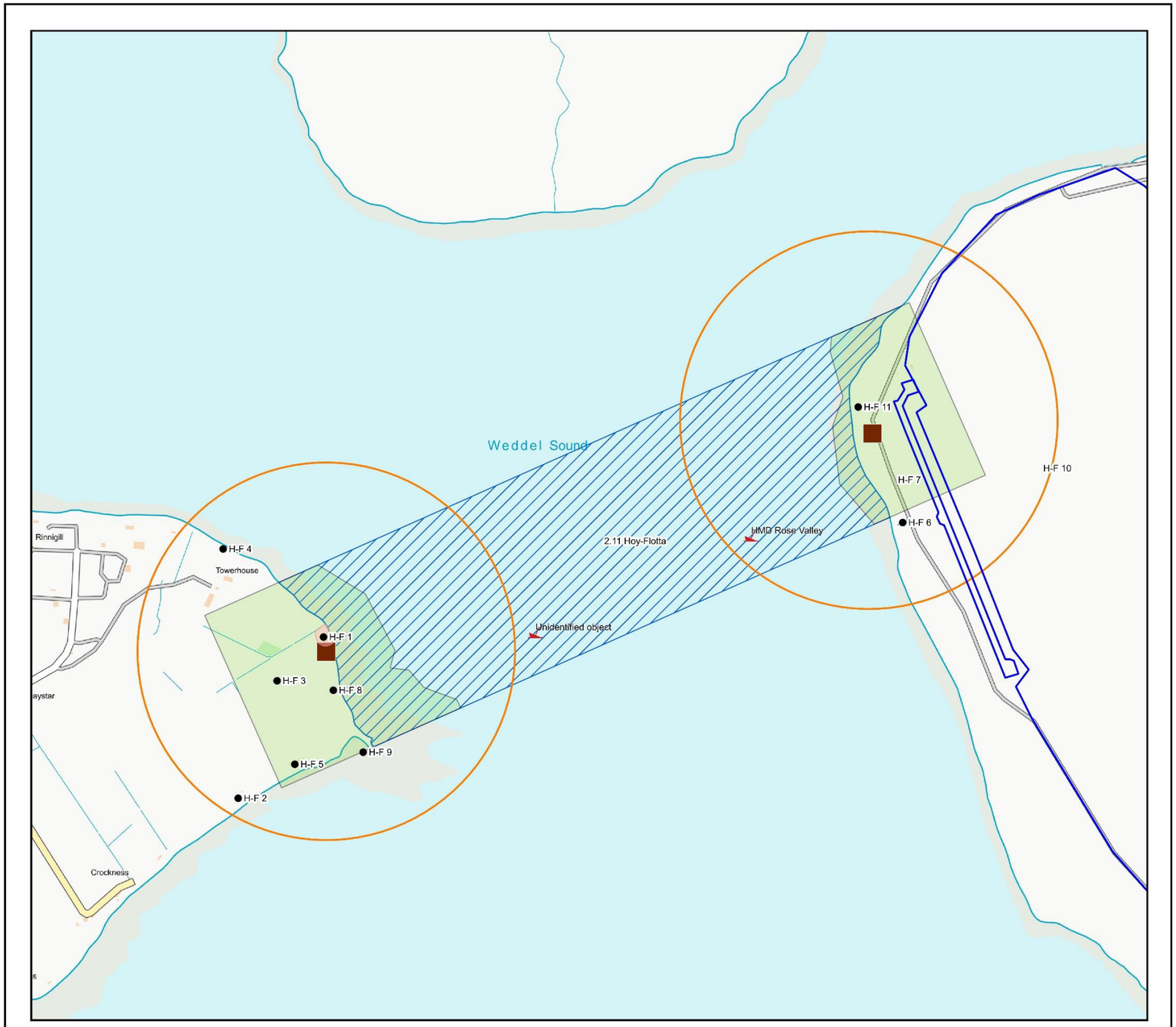
NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021
All rights reserved.



SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.11 Hoy - Flotta

Drawing No: 907 Route 2_11	**A**

Legend

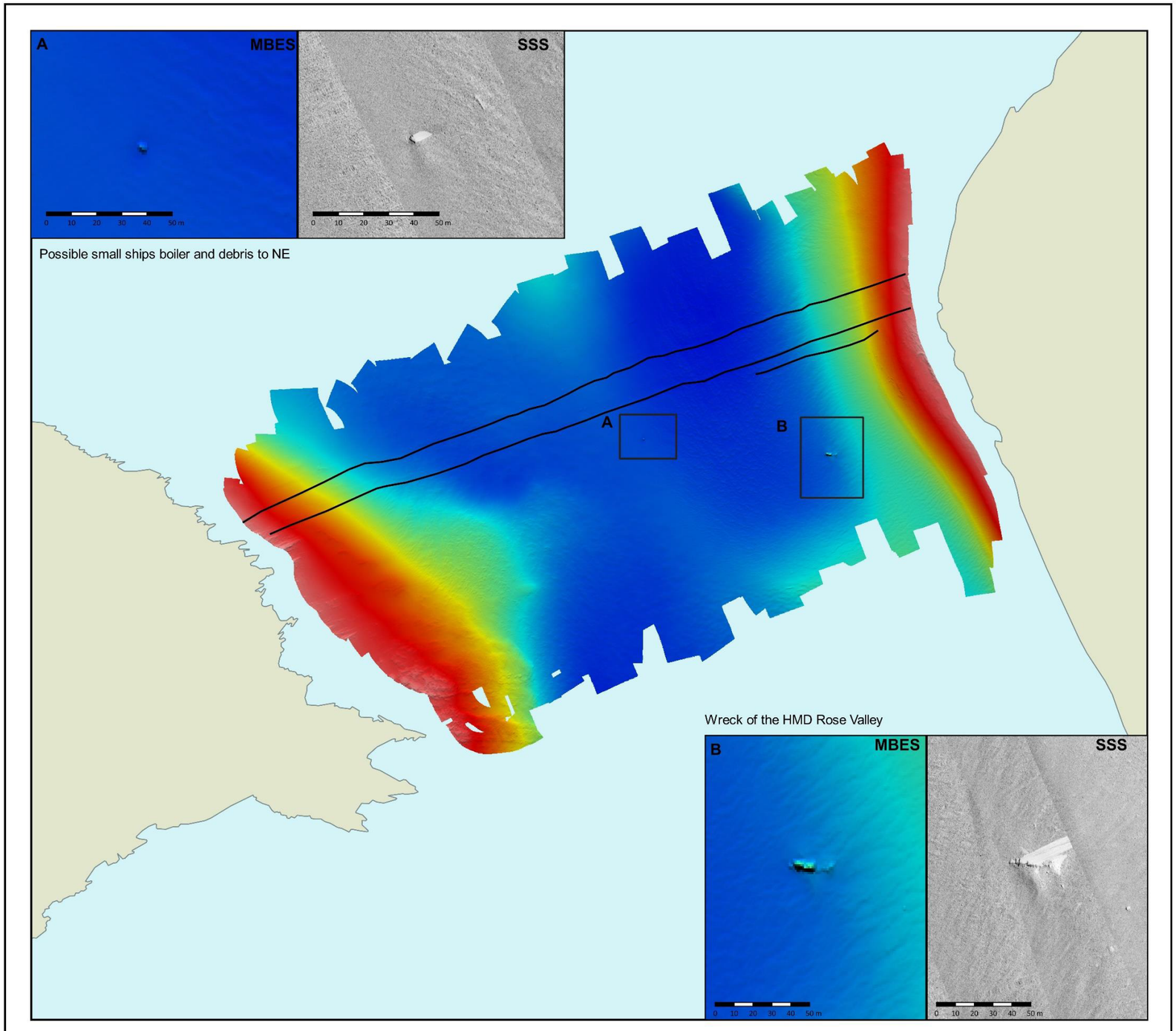
- Wrecks with Verified Locations
- ORCA Sites
- ORCA Area Sites
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4

NOTE: Not to be used for Navigation

Date	11/January/2022
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

0 0.1 0.2 0.3 0.4 0.5 km

© Metoc Ltd, 2022
All rights reserved.



SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.11b Hoy - Flotta

Drawing No: 907 Route 2_11 Marine Geophysics	A

Legend

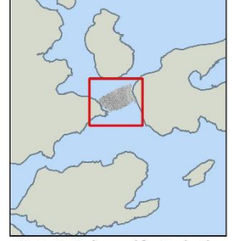
Hoy - Flotta Water Pipes

MBES Gradient

Shallow

Deep

N W E S



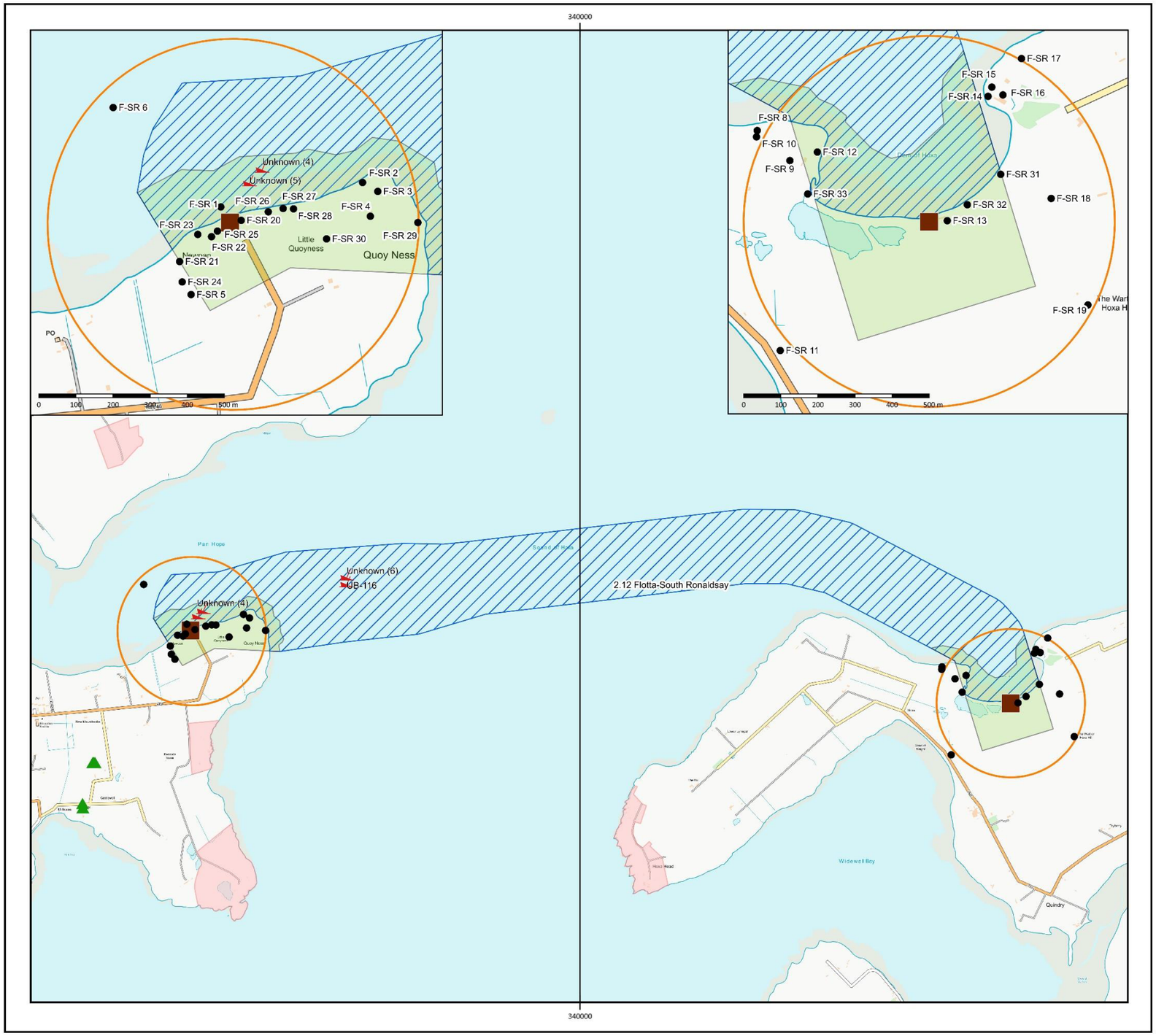
NOTE: Not to be used for Navigation

Date	05/November/
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Marine Surveys.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 100 200 300 400 m

© Metoc Ltd, 2021
All rights reserved.



SCOTTISH ISLES FIBRE OPTIC CABLE PROJECT

HEA 2.9 Flotta - South Ronaldsay

Drawing No: 907 Route 2_12	A

Legend

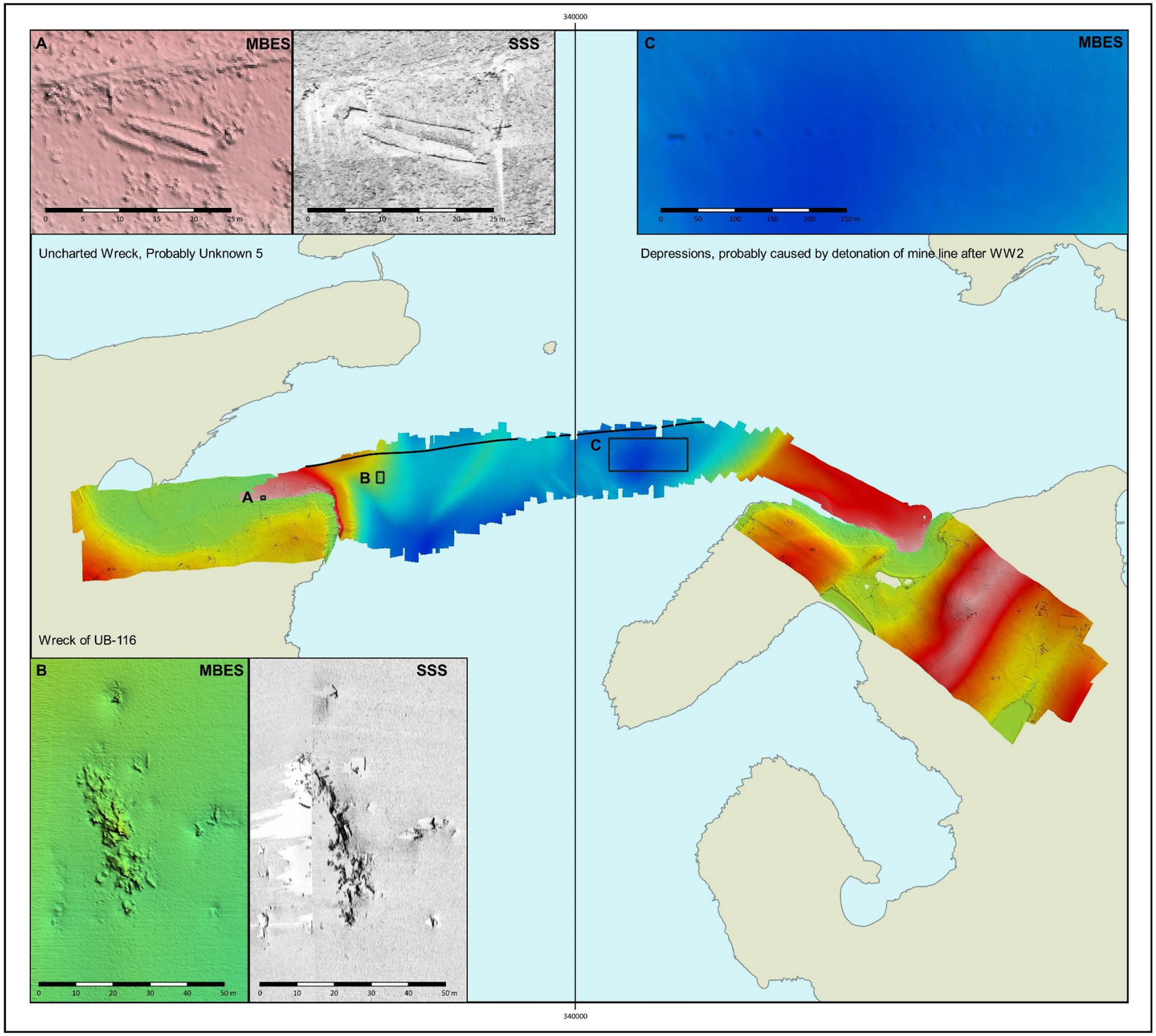
- Wrecks with Verified Locations
- ORCA Sites
- C Category Listed Building
- Scheduled Monuments
- BMH Update 20211012
- BMH 500m Radius Buffer Study Area 20210811
- Landfall Corridor & Walkover Survey Area
- R100 Marine Application Corridors 20210719 v4

NOTE: Not to be used for Navigation

Date	16/November/2021
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Base Map.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

0 0.25 0.5 0.75 1 km

© Metoc Ltd, 2021
All rights reserved.



SCOTTISH ISLES
FIBRE OPTIC CABLE PROJECT

HEA 2.12b Flotta - South Ronaldsay

Drawing No: 907 Route 2_12 Marine Geophysics	A

N
W E
S

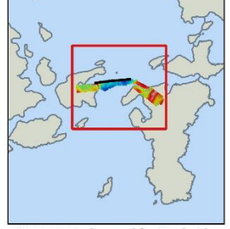
Legend

Flotta Oil Pipeline

MBES Gradient

Shallow

Deep



NOTE: Not to be used for Navigation

Date	05/November/
Coordinate System	OSGB 1936 / British National Grid
Projection	Transverse Mercator
Datum	OSGB 1936
Data Source	OS, HES, ORCA, Intertek
File Reference	C:\Users\OR01CB\University of the Highlands and Islands\OC ORCA - 907 GIS\Base Maps\907 Marine Surveys.qgz
Created By	[redacted]
Reviewed By	[redacted]
Approved By	

BT Global Marine intertek

0 0.5 1 1.5 2 km

© Metoc Ltd, 2021
All rights reserved.

9 Appendices

9.1 Appendix 1: Gazetteers of Sites

Appendix 1: Route 2.3 Gazetteers

Table A 1.1: Gazetteer of sites identified within the onshore 500m radius buffer study area, Scuthvie Bay, Sanday, Route 2.3 (**See Figure HEA 2.3)**.

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
S-Sh 01	Thrave	Treb Dyke	376440	1043859	3592	-	-	-	Location of a denuded treb dyke.	Bronze Age	Low-Medium	Mostly ploughed out. Possible faint traces noted in 2008 evaluation
S-Sh 02	Thrave Steading	Farmstead	376471	1043861	116653	-	-	-	Farmstead of two ranges with associated walled vegetable plots or animal pens. Traditional vernacular construction and design.	Post-medieval	Low	Traditional vernacular construction and design.
S-Sh 03	Scofferland	Chapel	376500	1043700	3586	-	-	-	An 'Old Chapl' is shown on Aberdeen's map of 1760. Precise location unknown.	Medieval	Uncertain	Precise location unknown. If found, likely to be at least of Medium importance
S-Sh 04	Scofferland	Mound	376650	1043600	306669	-	-	-	An amorphous mound with some exposure of walling on one side.	Prehistoric/ Medieval/ Post-medieval	Uncertain	-
S-Sh 05	Crue-Marron-Deme	Mound	376680	1044040	3589	-	-	-	Location of a high and prominent mound which is now obscured by surrounding sand dunes.	Prehistoric/ Medieval	Uncertain	Could not be located during walkover
S-Sh 06	Scofferland Steading	Farmstead	376721	1043751	112842	-	-	-	Linear range of buildings and an outbuilding with enclosures extending down to the shoreline. The farmstead is of traditional design and construction, and is now in a state of disrepair.	Post-medieval	Low	Traditional vernacular construction and design. The majority of the buildings are roofless but walls mostly stand to full height. Lintels and fireplaces survive as do some wooden fixtures.
S-Sh 07	Northwall	Fish House, Wind Generator	376840	1043750	192032	-	-	-	No further information	Post-medieval	Low	Not visited in walkover as currently occupied
S-Sh 08	Scofferland	Military Installation, Gun Emplacement	376850	1043869	183053	-	-	-	The base of a military building, radio mast bases and an emplacement for an AA battery are visible on air photographs.	Modern	Low	Part of WW2 defences. Survives as earthworks, crop marks and concrete pads. The site is now very rough and overgrown, a circular bank likely to be the gun emplacement is visible together with a smaller circular bank and a concrete platform. Additional remains may be concealed within a rough undulating area of c. 70m x 70m
S-Sh 09	Scuthvie Bay	Planticrub / gun emplacement	376890	1043930	306652	-	-	-	A ruinous circular drystone crubh, 4.5m in diameter. Possibly also used as a gun emplacement.	Post-medieval	Low-Negligible	As described. Contains two small orthostats and a large orthostat is located adjacent to the entrance
S-Sh 10	Bay of Wheevi	Noust	376930	1043729	306668	-	-	-	A passage cleared for landing boats leads to a berm which may be the site of a noust.	Medieval/ Post-medieval	Low	Age uncertain
S-Sh 11	Park	Chapel	377100	1043700	3587	-	-	-	An 'old church' is marked on Aberdeen's map of 1760. Site now occupied by farm buildings.	Medieval	Uncertain	Precise location unknown. If found, likely to be at least of Medium importance
S-Sh 12	Park	Shell Midden, Walling	377150	1043817	306654	-	-	-	Shell and stone deposits with some masonry are visible in coastal exposures. More fragmentary remains are visible further inland.	Prehistoric/ Medieval	Uncertain	-
S-Sh 13	Park	Earthwork	377188	1043715	307016	-	-	-	An earth and stone dyke, 4m in width and 1.5m high, running across the peninsular.	Prehistoric	Medium	Possibly prehistoric boundary
S-Sh 14	Park	Settlement	377190	1043550	3598	-	-	-	A series of low knolls, known locally as 'Pict's Houses'. No longer visible.	Prehistoric	Low - Medium	Though no longer visible above ground, may survive below plough soil

©ORCA 2021

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
S-Sh 15	Park	Burnt Mound	377270	1043710	3582	-	-	-	An amorphous ploughed-down, burnt mound	Prehistoric (?Bronze Age)	Low-Medium	Damaged and denuded by ploughing
S-Sh 16	N/A	Sand pit	376567	1044209	-	-	-	-	An area of sand extraction apparent as a series of depressions at the edge of a field adjacent to sand dunes (30m x 20m). Modern but short remnants of possible bounding dykes may suggest earlier activity	Post-medieval/ Modern	Low	-
S-Sh 17	N/A	Wall	376700	1044045	-	-	-	-	A corner section of walling exposed within a grassy field (1m x 1m, 0.3m). Likely to have been part of a rectangular structure but character unclear, also uncertain if there are further remains below the surface	Uncertain	Low	-
S-Sh 18	N/A	Mound	376659	1043951	-	-	-	-	A low sub-oval mound with flat top with several depressions on the surface and 2-3 earthfast stones. Characteristic of prehistoric archaeology but could also be natural	Prehistoric	Low - Medium	-

Table A 1.2: Gazetteer of marine sites identified within the Orkney Waters section of Route 2.3 (**See Figure HEA 2.3)**.

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason
HMS Goldfinch	487	102159	H Class Destroyer. Steel. 747 tons. 75.3m x 7.6m x 2.7m. All crew saved.	Stranded in fog. Sold for scrap 1920. All crew saved	19/02/1915	59 16,973N	02 23,102W	1,2,3,4,5,6,7	Low-Medium	WW1 interest but has been broken up for scrap. Usually some evidence of scrapping remains on seabed.
Ann	-	269271	Brig of Newcastle. Wood. 250 tons. Cargo of wood	Wrecked to the N of Start Point, Sanday	28/02/1813	-	-	1,3,5	Medium	Age
Frederic Eugene	-	228281	French Barque. Wood. 546 tons. Hernosand to Brazil. Cargo of deals, battens, iron tubes	Stranded Toftsness, Sanday.	24/06/1891	-	-	1,2,3,4, 5	Low	Common vessel & cargo of low interest.
Fancy Nancy (DEAD)	518	321266	Wooden Fishing Vessel.	Foundered, crew saved	11/12/1991	59 17,973N	02 22,103W	4,5,6	Negligible	Modern vessel of low interest
Unknown (1)	74401	330819	MBES contact 36.4m x 8.7m x 0.7m	-	-	59 18,028N	02 18,279W	3,5,6	Unknown	Unknown

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

©ORCA 2021

Appendix 1: Route 2.5 Gazetteers

Table A 1.3: Gazetteer of sites identified within the onshore 500m radius buffer study area, Whale Geo, Westray, Route 2.5 (See Figure HEA 2.5)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
W-E 1	Claybraes	Burnt Mounds	350628	1040134	3237	-	-	-	Two burnt mounds, close to the roadway and denuded by ploughing.	Prehistoric (?Bronze Age)	Low	Possible traces may survive
W-E 2	Whitelet	Structures	350761	1040199	296177	-	-	-	The remains of a sub-rectangular masonry structure and sub-circular earthwork enclosures were exposed by coastal erosion in the 1990s. Regarded as almost totally lost in 2015.	Prehistoric/Medieval	-Low	Possible traces may survive. Not located, but could be related to Site W-E 14
W-E 3	Sands Of Helzie	Nousts	350788	1040291	296231	-	-	-	Three nousts at the head of the beach.	Medieval/ Post-medieval	Low	Minor architectural interest. As described
W-E 4	Sands Of Woo	Nousts	351040	1040808	3241	-	-	-	Eight nousts in three discrete groups.	Medieval/ Post-medieval	Low	Minor architectural interest. As described
W-E 5	Helzie	Windmill	350698	1040629	3231	-	LB 47995	-	Stump of a post-windmill dating from the 18th or early 19th century.	Post-medieval	Medium	Category C Listed Building.
W-E 10	-	Culvert	343673	1027521	-	-	-	-	Stone built culvert running beneath road to the shore. Associated with farmstead at Helzie (Site W-E 12)	Post-medieval	Negligible	-
W-E 11	Whitelet	Farmstead	350693	1040245	-	-	-	-	Cluster of renovated traditional stone buildings	Post-medieval	Low	-
W-E 12	Helzie	Farmstead	350778	1040481	-	-	-	-	Cluster of traditional stone buildings, two with corrugated shed roofs, 1 roofless	Post-medieval	Low	-
W-E 13	Sulland	Farmstead	350916	1040681	-	-	-	-	Cluster of ruinous traditional stone buildings	Post-medieval	Low	-
W-E 14	-	Stone spread	350746	1040184	-	-	-	-	A spread of horizontal slabs within the coastal section. No obvious structural form, perhaps a dump or infilling deposit. Could be related to Site W-E 2	Prehistoric/ Medieval	Negligible - Low	-
W-E 15	-	Trig point	350529	1040357	-	-	-	-	Ordnance Survey trig point	Post-medieval	Negligible	-

©ORCA 2021

Table A 1.4: Gazetteer of sites identified within the onshore 500m radius buffer study area, Cusbay, Eday, Route 2.5 (See Figure HEA 2.5)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
W-E 6	North House	Croft	355240	1038399	182005	-	-	-	A group of three buildings shown on the 1st Edition OS map.	Post-medieval	Negligible - Low	Minor historic or architectural interest.
W-E 7	Mucklehouse	Croft	355410	1038278	182006	-	-	-	A single building and a well shown on the 1st Edition OS map. The building is now roofless.	Post-medieval	Negligible - Low	Minor historic or architectural interest.
W-E 8	Mucklehouse	Structure	355530	1038219	182007	-	-	-	An unroofed structure shown on the 1st Edition OS map. No longer extant.	Post-medieval	Negligible	No longer extant
W-E 9	Gairhouse	Structure	355710	1038220	182008	-	-	-	An unroofed structure shown on the 1st Edition OS map. No longer extant.	Post-medieval	Negligible	No longer extant
W-E 16	-	Farmstead	355373	1038329	-	-	-	-	Two ruinous stone buildings (one roofed, the other unroofed) and two enclosures just above shore. Marked on the OS first edition	Post-medieval	Low	-
W-E 17	-	Dyke	355389 355399 355424 355420	1038297 1028260 1038198 1038132	-	-	-	-	Ruinous drystone dyke at top of shore, survives in small sections	Post-medieval	Negligible	-
W-E 18	Mucklehouse	Structure	355410	1038300	-	-	-	-	Single stone built roofed structure, probably associated with Site W-E 8. Marked on the OS First edition	Post-medieval	Low	-
W-E 19	South House	Farmstead	355442	1038056	-	-	-	-	Farmstead including traditional stone buildings. Marked on the OS first edition	Post-medieval	Low	Occupied site, not visited
W-E 20	-	Enclosures	355376	1037925	-	-	-	-	Two adjacent stone enclosures parallel to the shore, probably associated with site W-E 19. Marked on the OS first edition	Post-medieval	Negligible	-
W-E 21	-	Stone piles	355522	1037728	-	-	-	-	Two irregular piles of stone. Probable clearance or demolition debris. Probably modern	Modern	Negligible	-
W-E 22	-	Farmstead	355328	1037786	-	-	-	-	Farmstead including traditional stone buildings. Marked on the OS first edition	Post-medieval	Low	-

Table A 1.5: Gazetteer of marine sites identified within marine corridor of Route 2.5 (**See Figure HEA 2**.5).

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason
Unknown (2)	-	327905 & 228017	Lugsail, wood, 2 tons. Capt. Allan	Foundered off Pharary Island	22/10/1887	-	-	1,2,5	Low	Common type,
Hope PD 366	-	269600	Peterhead Steam Trawler, steel, 185 tons	Foundered on Faray.	29/12/1908	-	-	1,3,4,5	Low	Common vessel, cargo of low interest

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

©ORCA 2021

Appendix 1: Route 2.6 Gazetteers

Table A 1.6: Gazetteer of sites identified within the onshore 500m radius buffer study area, Bay of London, Eday, Route 2.6 (See Figure HEA 2.6)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
E-S 1	London Airport	Airport	356152	1034085	353354	-	-	-	20th-century airport.	Modern	Low	-
E-S 2	Bay Of London	Road	356372 356352	1034128 1033881	352667	-	-	-	Former line of the roadway, now diverted and designated as the B9063, which originally ran across the Bay of London.	Post-medieval/ Modern	Low	Structural remains across Bay itself, some sections in good condition. Of local interest. Marked on the Ordnance survey First Edition (1882)
E-S 3	Bay Of London	Enclosure	356380	1034050	3199	-	-	-	A sub-circular enclosure initially recorded in the early twentieth century, the antiquity of which has subsequently questioned. 1984). The feature was not identified during the current walkover survey.	Uncertain	Negligible	No longer extant. Not located during walkover
E-S 4	Cauldhame	Farmstead	356501	1033856	182064	-	-	-	Former farmstead comprising two buildings on the 1st Edition OS map. Only the largest currently remains.	Post-medieval	Low	Traditional vernacular construction and design.
E-S 5	London	Farmstead	356560	1034397	352668	-	-	-	Former farmstead comprising buildings and enclosures on the 1st Edition OS map. Most of the upstanding walls are still extant.	Post-medieval	Low	Two sub-divided unroofed structures with a kiln. Enclosure contains upright flagstone divisions. Predominantly built of red sandstone.
E-S 6	Bay Of London	Mound	356594	1034394	3208	SM 1241	-	-	A circular mound, up to 14m in diameter, possibly a barrow, but tentatively identified as a chambered cairn.	Neolithic (?Bronze Age)	High	Scheduled Monument. As described.
E-S 7	-	Mounds	356432 356434 356392 356412 356448 356453	1033773 1033776 1033806 1033862 1033779 1033882	-	-	-	-	A series of eight mounds identified on the hillside overlooking the Bay of London during the walkover survey.	Uncertain	Uncertain	Unknown date/ importance, but could be at least Medium if prehistoric
E-S 12	-	Bank	356468	1033954	-	-	-	-	Low earthen bank,, probably associated with Site E-S 4	Post-medieval	Negligible	-

Table A 1.7: Gazetteer of sites identified within the onshore 500m radius buffer study area, Staney Ayre, Sanday, Route 2.6 (See Figure HEA 2.6)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
E-S 8	Gump of Spurness	Field Dyke	360570	1035570	140901	-	-	-	A low ridge was visible running approximately north-south on the hillside.	Medieval/ Post-medieval	Low	Unknown date
E-S 9	-	Earthen Platform	360275	1035552	-	-	-	-	A possible earthen platform, measuring 18m by 14m.	Post-medieval	Negligible-Low	-
E-S 10	-	Mound/ Cairn	360445	1035545	-	-	-	-	The OS trig point stands upon a mound containing earth-fast stones which may be a heavily denuded barrow or cairn.	Prehistoric (?Bronze Age)	Low	Mound heavily disturbed by trig point.
E-S 11	Gump of Spurness	Enclosure	360135	1035800	345053	-	-	-	A grass covered sub-rectangular enclosure measuring 140m by 100m.	Uncertain	Uncertain	-

Table A 1.8: Gazetteer of marine sites identified within marine corridor of Route 2.6

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason
-	-	-	-	-	-	-	-	-	-	-

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

No sites identified from sources above.

Appendix 1: Route 2.7 Gazetteers

Table A 1.9: Gazetteer of sites identified within the onshore 500m radius buffer study area, Links Ness, Stronsay, Route 2.7 (See Figure HEA 2.7)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
S-S 1	Ness	Farmstead	361779	1029650	352795	-	-	-	-	Post-medieval/ Modern	Negligible	Farmstead first visible on 2nd Edition OS map
S-S 2	Red Banks	Jetty	361910	1029410	3327	-	-	-	The remnants of two tracks lead down to a jetty, built of boulders, across the sand beach.	Post-medieval	Low	Possibly of local interest
S-S 3	Runthall	Settlement	362400	1029610	3331	-	-	-	At least 3 walls and a possible floor exposed by erosion of the coastal edge below an amorphous mound.	Medieval	Low-Medium	Uncertain if a mostly eroded building or edge of a settlement
S-S 4	Pier of Stursy	Jetty	361911	1029412	3326	-	-	-	-	Medieval/ Post-medieval	Negligible-Low	Though there are references to there being a pier at this location, the site appears to be a natural rock formation. However, it is possible that this edge was used as a jetty, as happened in many places around the coastline, and so potentially of local interest
S-S 23	-	Slipway	362165	1029594	-	-	-	-	Short ruinous concrete slipway. Modern	Modern	Negligible	-
S-S 24	-	Structure	362088	1029615	-	-	-	-	Part of ruinous structure made of concrete and flagstone, function unclear. Modern	Modern	Negligible	-

Table A 1.10: Gazetteer of sites identified within the onshore 500m radius buffer study area, Bay of Stove, Sanday, Route 2.7 (See Figure 2.7)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
S-S 5	Stove	Buildings, Enclosure and Trackway	360740	1035620	182072	-	-	-	A platform, 8m by 5m, butting against an enclosure with a denuded trackway extending towards the coastal trackway.	Post-medieval	Negligible	The Canmore description relates to an unroofed building on the N side of a stone dyke. During a walkover survey, an adjoining building on the south side of the dyke, a small enclosure and a trackway leading to it were noted. All appeared to be part of the same entity.
S-S 6	Stove	Burnt Mound	360990	1035820	3456	-	-	-	An amorphous mound of burnt stones.	Prehistoric (?Bronze Age)	Low-Medium	-
S-S 7	Stove	Chambered Tomb	360800	1035500	3415	-	-	-	A chambered mound was accidentally discovered c.1912. No trace of the structure remains.	Prehistoric	Negligible-Low	-
S-S 8	Stove Farm	Steading with Farmhouse and Steam-Powered Threshing Machine	360881	1035521	3446, 140814, 140885, 192139	-	LB 46404	-	Large farm-building complex, the largest in Orkney. Built c.1857.	Post-medieval	Medium	Category B Listed Building and model farm.
S-S 9	Stove	Bone Implements, Spindle Whorl, Lithic Implements	361000	1035499	3438, 3441	-	-	-	Objects recovered from Lambaness and recorded in the Tankerness House old accession register.	Prehistoric/ Medieval	Negligible	Negligible as a precise findspot location. Mix of types including flint and steatite objects. Found over time by the landowners. Generally indicate multi-period activity in the area, probably captured by the more specific sites identified here.
S-S 10	Hill Street, Stove Farm	Farm Cottages	360768	1035352	140825	-	LB 46404	-	A row of farm workers cottages associated with Stove Farm.	Post-medieval	Medium	Category B Listed Building.
S-S 11	Stove	Chapel	361100	1035510	3418	-	-	-	The site of an Episcopal chapel built 1714 (demolished 1830) for the Sinclair family. Site now occupied by modern buildings.	Post-medieval	Negligible	No evidence for any surviving elements or re-use identified during the walkover.

©ORCA 2021

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
S-S 12	Bay of Stove	Ditch	361190	1035399	313957	-	-	-	A cut feature, possibly part of a ditch, exposed in the coastal section.	Prehistoric (?Neolithic)	Low	But could be indicative of more prehistoric remains in the area. Could not be located during walkover but could be part of S-S 19.
S-S 13	Bay of Stove	Settlement	361210	1035310	3458	-	-	-	Traces of a prehistoric settlement identified in the early 20th century. Recent fieldwalking has recovered numerous artefacts of Neolithic date.	Prehistoric (?Neolithic)	Medium	Could not be located during walkover but could be part of S-S 19.
S-S 14	-	Earthen Platform	360792	1035773	-	-	-	-	An earthen platform, c.48m by 29m. May be the site of a former croft. It is possible (but less likely) that it is related to the numerous prehistoric features and settlements present in the surrounding landscape.	Post-medieval	Low	-
S-S 15	-	Mound/ Raised Platform	360936	1035617	-	-	-	-	A flat-topped mound, c.75m by 30m, within a waterlogged area of reed vegetation.	Uncertain	Uncertain	-
S-S 16	-	Stone Spread	361185	1035402	-	-	-	-	A spread of stone on a coastal slope (3m x 1m). Origin unclear but probably modern.	Modern	Negligible	-
S-S 17	-	Dyke	361281	1035166	-	-	-	-	Drystone dyke running from Stove Farm along the East coast of the Bay of Stove	Post-medieval	Low-Medium	Associated with Listed farmstead-
S-S 18	-	Stone Pile	361278	1035115	-	-	-	-	Small circular pile of stone close to S-S 17. Probably post-medieval	Post-medieval	Negligible	-
S-S 19	-	Structure	361214	1035304	-	-	-	-	A series of small sections of coursed drystone masonry or tumble located within the coastal section, may be related to S-S 13.	Prehistoric (?Neolithic)	Medium	-
S-S 20	-	Dyke	361243	1035238		-	-	-	Drystone dyke associated with Stove farm	Post-medieval	Low-Medium	Associated with Listed farmstead-
S-S 21	-	Pier	361049	1035495	-	-	-	-	Stone and concrete pier associated with Stove Farm	Post-medieval	Low-Medium	Associated with Listed farmstead-
S-S 22	-	Structure	361273	1035149	-	-	-	-	Small rectangular structure (2.5m x 1m x 0.75m) filled with stone, adjacent to dyke, function unclear	Post-medieval/ Modern	Low	-

©ORCA 2021

Table A 1.11: Gazetteer of marine sites identified within marine corridor of Route 2.7 (**See Figure HEA 2.3)**.

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason
Sebla	-	223076	Swedish Frigate of Gothenburg. Wood. Capt Anderson	Wrecked at Hackness	30/10/1711	-	-	1,2,3,5	High	Age and international
Henry	-	226837	Norwegian brig, wood, 208 tons, 10 crew, Christiania [Oslo] for Kinsale, cargo ice. 7 crew lost.	Wrecked at Hackness	08/02/1870	-	-	1,2,3,4,5	Medium	International trade, crew lost. Cargo of low interest
Memoria	-	228308	Norwegian Barque, Wood 382 tons. Drammen to Gloucester. Cargo timber	Stranded at Hackness	09/04/1894	-	-	1,2,3,4,5	Low	Common vessel and cargo of low interest
Freya	-	227937	Norwegian Barque. Wood 384 tons. 11 crew. Tonsberg to America, in ballast. Crew saved	Stranded at Spurness, Stove.	08/04/1879	-	-	1,2,3,4,5	Low	Common vessel and cargo of low interest
Object (1)	-	330674	Object found during project ADAIR	-	-	59 10.235N	2 40.376W	5	Unknown	Unknown

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

©ORCA 2021

Appendix 1: Route 2.9 Gazetteers

Table A 1.12: Gazetteer of sites identified within the onshore 500m radius buffer study area, Sands of Evie, West Mainland, Route 2.9 (See Figure HEA 2.9)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
M-R 1	Sands of Evie	Burial	33700	1026000	278098	-	-	-	A crouched burial was discovered in the Sands of Evie, in 1932. Its precise location is unknown.	Prehistoric	Negligible	Uncertain location
M-R 2	St Nicholas's Chapel	Chapel & Burial Ground	337130	1026227	2205	-	-	-	The chapel is of unknown date and is no longer visible but the burial ground is extant.	Medieval	Medium-High	Burial ground. As described.
M-R 3	Grit Ness	Decoy Bunker	337124	1026410	269132	-	-	-	A decoy bunker dating from the Second World War. This was removed in the Post-War period.	Modern	Negligible	Removed. No trace.
M-R 4	Evie Pier	Storehouse	337120	1026430	156573	-	-	-	A single-storey storehouse with a corrugated iron roof and concrete floor.	Post-medieval	Low	Local historical value. Evie pier was the landing/loading place for Rousay prior to current Rousay harbour built in 19th century. As described but flagstone floor.
M-R 5	Evie Pier	Pier	337150	1026512	156572	-	-	-	A long drystone rubble jetty dating from the 18th century.	Post-medieval	Low	Local historical value. Evie pier was the landing/loading place for Rousay prior to current Rousay harbour built in 19th century.
M-R 6	Sands of Evie	Winches	337220	1026399	156576	-	-	-	A pair of winches on the shoreline for boat landing.	Post-medieval	Low	Local historical value. Evie pier was the landing/loading place for Rousay prior to current Rousay harbour built in 19th century. Only one could be located during walkover survey. Associated with a group of nousts (M-R 16).
M-R 7	Sands of Evie	Pictish Symbol Stone	337230	1026399	2183	-	-	-	A fragment of a symbol stone bearing a mirror symbol. Now in Tankerness Museum.	Late Iron Age	Negligible	No associated site known
M-R 8	Heart Of Neolithic Orkney World Heritage Site Sensitive Area	Planning designation	-	-	-	-	-	-	The Sands of Evie landfall is within the HONO WHS Sensitive Area of the Orkney West Mainland	Multi-period	Medium	A designation to aid planning decisions to ensure possible effects of development on the setting of the HONO WHS are considered.
M-R 14	-	Noust?	337108	1026450	-	-	-	-	Small hollow and flattened area on grassy slope just above shore, serving as a modern noust but may be earlier if artificial	Post-medieval/ Modern	Low - Negligible	-
M-R 15	-	Culvert	337070	1026466	-	-	-	-	Small roughly built culvert feeding field drain to shore	Post-medieval/ Modern	Negligible	-
M-R 16	-	Nousts	337243 337273	1026379 1026360	-	-	-	-	A line of a least four heavily eroded nousts on a grassy slope above the shore. One ruined wall divides two of them but the rest have no visible structural elements. Associated with Site M-R 6 [winch].	Post-medieval	Low	-

©ORCA 2021

Table A 1.13: Gazetteer of sites identified within the onshore 500m radius buffer study area, Westness, Rousay, Route 2.9 (See Figure HEA 2.9)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
M-R 9	Westness	Burial	338201	1028900	2197	-	-	-	Inhumation of a Viking woman and her baby with two oval brooches, a silver-gilt ringed pin (of 8th-century type), beads, a weaving batten, bronze straps, the remains of a bronze bowl and a pair of wool combs. Possible disturbed grave 3m away.	Early Medieval	Medium	While this grave removed, there's potential to be graves in immediate vicinity. Not an exact location. No associated sites noted during walkover.
M-R 10	Westness Farm	Farmstead	338189	1028999	354412	-	-	-	Shown on 1st Edition OS map.	Post-medieval	Low-Medium	Vernacular farm buildings, related to Westness House. Likely to be latest in a sequence of farmsteads at he high status Westness site. Working farm, not visited during walkover.
M-R 11	Westness	Barrow	338300	1029090	2165	-	-	-	A circular mound, 17m in diameter and interpreted as a barrow. Denuded by ploughing.	Bronze Age	Low-Medium	Ploughed down, but low mound still present.
M-R 12	Westness	Mound	338400	1028978	2166	-	-	-	Initially interpreted as a Neolithic chambered barrow, this mound is now considered to more likely be a domestic structure.	Prehistoric (?Neolithic)	Low-Medium	Subjected to investigations in late 19th century and 1930s. Appears as sub-circular earthen bank, c. 6m across.
M-R 13	Westness House	House	338320	1028906	2196	-	LB 18640	-	2 1/2-storied house built c.1750 to replace one burned down by Captain Moodie of Melsetter (Hay) 1746.	Post-medieval	Medium	Category B Listed Building. Occupied, not visited during walkover.

Table A 1.14: Gazetteer of marine sites identified within marine corridor of Route 2.9 (**See Figure HEA 2.9)**.

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason
Fortune	-	269726	Ship of London. Wood, Cargo of coal from Newcastle. Capt Weston	Sank at anchor	02/05/1746	-	-	1,3,5	Medium	Age pre 1800
Elizabeth	-	285298	Cutter of Kirkwall.wood, Cargo of oats.	Drifted ashore while at anchor. Most likely refloated on next tide.	15/02/1869	-	-	5	Negligible	Refloated, so no loonger present

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

©ORCA 2021

Appendix 1: Route 2.10 Gazetteers

Table A 1.15: Gazetteer of sites identified within the onshore 500m radius buffer study area, Sand of Heatherhouse, Mainland, Route 2.10 (See Figure HEA 2.10)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
M-S 1	Heatherhouse	Croft	352951	1010919	182569	-	-	-	Two buildings, one structure and two enclosures depicted on the 1st Edition OS map, which appear to be no longer extant.	Post-medieval	Negligible	No longer extant. Probably below modern farm.
M-S 2	Heatherhouse	Croft	353171	1011023	182570	-	-	-	Four buildings and three enclosures depicted on the 1st Edition OS map, which appear to be no longer extant.	Post-medieval	Negligible	No longer extant. Probably below modern farm. Some possible fragments of structure seen

Table A 1.16: Gazetteer of sites identified within the onshore 500m radius buffer study area, Bay of Sandgarth, Shapinsay, Route 2.10 (See Figure HEA 2.10)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
M-S 3	Bay of Sandgarth	Nousts	351510	1015610	3091	-	-	-	Two truncated and denuded nousts	Medieval/ Post-medieval	Low	Local historical value
M-S 4	Ness Of Howel	Structure	351520	1015600	182791	-	-	-	Unroofed building or enclosure	Post-medieval	Low	Visible on Google Earth
M-S 5	Haroldsgarth	Burnt Mound	351980	1015910	3100	-	-	-	Site of a prehistoric burnt mound. Now denuded by cultivation.	Prehistoric (?Bronze Age)	Low	Appears to be no surface trace now, but uncertain if anything survives below ploughsoil. Not identified during walkover.
M-S 6	Bay of Sandgarth	Kelp Pits	351980	1015790	3089	-	-	-	A series of kelp pits and possible drying walls within an area of storm beach and blown sand.	Post-medieval	Low	Local historical value. Not identified during walkover.
M-S 7	Skate Noost	Landing Place	352210	1015530	3093	-	-	-	A place for landing boats with a wave-cut platform.	Medieval/ Post-medieval	Low	Local historical value
M-S 8	Pool of Haroldsgarth	Earthworks	352055 352034	1015727 1015739	-	-	-	-	A series of turf covered sub-circular earthworks. The larger of the two earthworks is situated to the east and measures 20m (east–west) by 13m (north–south) by maximum of 1.2m high. A large quantity of earthfast stone is visible with an exposed cellular feature on the south side of the mound. A second earthwork is situated 18m to the west and measures 6m in diameter by maximum of 0.5m high. Again, large quantities of earthfast stone is visible. The area immediately to the north of this area is very undulating and sand dunes could be concealing more structural features.	? Prehistoric	Medium	Likely to be of at least medium importance if prehistoric and structural features visible.

Table A 1.17: Gazetteer of marine sites identified within marine corridor of Route 2.10 (**See Figure HEA 2.10)**.

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason
Village Belle	-	286824	Yacht, wood.	''Sank near Kirkwall''	03/08/1929	-	-	5	Negligible	Common vessel
Swift	-	286825	Sloop of Fraserburgh. Wood, 48 ton	''Lost near Kirkwall''	00/11/1825	-	-	5	Unknown	Cargo unspecified
Unknown (3)	-	325823	Ferry of Eday. Wood.	''Upset and ashore at Saverock, Shapinsay''.	07/11/1844	-	-	1,5	Unknown	No information on vessel.
Fuscia	-	226748	Schooner of Newcastle, wood,. 66 tons. Newcastle to Kirkwall. Cargo coal	Wrecked on ''The Maidens'' Shapinsay. Crew saved	01/04/1854	-	-	1,2,3.5	Low	Common vessel and cargo of low interest

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

Appendix 1: Route 2.11 Gazetteers

Table A 1.18: Gazetteer of sites identified within the onshore 500m radius buffer study area, Crockness, Hoy, Route 2.11 (See Figure HEA 2.11)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
H-F 1	Crockness Tower	Martello Tower	332426	993437	9478	SM27 26	-	-	A circular, masonry tower. Built in 1813-15, along with Hackness tower, to guard the approach to the Longhope anchorage	Nineteenth century	High	Scheduled Monument.
H-F 2	Crockness	Croft	332200	993010	9483	-	-	-	A dwelling house and outbuilding with corn-drying kiln. Stone-built with mortar bonding. 19th century	Post-medieval	Low	Ruinous, but corn-drying kilns are disappearing
H-F 3	Crockness	Linear Feature	332303	993321	133619	-	-	-	A linear feature visible on aerial photographs.	Uncertain	Uncertain	Not on OS maps, so likely earlier. This site could not be located during the walkover.
H-F 4	Rinnigill	Military Telegraph Hut and Boathouse	332160	993670	138768	-	-	-	First World War concrete telegraph hut and a stone-built boathouse with a concrete floor. Largely intact.	Modern	Medium	WWI buildings. East of WWII Rinnigill camp.
H-F 5	Crockness	Croft	332350	993100	138786	-	-	-	A group of five ruined structures, four of which are conjoined. The single building appears to be a boathouse. All these structures are probably associated with a refurbished cottage nearby.	Post-medieval	Low	Ruinous. A linear farmstead (occupied) with adjacent ruinous buildings- two outbuildings and a probable boat house and three nousts, and a pier.
H-F 8	-	Culvert	332452	993296	-	-	-	-	Small roughly built stone culvert at edge of field above shore.	Modern	Negligible	-
H-F 9	-	Mooring/ Fish Trap	332531	993132	-	-	-	-	A sub-circular tidal pool formed by a bank of beach cobbles around a sandy gravel area with an opening to the sea. Unclear if this is artificially formed or a product of tidal action. Upon the bank is an upright stone with packing stones, and there is a wooden post in the pool (332510E 1093130N).	Uncertain	Uncertain	-

Table A 1.19: Gazetteer of sites identified within the onshore 500m radius buffer study area, Weddel, Flotta, Route 2.11 (See Figure HEA 2.11)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
H-F 6	Weddel	Buildings	333960	993740	182502	-	-	-	Two unroofed buildings depicted on the First Edition OS map (Orkney and Shetland (Orkney) 1882, sheet cxix).	Post-medieval	Negligible-Low	-
H-F 7	Weddell Airstrip	Airfield	334000	993700	339718	-	-	-	20th-century airstrip, used by Flotta oil terminal	Modern	Low	-
H-F 10	-	Peat cuttings	-	-	-	-	-	-	Extensive area of peat cuttings across much of side of West Hill	Post-medieval	Negligible	-
H-F 11	-	Structure	333842	994046	-	-	-	-	Base of a small concrete structure. Could be related to the airfield or could be related to wartime defences	Modern	Negligible-Low	-

Table A 1.20: Gazetteer of marine sites identified within marine corridor of Route 2.11 (See Figure HEA 2.11 and 2.11b**)**.

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason	Fugro Geophysical anomaly
V45	979	325195	German Destroyer. Steel	Beached during attempt to scuttle	21/06/1919	-	-	1,2,3,4,5,6	Negligible	Refloated and towed away	-
Unidentified object	-	330757	Mound 108m by 97m x 2m	-	-	58 49.397N	03 09.732W	5,6	Negligible	Natural feature	-
HMD Rose Valley	59275	323834 & 330751	Steam Drifter. Wood 100 tons. Cargo torpedoes	Foundered after a collision. Crew saved.	16/12/1943	58 49.574N	03 09.240W	1,3,5,6	Low	Common vessel cargo recovered	211_VK_SSS_0236 211_VK_MAG_0502
Helen	-	223498	Ship of Liverpool. Wood. Cargo of salt From Liverpool to Baltic.	Wrecked SW side of Flotta	00/04/1800	-	-	1,2,3,4,6	Low	Common vessel and cargo of low interest	-
Barbara	-	229463	Schooner. Wood. 113 tons. Cargo of fishing stock and herrings	Wrecked SW side of Flotta	04/11/1911	-	-	1,2,3,4,6	Low	Common vessel. Cargo of low interest.	-
Sir William Cumming	-	259755	Schooner of Inverness. Wood. 48 tons.	Wreck on Flotta while attempting to enter Longhope.	22/04/1844	-	-	1,3,4,6	Unknown	Cargo not listed	-
Isabella Wilson	-	287896	Schooner of Banff. Wood. 183 tons. Cargo of wheat.	Stranded on west side of Flotta	17/11/1877	-	-	1,3,4,6	Low	Common vessel and cargo of low interest	-
-	-	-	Small ship's boiler and debris	-	-	58 49. 35.126N	03 09. 24.678W	Fugro Geophysical surveys	Unknown	No further information known	211_VK_SSS_0222 211_VK_MAG_0371
-	-	-	Debris associated with small ship's boiler	-	-	58 49. 35.126N	03 09. 23.02W	Fugro Geophysical surveys	Unknown	No further information known	211_VK_SSS_0221 211_VK_MAG_ 0492

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992).

©ORCA 2021

Appendix 1: Route 2.12 Gazetteers

Table A 1.21: Gazetteer of sites identified within the onshore 500m radius buffer study area, Pan Hope, Flotta, Route 2.12 (See Figure HEA 2.12)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
F-SR 1	Pan	Pier	337351	994330	307192	-	-	-	A dilapidated concrete pier.	Nineteenth century	Low	Could be associated with Post Office (Site F-SR 20). Poor condition but not wholly dilapidated, appears to still be in use. Associated with concrete slipway.
F-SR 2	Quoyness	Buildings, Pier	337733	994396	138698	-	-	-	An unroofed structure with a stone jetty. Could be associated with Quoyness Farm.	Post-medieval	Low	Misnamed Newpan on Canmore. The remains of a substantial pier of upright flagstones. The building is later- possibly associated with F-SR 3, it is built of breeze blocks next to a small stone built structure Remnants of additional small concrete/ stone features ion the foreshore
F-SR 3	Quoyness	Observation Posts	337774	994372	104489	-	-	-	Remains of three brick and concrete buildings. These may have served as look-out positions overlooking the entrance to Pan Hope.	Modern	Low	Wartime. The most northerly is made of stone and brick and is open on one side. The others are made of brick and concrete
F-SR 4	Quoyness	Farmstead	337754	994305	104491	-	-	-	Three buildings with an enclosure. One of the buildings is a horse-engine house.	Post-medieval	Low	Horse engine house still contains gears. Three sub-divided buildings and enclosure. The horse engine house is ruinous and overgrown but the gears can still be seen. One building has extant flagstone roof, some wooden fixtures and fittings survive.
F-SR 5	Newpan	Structure	337271	994094	182516	-	-	-	A roofless structure. No longer extant.	Post-medieval	Low	-
F-SR 6	Pan Hope	Pipeline	337061	994598	312099	-	-	-	Submerged site identified through aerial photographs. Identified as Flotta oil terminal pipeline.	Modern	Negligible - High	negligible in terms of historic environment, but high in terms of general importance
F-SR 20	Pan	Farmstead, Post Office	337406	994294	-	-	-	-	Farmstead shown on the 1st Edition OS map, marked as a Post Office. Associated with a pier (Site F-SR 1)	Post-medieval	Low	Remains of at least two sub-divided buildings within partial stone enclosure, different parts of the complex appear to be of different dates and are of various levels of preservation. Many fixtures, fittings and original architectural features survive. One part still has its flagstone roof and contains furniture, books, crockery and other personal possessions. One part has a modern roof.
F-SR 21	Newpan	Farmstead, Wells, Jetty	337240	994183	-	-	-	-	A group of four roofed buildings shown on the 1st Edition OS map, with two adjacent wells. Only one appears to be still roofed with the remainder appearing to be dilapidated. Possible related jetty at the shore.	Post-medieval	Low	Remains of two sub-divided buildings and an enclosure with remnants of associated pier and revetment above shore. Inscribed corner stone on one buildings reads "1874". Many wooden fixtures and fittings survive. One building has a modern roof.
F-SR 22	-	Structure	337326	994250	-	-	-	-	A small pile of stone within a drystane dyke enclosure. Appears to be the ruins/ demolition debris of a small structure. May be related to F-SR 20 or F-SR 21. Marked on the OS first edition (1882)	Post-medieval	Low - Negligible	Could not be accessed due to cows
F-SR 23	-	Structure	337289	994256	-	-	-	-	Small, ruinous stone structure just above the shore. May be related to F-SR 20 or F-S 21. Marked on the OS first edition (1882)	Post-medieval	Low - Negligible	-
F-SR 24	-	Mound	337247	994128	-	-	-	-	Small, sub-oval grassy mound within boggy area. Likely to be related to drainage works in field but could be older	Uncertain	Uncertain	-
F-SR 25	-	Well	337342	994265	-	-	-	-	Small pit lined with coursed flagstone masonry with concrete capping stone. Possibly associated with Site F-SR 20	Post-medieval	Low	Shown on 1st Edition OS

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
F-SR 26	-	Concrete pillars	337479	994317	-	-	-	-	A line of three concrete pillars running down the beach at right angles to the shore	Modern	Low	Associated with wartime defences?
F-SR 27	-	Concrete blocks	337519	994326	-	-	-	-	A spread of large concrete blocks located on the coastal slope and the top of the beach	Modern	Low	Associated with wartime defences?
F-SR 28	-	Wall	337547	994325	-	-	-	-	A small section of roughly coursed drystone wall at the top of the shore. Possible revetment for slipway or access route to shore?	Post-medieval	Low - Negligible	-
F-SR 29	-	Structure/ pit	337882	994288	-	-	-	-	A small concrete platform, possibly the base of a structure, adjacent to a small sub-rectangular pit located close to low cliffs	Modern	Low	Associated with wartime defences?
F-SR 30	Little Quoyness	Farmstead	337636	994244	-	-	-	-	Two traditional stone buildings with extant flagstone roofs, marked on the OS first Edition	Post-medieval	Low	-

Table A 1.22: Gazetteer of sites identified within the onshore 500m radius buffer study area, Dam of Hoxa, South Ronaldsay, Route 2.12 (See Figure HEA 2.12)

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
F-SR 8	Little Howe	Croft	342438	994043	138466	-	-	-	A roofless farm dwelling.	Post-medieval	Negligible-Low	Ruinous
F-SR 9	Howe Of Hoxa	Broch	342526	993962	9612, 9615	-	-	-	Remains of an Iron Age broch which has been heavily disturbed and altered. The structure has an internal diameter of c.9m and overlooks the beach at the Dam of Hoxa. There is also evidence for settlement around the broch.	Iron Age	Medium	Figurines and cists referred to in entry for 9615 almost certainly refer to those found at Newbigging Farm on the south side of Widewall Bay. Reputed burial place of Earl Thorfinn Torf-Einarsson.
F-SR 10	Little Howe Of Hoxa	Settlement	342436	994026	9623	-	-	-	A circular mound measuring c.19m in diameter and c.1.5m high, with internal stone-built structural elements. Interpreted as being part of a settlement associated with the nearby broch.	Iron Age	Medium	-
F-SR 11	Hoxa	Military Camp	342500	993450	105309	-	-	-	Small military camp. Now redeveloped as an amenity area.	Modern	Negligible	Destroyed
F-SR 12	Howe	Farmstead, Pier	342600	993985	315507	-	-	-	Two unroofed buildings with a slipway nearby. A number of building footings are visible around the buildings	Post-medieval	Low	Part of the large farmstead complex at Hoxa.
F-SR 13	Longhouse	Farmstead	342950	993800	138465	-	-	-	A range of conjoined buildings, with a corn-drying kiln. Buildings converted into a modern cottage.	Post-medieval	Low	Still occupied and kiln intact. Roof entirely modern.
F-SR 14	Mayfield	Boathouse	343060	994135	138463	-	-	-	A ruinous, rectangular drystone structure on the cliff edge. A possible boathouse.	Post-medieval	Negligible-Low	Very ruinous

©ORCA 2021

ORCA Site No.	Name	Type	Easting	Northing	Canmore ID	SAM No.	LB No.	GDL No.	Description	Period	Importance	Comments
F-SR 15	Mayfield	Enclosure	343070	994160	9616	-	-	-	A sub-circular structure. 30m in diameter, defined by an earthen and stone bank. Located on a small, low-lying promontory.	Prehistoric	Medium	-
F-SR 16	Swartiquoy	Farmstead	343100	994139	182444	-	-	-	Two buildings, three structures and two enclosures.	Post-medieval	Low	Occupied
F-SR 17	Mayfield	Boundary	343150	994237	306741	-	-	-	An earthen bank, c.50m in length, at the boundary between rough pasture and the foreshore.	Post-medieval	Negligible	-
F-SR 18	Heatherbell	Farmstead	343230	993860	182489	-	-	-	A single building and enclosure depicted on the 1st Edition OS map, which appear to be no longer extant.	Post-medieval	Negligible	-
F-SR 19	Hoxa Hill	Chambered Cairn	343329	993573	9630	-	-	-	A Neolithic chambered cairn known locally as "The Wart", c.9.5m in diameter. Human bones removed during the excavation of 1870.	Neolithic	Medium	-
F-SR 31	-	Stone Spread	343094	993925	-	-	-	-	A spread of stone in the coastal section. No discernible pattern or structure.	Uncertain	Low	-
F-SR 32	-	Structure	343004	993843	-	-	-	-	Modern, stone-built structure at base of coastal section. Appears to be associated with F-SR 13	Modern	Negligible	-
F-SR 33	-	Culvert	342574	993872	-	-	-	-	Stone built culvert with breeze block additions	Post-medieval/ Modern	Negligible	-

©ORCA 2021

Table A 1.23: Gazetteer of marine sites identified within marine corridor of Route 2.12 (**See Figures HEA 2.12 and HEA 2.12b)**.

Name	UKHO Wreck Number	Canmore ID	Description	Circumstance of loss	Date Lost	Lat (WGS84)	Long (WGS84)	Source	Importance	Reason	Fugro Geophysical anomaly
Unknown (4)	-	102246	Small wreck	-	-	58 59.97N	03 05.10W	1,8	Unknown	Unknown	
Unknown (5)	986	321499	wreck	-	-	58 49.950N Geophysical anomaly location at 58 50.0.806N	03 05.135W Geophysical anomaly location at 03 05. 5.829W	5,6, Fugro report	Unknown	Unknown	212_VK_SSS_0001, 212_VK_MAG_0822, 212_VK_MAG_0634
Sykes	-	287845	Sloop of Hull. Wood. Cargo of timber and iron.	Wrecked in Pan Hope Bay.	22/05/1788	-	-	1,6	Medium	Age pre-1800, cargo of low interest	
Unknown (6)	-	287813	Unknown	Most likely relates to UB 116	-	58 50.1N	03 04.1W	1,5	Unknown	Unknown	212_VK_SSS_0138, 212_VK_SSS_0130, 212_VK_SSS_0127
UB-116	992	102250	German UB class U Boat .steel. 651 tons. 36 crew, all lost.	Sunk by controlled mine	26/10/1918	58 50.075N	03 04.100W	1,2,3,4,5,6,7	High	War Grave. Constituent part of proposed Scapa Flow HMPA.	212_VK_SSS_0128
Boom Defence	-	332492	Anti-submarine Booms 'a' And 'b'	Shown on chart within ADM 137/1074	WW1 & WW2	-	-	5, 8	Medium (in terms of the defence) Low (in terms of what remains)	WW1 and WW2 defense of Scapa Flow. These are common in the Flow.	
Destroyer Boom Defence And Minefield	-	332541	Anti-Destroyer Boom	Shown on chart within ADM 137/1074	WW1 & WW2	-	-	5, 8	Medium (in terms of the defence) Low (in terms of what remains)	WW1 and WW2 defense of Scapa Flow. These are common in the Flow.	

1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Fergusson/Heath Collection; 4 = Britishnewspaperarchive.com; 5 = CANMORE 6 = UKHO; 7 = Ridley (1992); 8 = Stell (2010).

9.2 Appendix 2: Impact Appraisal

Appendix 2: Route 2.3 Appraisal

Table A 2.1: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Scuthvie Bay, Sanday, Route 2.3.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
S-Sh 01	Treb Dyke	Location of a destroyed treb dyke.	Bronze Age	Low-Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 02	Farmstead	Farmstead of two ranges with associated walled vegetable plots or animal pens. Traditional vernacular construction and design.	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 03	Chapel	An 'Old Chapl' is shown on Aberdeen's map of 1760. Precise location unknown.	Medieval	Uncertain	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 04	Mound	An amorphous mound with some exposure of walling on one side.	Prehistoric/ Medieval/ Post-medieval	Uncertain	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 05	Mound	Location of a high and prominent mound which is now obscured by surrounding sand dunes.	Prehistoric/ Medieval	Uncertain	Medium	Avoidance of noted location; Watching brief	Minor
S-Sh 06	Farmstead	Linear range of buildings and an outbuilding with enclosures extending down to the shoreline. The farmstead is of traditional design and construction, and is now in a state of disrepair.	Post-medieval	Low	Low	Avoidance	Negligible
S-Sh 07	Fish House, Wind Generator	No further information	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 08	Military Installation, Gun Emplacement	The base of a military building, radio mast bases and an emplacement for an AA battery are visible on air photographs.	Modern	Low	Medium	Avoidance (c.40-70m from BMH) with exclusion zone marked as a precaution	Minor
S-Sh 09	Planticrub / gun emplacement	A ruinous circular drystone crubh, 4.5m in diameter. Possibly also utilised as a gun emplacement.	Post-medieval	Low-Negligible	Low	Avoidance (c.40m from BMH) with exclusion zone marked as a precaution	Negligible
S-Sh 10	Noust	A passage cleared for landing boats leads to a berm which may be the site of a noust.	Medieval/ Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 11	Chapel	An 'old church' is marked on Aberdeen's map of 1760. Site now occupied by farm buildings.	Medieval	Uncertain	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 12	Shell Midden, Walling	Shell and stone deposits with some masonry are visible in coastal exposures. More fragmentary remains are visible further inland.	Prehistoric/ Medieval	Uncertain	Medium	Avoidance with exclusion zone marked; Watching brief	Minor
S-Sh 13	Earthwork	An earth and stone dyke, 4m in width and 1.5m high, running across the peninsular.	Prehistoric	Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 14	Settlement	A series of low knolls, known locally as 'Pict's Houses'. No longer visible.	Prehistoric	Low - Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 15	Burnt Mound	An amorphous ploughed-down, burnt mound	Prehistoric (?Bronze Age)	Low-Medium	None (outwith landfall corridor and BMH location)	Avoidance	None

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
S-Sh 16	Sand pit	An area of sand extraction apparent as a series of depressions at the edge of a field adjacent to sand dunes (30m x 20m). Modern but short remnants of possible bounding dykes may suggest earlier activity	Post-medieval/ Modern	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
S-Sh 17	Wall	A corner section of walling exposed within a grassy field (1m x 1m, 0.3m). Likely to have been part of a rectangular structure but character unclear, also uncertain if there are further remains below the surface	Uncertain	Low	Low-Medium	Avoidance (is 250m away from BMH)	None
S-Sh 18	Mound	A low sub-oval mound with flat top with several depressions on the surface and 2-3 earthfast stones. Characteristic of prehistoric archaeology but could also be natural	Prehistoric	Low - Medium	Medium	Avoidance (is 250m away from BMH)	None

Table A 2.2: Impact appraisal of marine sites identified within the Orkney Waters section of Route 2.3 corridor to Shetland.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
HMS Goldfinch	H Class Destroyer. Steel. 747 tons. 75.3m x 7.6m x 2.7m. All crew saved.	Stranded in fog. Sold for scrap 1920. All crew saved	19/02/1915	Low-Medium	Low.	Avoidance	Negligible / None
Ann	Brig of Newcastle. Wood. 250 tons. Cargo of wood	Wrecked to the N of Start Point, Sanday	28/02/1813	Medium	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Frederic Eugene	French Barque. Wood. 546 tons. Hernosand to Brazil. Cargo of deals, battens, iron tubes	Stranded Toftsness, Sanday.	24/06/1891	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Fancy Nancy (DEAD)	Wooden Fishing Vessel.	Foundered, crew saved	11/12/1991	Negligible	Low	Avoidance	Negligible / None
Unknown (1)	MBES contact 36.4m x 8.7m x 0.7m	-	-	Unknown	Unknown	Avoidance	Negligible / None

©ORCA 2021

Appendix 2: Route 2.5 Appraisal

Table A 2.3: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Whale Geo, Westray, Route 2.5.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
W-E 1	Burnt Mounds	Two burnt mounds, close to the roadway and destroyed by ploughing.	Prehistoric (?Bronze Age)	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
W-E 2	Structures	The remains of a sub-rectangular masonry structure and sub-circular earthwork enclosures were exposed by coastal erosion in the 1990s. Regarded as almost totally lost in 2015.	Prehistoric/Medieval	Low	None (250m from BMH location and route to it)	Avoidance	None
W-E 3	Nousts	Three nousts at the head of the beach.	Medieval/ Post-medieval	Low	None (150m from BMH location and route to it)	Avoidance	None
W-E 4	Nousts	Eight nousts in three discrete groups.	Medieval/ Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
W-E 5	Windmill	Stump of a post-windmill dating from the 18th or early 19th century.	Post-medieval	Medium	None (150m from BMH location and route to it)	Avoidance	None
W-E 10	Culvert	Stone built culvert running beneath road to the shore. Associated with farmstead at Helzie (Site W-E 12)	Post-medieval	Negligible	High	Will need to avoid or reinstate	Negligible
W-E 11	Farmstead	Cluster of renovated traditional stone buildings	Post-medieval	Low	None (200m from BMH location and route to it)	Avoidance	None
W-E 12	Farmstead	Cluster of traditional stone buildings, two with corrugated shed roofs, 1 roofless	Post-medieval	Low	None, assuming the BMH is beside the road and does not cross over into the farmstead 25m away Low if cross over but doesn't physically impact the buildings	Avoidance Reinstate drystone dykes if cut through	Negligible Minor
W-E 13	Farmstead	Cluster of ruinous traditional stone buildings	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
W-E 14	Stone spread	A spread of horizontal slabs within the coastal section. No obvious structural form, perhaps a dump or infilling deposit. Could be related to Site W-E 2	Prehistoric/ Medieval	Negligible - Low	None (250m from BMH location and route to it)	Avoidance	None
W-E 15	Trig point	Ordnance Survey trig point	Post-medieval	Negligible	None (250m from BMH location and route to it)	Avoidance	None

Table A 2.4: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Cusbay, Eday, Route 2.5.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
W-E 6	Croft	A group of three buildings shown on the 1st Edition OS map.	Post-medieval	Negligible - Low	None (outwith landfall corridor and BMH location)	Avoidance	None
W-E 7	Croft	A single building and a well shown on the 1st Edition OS map. The building is now roofless.	Post-medieval	Negligible - Low	None (250m from BMH location and route to it)	Avoidance	None
W-E 8	Structure	An unroofed structure shown on the 1st Edition OS map. No longer extant.	Post-medieval	Negligible	None (220m from BMH location and route to it)	Avoidance	None
W-E 9	Structure	An unroofed structure shown on the 1st Edition OS map. No longer extant.	Post-medieval	Negligible	None (outwith landfall corridor and BMH location)	Avoidance	None
W-E 16	Farmstead	Two ruinous stone buildings (one roofed, the other unroofed) and two enclosures just above shore. Marked on the OS first edition	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
W-E 17	Dyke	Ruinous drystone dyke at top of shore, survives in small sections	Post-medieval	Negligible	None (ends 120m from BMH location and route to it)	Avoidance	None
W-E 18	Structure	Single stone built roofed structure, probably associated with Site W-E 8. Marked on the OS First edition	Post-medieval	Low	None (300m from BMH location and route to it)	Avoidance	None
W-E 19	Farmstead	Farmstead including traditional stone buildings. Marked on the OS first edition, still occupied.	Post-medieval	Low	None, assuming the BMH in the field and does not cross over into the farmstead 25m away	Avoidance (is active working farm)	None
W-E 20	Enclosures	Two adjacent stone enclosures parallel to the shore, probably associated with site W-E 19. Marked on the OS first edition	Post-medieval	Negligible	Low	Reinstate drystone dykes if cut through	Negligible
W-E 21	Stone piles	Two irregular piles of stone. Probable clearance or demolition debris. Probably modern	Modern	Negligible	None (250m from BMH location and route to it)	Avoidance	None
W-E 22	Farmstead	Farmstead including traditional stone buildings. Marked on the OS first edition	Post-medieval	Low	None (150m from BMH location and route to it)	Avoidance	None

Table A 2.5: Impact appraisal of marine sites identified within the marine corridor of Route 2.5.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
Unknown (2)	Lugsail, wood, 2 tons. Capt. Allan	Foundered off Pharary Island	22/10/1887	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Hope PD 366	Peterhead Steam Trawler, steel, 185 tons	Foundered on Faray.	29/12/1908	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible

©ORCA 2021

Appendix 2: Route 2.6 Appraisal

Table A 2.6: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Bay of London, Eday, Route 2.06.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
E-S 1	Airport	20th-century airport.	Modern	Low	None	Avoidance	None
E-S 2	Road	Former line of the roadway, now diverted and designated as the B9063, which originally ran across the Bay of London.	Post-medieval/ Modern	Low	Minor (if cut through)	Watching Brief	Negligible
E-S 3	Enclosure	A sub-circular enclosure initially recorded in the early twentieth century, the antiquity of which has subsequently questioned. The feature was not identified during the current walkover survey.	Uncertain	Negligible	None (100m from BMH location and route to it)	Avoidance	None
E-S 4	Farmstead	Former farmstead comprising two buildings on the 1st Edition OS map. Only the largest currently remains.	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
E-S 5	Farmstead	Former farmstead comprising buildings and enclosures on the 1st Edition OS map. Most of the upstanding walls are still extant.	Post-medieval	Low	None (320m from BMH location and route to it)	Avoidance	None
E-S 6	Mound	A circular mound, up to 14m in diameter, possibly a barrow, but tentatively identified as a chambered cairn.	Neolithic (?Bronze Age)	High	None (350m from BMH location and route to it)	Avoidance	None
E-S 7	Mounds	A series of eight mounds identified on the hillside overlooking the Bay of London during the walkover survey.	Uncertain	Uncertain	None (outwith landfall corridor and BMH location)	Avoidance	None
E-S 12	Bank	Low earthen bank, probably associated with Site E-S 4	Post-medieval	Negligible	None (220m from BMH location and route to it)	Avoidance	None

Table A 2.7: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Staney Ayre, Sanday, Route 2.06.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
E-S 8	Field Dyke	A low ridge was visible running approximately north-south on the hillside.	Medieval/ Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
E-S 9	Earthen Platform	A possible earthen platform, measuring 18m by 14m.	Post-medieval	Negligible-Low	None (220m from BMH location and route to it)	Avoidance	None
E-S 10	Mound/ Cairn	The OS trig point stands upon a mound containing earth-fast stones which may be a heavily denuded barrow or cairn.	Prehistoric (?Bronze Age)	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
E-S 11	Enclosure	A grass covered sub-rectangular enclosure measuring 140m by 100m.	Uncertain	Uncertain	None (80m from BMH location and route to it)	Avoidance	None

©ORCA 2021

Table A 2.8: Impact appraisal of marine sites identified within the marine corridor of Route 2.06.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
-	-	-	-	-	None	None	None

No sites identified in corridor.

©ORCA 2021

Appendix 2: Route 2.7 Appraisal

Table A 2.9: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Links Ness, Stronsay, Route 2.07.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
S-S 1	Farmstead	Farmstead	Post-medieval/ Modern	Negligible	None (occupied farm)	Avoidance	None
S-S 2	Jetty	The remnants of two tracks lead down to a jetty, built of boulders, across the sand beach.	Post-medieval	Low	None (on S coast of Links Ness and 250m away from BMH location)	Avoidance	None
S-S 3	Settlement	At least 3 walls and a possible floor exposed by erosion of the coastal edge below an amorphous mound.	Medieval	Low-Medium	None (outwith landfall corridor and 200-250m away from BMH location)	Avoidance	None
S-S 4	Jetty	Rock edge, used as a jetty?	Medieval/ Post-medieval	Negligible-Low	None (on S coast of Links Ness and 250m away from BMH location)	Avoidance	None
S-S 23	Slipway	Short ruinous concrete slipway. Modern	Modern	Negligible	Minor (at or within 20m of BMH location)	None needed	Negligible
S-S 24	Structure	Part of ruinous structure made of concrete and flagstone, function unclear. Modern	Modern	Negligible	Minor (at or within 20m of BMH location)	None needed	Negligible

Table A 2.10: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Bay of Stove, Sanday, Route 2.07.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
S-S 5	Buildings, Enclosure and Trackway	A platform, 8m by 5m, butting against an enclosure with a denuded trackway extending towards the coastal trackway.	Post-medieval	Negligible	None (outwith landfall corridor and BMH location)	Avoidance	None
S-S 6	Burnt Mound	An amorphous mound of burnt stones.	Prehistoric (?Bronze Age)	Low-Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
S-S 7	Chambered Tomb	A chambered mound was accidentally discovered c.1912. No trace of the structure remains.	Prehistoric	Negligible-Low	None (170m from BMH location and route to it)	Avoidance	None
S-S 8	Steading with Farmhouse and Steam-Powered Threshing Machine	Large farm-building complex, the largest model farm in Orkney. Built c.1857.	Post-medieval	Medium	Low	Micro-siting and exclusion zones to avoid any listed elements or vernacular stone-built elements that form context for listed buildings of the farm complex	Minor / Negligible
S-S 9	Bone Implements, Spindle Whorl, Lithic Implements	Objects recovered from Lambaness and recorded in the Tankerness House old accession register. Location an artificially created location so artefacts could be recorded.	Prehistoric/ Medieval	Negligible	None (no actual site to impact)	Instatement of PAD	Negligible
S-S 10	Farm Cottages	A row of farm workers cottages associated with Stove Farm.	Post-medieval	Medium	None (230m from BMH location and route to it)	Avoidance	None
S-S 11	Chapel	The site of an Episcopal chapel built 1714 (demolished 1830) for the Sinclair family. Site now occupied by modern buildings.	Post-medieval	Negligible	None (60m from BMH location and route to it, but chapel already destroyed)	None required	None
S-S 12	Ditch	A cut feature, possibly part of a ditch, exposed in the coastal section.	Prehistoric (?Neolithic)	Low	None (150m from BMH location and route to it)	Avoidance	None

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
S-S 13	Settlement	Traces of a prehistoric settlement identified in the early 20th century. Recent fieldwalking has recovered numerous artefacts of Neolithic date.	Prehistoric (?Neolithic)	Medium	None (220m from BMH location and route to it)	Avoidance	None
S-S 14	Earthen Platform	An earthen platform, c.48m by 29m. May be the site of a former croft. It is possible (but less likely) that it is related to the numerous prehistoric features and settlements present in the surrounding landscape.	Post-medieval	Low	None (250m from BMH location and route to it)	Avoidance	None
S-S 15	Mound/ Raised Platform	A flat-topped mound, c.75m by 30m, within a waterlogged area of reed vegetation.	Uncertain	Uncertain	None (100m from BMH location and route to it)	Avoidance	None
S-S 16	Stone Spread	A spread of stone on a coastal slope (3m x 1m). Origin unclear but probably modern.	Modern	Negligible	None (150m from BMH location and route to it)	Avoidance	None
S-S 17	Dyke	Drystone dyke running from Stove Farm along the East coast of the Bay of Stove	Post-medieval	Low-Medium	None (180m from BMH location and route to it)	Avoidance	None
S-S 18	Stone Pile	Small circular pile of stone close to S-S 17. Probably post-medieval	Post-medieval	Negligible	None (450m from BMH location and route to it)	Avoidance	None
S-S 19	Structure	A series of small sections of coursed drystone masonry or tumble located within the coastal section, may be related to S-S 13.	Prehistoric (?Neolithic)	Medium	None (250m from BMH location and route to it)	Avoidance	None
S-S 20	Dyke	Drystone dyke associated with Stove farm	Post-medieval	Low-Medium	None (320m from BMH location and route to it)	Avoidance	None
S-S 21	Pier	Stone and concrete pier associated with Stove Farm	Post-medieval	Low-Medium	Medium-Low, at BMH location	Micro-site to avoid physical impact on pier.	Minor / Negligible
S-S 22	Structure	Small rectangular structure (2.5m x 1m x 0.75m) filled with stone, adjacent to dyke, function unclear	Post-medieval/ Modern	Low	None (420m from BMH location and route to it)	Avoidance	None

Table A 2.11: Impact appraisal of marine sites identified within the marine corridor of Route 2.07.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
Sebla	Swedish Frigate of Gothenburg. Wood. Capt Anderson	Wrecked at Hackness	30/10/1711	High	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor
Henry	Norwegian brig, wood, 208 tons, 10 crew, Christiania [Oslo] for Kinsale, cargo ice. 7 crew lost.	Wrecked at Hackness	08/02/1870	Medium	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor
Memoria	Norwegian Barque, Wood 382 tons. Drammen to Gloucester. Cargo timber	Stranded at Hackness	09/04/1894	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Freya	Norwegian Barque. Wood 384 tons. 11 crew. Tonsberg to America, in ballast. Crew saved	Stranded at Spurness, Stove.	08/04/1879	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Object (1)	Object found during project ADAIR	-	-	Unknown	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Unknown / Minor

Appendix 2: Route 2.9 Appraisal

Table A 2.12: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Sands of Evie, West Mainland, Route 2.09.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
M-R 1	Burial	A crouched burial was discovered in the Sands of Evie, in 1932. Its precise location is unknown.	Prehistoric	Negligible	None (location unknown)	Watching brief of trench from intertidal zone to and including BMH	Minor / Negligible
M-R 2	Chapel & Burial Ground	The chapel is of unknown date and is no longer visible but the burial ground is extant.	Medieval	Medium-High	None (Xm from BMH location and route to it)	Avoidance	None
M-R 3	Decoy Bunker	A decoy bunker dating from the Second World War. This was removed in the Post-War period.	Modern	Negligible	None (removed)	None required	None
M-R 4	Storehouse	A single-storey storehouse with a corrugated iron roof and concrete floor.	Post-medieval	Low	Minor	Avoid with exclusion zone to prevent damage to structure or foundations. Full standing building recording if not	Minor
M-R 5	Pier	A long drystone rubble jetty dating from the 18th century.	Post-medieval	Low	Minor	Avoid with exclusion zone to prevent damage to structure or foundations. Full standing building recording if not	Minor
M-R 6	Winches	A pair of winches on the shoreline for boat landing.	Post-medieval	Low	None (110m from BMH location and route to it)	Avoidance	None
M-R 7	Pictish Symbol Stone	A fragment of a symbol stone bearing a mirror symbol. Now in Tankerness Museum.	Late Iron Age	Negligible	None (removed)	Watching brief of trench from intertidal zone to and including BMH	Minor / Negligible
M-R 8	Planning designation	The Sands of Evie landfall is within the HONO WHS Sensitive Area of the Orkney West Mainland	Multi-period	Medium	Minor	Ground will be reinstated after cable and BMH installed	None
M-R 14	Noust?	Small hollow and flattened area on grassy slope just above shore, serving as a modern noust but may be earlier if artificial	Post-medieval/ Modern	Low - Negligible	Negligible	None required	Negligible
M-R 15	Culvert	Small roughly built culvert feeding field drain to shore	Post-medieval/ Modern	Negligible	Negligible	Replace/rebuild if damaged	Negligible
M-R 16	Nousts	A line of a least four heavily eroded nousts on a grassy slope above the shore. One ruined wall divides two of them but the rest have no visible structural elements. Associated with Site M-R 6 [winch].	Post-medieval	Low	None (120m from BMH location and route to it)	Avoidance	None

Table A 2.13: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Westness, Rousay, Route 2.09.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
M-R 9	Burial	Inhumation of a Viking woman and her baby with two oval brooches, a silver-gilt ringed pin (of 8th-century type), beads, a weaving batten, bronze straps, the remains of a bronze bowl and a pair of wool combs. Possible disturbed grave 3m away.	Early Medieval	Medium	High	Archaeologically excavate trench above MHWM to BMH	Minor
M-R 10	Farmstead	Shown on 1st Edition OS map.	Post-medieval	Low-Medium	None (50m from BMH location and route to it)	Avoidance	None

©ORCA 2021

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
M-R 11	Barrow	A circular mound, 17m in diameter and interpreted as a barrow. Denuded by ploughing.	Bronze Age	Low-Medium	None (140m from BMH location and route to it)	Avoidance	None
M-R 12	Mound	Initially interpreted as a Neolithic chambered barrow, this mound is now considered to more likely be a domestic structure.	Prehistoric (?Neolithic)	Low-Medium	None (150m from BMH location and route to it)	Avoidance	None
M-R 13	House	2 1/2-storied house built c.1750 to replace one burned down by Captain Moodie of Melsetter (Hay) 1746.	Post-medieval	Medium	None (80m from BMH location and route to it)	Avoidance	None

Table A 2.14: Impact appraisal of marine sites identified within the marine corridor of Route 2.09.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
Fortune	Ship of London. Wood, Cargo of coal from Newcastle. Capt Weston	Sank at anchor	02/05/1746	Medium	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Elizabeth	Cutter of Kirkwall.wood, Cargo of oats.	Drifted ashore while at anchor. Most likely refloated on next tide.	15/02/1869	Negligible	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Negligible

©ORCA 2021

Appendix 2: Route 2.10 Appraisal

Table A 2.15: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Sand of Heatherhouse, Mainland, Route 2.10.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
M-S 1	Croft	Two buildings, one structure and two enclosures depicted on the 1st Edition OS map, which appear to be no longer extant.	Post-medieval	Negligible	None (outwith landfall corridor and BMH location)	Avoidance	None
M-S 2	Croft	Four buildings and three enclosures depicted on the 1st Edition OS map, which appear to be no longer extant.	Post-medieval	Negligible	None (200m from BMH location and route to it)	Avoidance	None

Table A 2.16: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Bay of Sandgarth, Shapinsay, Route 2.10.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
M-S 3	Nousts	Two truncated and denuded nousts	Medieval/ Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
M-S 4	Structure	Unroofed building or enclosure	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
M-S 5	Burnt Mound	Site of a prehistoric burnt mound. Now denuded by cultivation.	Prehistoric (?Bronze Age)	Low	None (100m from BMH location and route to it)	Avoidance	None
M-S 6	Kelp Pits	A series of kelp pits and possible drying walls within an area of storm beach and blown sand.	Post-medieval	Low	Medium/High	Avoidance by placing BMH on disturbed ground at end of farm track. Watching brief during trench and BMH excavation in case of archaeological deposits below the disturbed ground.	Minor
M-S 7	Landing Place	A place for landing boats with a wave-cut platform.	Medieval/ Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
M-S 8	Earthworks	A series of turf covered sub-circular earthworks. earthfast stone is visible, also an exposed cellular feature on the south side of the mound.. The area immediately to the north of this is very undulating and sand dunes could be concealing more structural features.	? Prehistoric	Medium	Medium/High	Avoidance by placing BMH on disturbed ground at end of farm track. Watching brief during trench and BMH excavation in case of archaeological deposits below the disturbed ground.	Minor

©ORCA 2021

Table A 2.17: Impact appraisal of marine sites identified within the marine corridor of Route 2.10.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
Village Belle	Yacht, wood.	''Sank near Kirkwall''	03/08/1929	Negligible	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Negligible
Swift	Sloop of Fraserburgh. Wood, 48 ton	''Lost near Kirkwall''	00/11/1825	Unknown	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor
Unknown (3)	Ferry of Eday. Wood.	''Upset and ashore at Saverock, Shapinsay''.	07/11/1844	Unknown	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor
Fuscia	Schooner of Newcastle, wood,. 66 tons. Newcastle to Kirkwall. Cargo coal	Wrecked on ''The Maidens'' Shapinsay. Crew saved	01/04/1854	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible

Appendix 2: Route 2.11 Appraisal

Table A 2.18: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Crockness, Hoy, Route 2.11.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
H-F 1	Martello Tower	A circular, masonry tower. Built in 1813-15, along with Hackness tower, to guard the approach to the Longhope anchorage	Nineteenth century	High	Minor (BMH adjacent to Scheduled area)	Avoidance of Scheduled area, not just the tower itself (required by law. Put in exclusion zone 10m around scheduled boundary to ensure avoidance.	None
H-F 2	Croft	A dwelling house and outbuilding with corn-drying kiln. Stone-built with mortar bonding. 19th century	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
H-F 3	Linear Feature	A linear feature visible on aerial photographs. Not noted in walkover.	Uncertain	Uncertain	Minor	Plot on ground from aerial photos so can be avoided. Watching brief as alternative.	Minor - Negligible
H-F 4	Military Telegraph Hut and Boathouse	First World War concrete telegraph hut and a stone-built boathouse with a concrete floor. Largely intact.	Modern	Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
H-F 5	Croft	A group of five ruined structures, four of which are conjoined. The single building appears to be a boathouse. All these structures are probably associated with a refurbished cottage nearby.	Post-medieval	Low	None (300m from BMH location and route to it)	Avoidance	None
H-F 8	Culvert	Small roughly built stone culvert at edge of field above shore.	Modern	Negligible	None (80m from BMH location and route to it)	Avoidance	None
H-F 9	Mooring/ Fish Trap	A sub-circular tidal pool formed by a bank of beach cobbles around a sandy gravel area with an opening to the sea. Unclear if this is artificially formed or a product of tidal action. Upon the bank is an upright stone with packing stones, and there is a wooden post in the pool (332510E 1093130N).	Uncertain	Uncertain	None (220m from BMH location and route to it)	Avoidance	None

Table A 2.19: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Weddel, Flotta, Route 2.11.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
H-F 6	Buildings	Two unroofed buildings depicted on the First Edition OS map (Orkney and Shetland (Orkney) 1882, sheet cxix).	Post-medieval	Negligible-Low	None (outwith landfall corridor and BMH location)	Avoidance	None
H-F 7	Airfield	20th-century airstrip, used by Flotta oil terminal	Modern	Low	None	Avoidance	None
H-F 10	Peat cuttings	Extensive area of peat cuttings across much of side of West Hill	Post-medieval	Negligible	None (outwith landfall corridor and BMH location)	Avoidance	None
H-F 11	Structure	Base of a small concrete structure. Could be related to the airfield or could be related to wartime defences	Modern	Negligible-Low	None (50m from BMH location and route to it)	Avoidance	None

Table A 2.20: Impact appraisal of marine sites identified within the marine corridor of Route 2.11.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
V45	German Destroyer. Steel	Beached during attempt to scuttle	21/06/1919	Negligible	Medium	None required – vessel removed	None
Unidentified object	Mound 108m by 97m x 2m	-	-	Negligible	Medium	None required – natural feature	None
HMD Rose Valley	Steam Drifter. Wood 100 tons. Cargo torpedoes	Foundered after a collision. Crew saved.	16/12/1943	Low	Medium	Avoidance, with 40m exclusion zone	None
Helen	Ship of Liverpool. Wood. Cargo of salt From Liverpool to Baltic.	Wrecked SW side of Flotta	00/04/1800	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Barbara	Schooner. Wood. 113 tons. Cargo of fishing stock and herrings	Wrecked SW side of Flotta	04/11/1911	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Sir William Cumming	Schooner of Inverness. Wood. 48 tons.	Wreck on Flotta while attempting to enter Longhope.	22/04/1844	Unknown	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Isabella Wilson	Schooner of Banff. Wood. 183 tons. Cargo of wheat.	Stranded on west side of Flotta	17/11/1877	Low	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
-	Small ship's boiler and nearby debris	-	-	Unknown	Medium	Avoidance, with 30m exclusion zone	None

©ORCA 2021

Appendix 2: Route 2.12 Appraisal

Table A 2.21: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Pan Hope, Flotta, Route 2.12.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
F-SR 1	Pier	A dilapidated concrete pier.	Nineteenth century	Low	Medium (potential vibration from trench cutting machinery or destabilising of foundations)	Avoidance with exclusion zone marked; PAD	Minor
F-SR 2	Buildings, Pier	An unroofed structure with a stone jetty. Could be associated with Quoyness Farm.	Post-medieval	Low	None (350m from BMH location and route to it)	Avoidance	None
F-SR 3	Observation Posts	Remains of three brick and concrete buildings. These may have served as look-out positions overlooking the entrance to Pan Hope.	Modern	Low	None (350m from BMH location and route to it)	Avoidance	None
F-SR 4	Farmstead	Three buildings with an enclosure. One of the buildings is a horse-engine house.	Post-medieval	Low	None (350m from BMH location and route to it)	Avoidance	None
F-SR 5	Structure	A roofless structure. No longer extant.	Post-medieval	Low	None (200m from BMH location and route to it)	Avoidance	None
F-SR 6	Pipeline	Submerged site identified through aerial photographs. Identified as Flotta oil terminal pipeline.	Modern	Negligible - High	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 20	Farmstead, Post Office	Farmstead shown on the 1st Edition OS map, marked as a Post Office. Associated with a pier (Site F-SR 1)	Post-medieval	Low	Medium (potential vibration from trench cutting machinery or destabilising of foundations)	Avoidance with exclusion zone marked; PAD	Minor
F-SR 21	Farmstead, Wells, Jetty	A group of four roofed buildings shown on the 1st Edition OS map, with two adjacent wells. Only one appears to be still roofed with the remainder appearing to be dilapidated. Possible related jetty at the shore.	Post-medieval	Low	None (120m from BMH location and route to it)	Avoidance	None
F-SR 22	Structure	A small pile of stone within a drystane dyke enclosure. Appears to be the ruins/ demolition debris of a small structure. May be related to F-SR 20 or F-SR 21. Marked on the OS first edition (1882)	Post-medieval	Low - Negligible	None (20m from BMH location and route to it)	Avoidance	None
F-SR 23	Structure	Small, ruinous stone structure just above the shore. May be related to F-SR 20 or F-S 21. Marked on the OS first edition (1882)	Post-medieval	Low - Negligible	None (50m from BMH location and route to it)	Avoidance	None
F-SR 24	Mound	Small, sub-oval grassy mound within boggy area. Likely to be related to drainage works in field but could be older	Uncertain	Uncertain	None (150m from BMH location and route to it)	Avoidance	None
F-SR 25	Well	Small pit lined with coursed flagstone masonry with concrete capping stone. Possibly associated with Site F-SR 20	Post-medieval	Low	Medium (potential vibration from trench cutting machinery resulting in destabilising)	Avoidance with exclusion zone marked	Minor
F-SR 26	Concrete pillars	A line of three concrete pillars running down the beach at right angles to the shore	Modern	Low	None (80m from BMH location and route to it)	Avoidance	None
F-SR 27	Concrete blocks	A spread of large concrete blocks located on the coastal slope and the top of the beach	Modern	Low	None (100m from BMH location and route to it)	Avoidance	None
F-SR 28	Wall	A small section of roughly coursed drystone wall at the top of the shore. Possible revetment for slipway or access route to shore?	Post-medieval	Low - Negligible	None (140m from BMH location and route to it)	Avoidance	None
F-SR 29	Structure/ pit	A small concrete platform, possibly the base of a structure, adjacent to a small sub-rectangular pit located close to low cliffs	Modern	Low	None (500m from BMH location and route to it)	Avoidance	None
F-SR 30	Farmstead	Two traditional stone buildings with extant flagstone roofs, marked on the OS first Edition	Post-medieval	Low	None (250m from BMH location and route to it)	Avoidance	None

©ORCA 2021

Table A 2.22: Impact appraisal of sites identified within the onshore 500m radius buffer study area, Dam of Hoxa, South Ronaldsay, Route 2.12.

ORCA Site No.	Type	Description	Period	Importance	Magnitude of Impact	Mitigation	Significance of Effect
F-SR 8	Croft	A roofless farm dwelling.	Post-medieval	Negligible-Low	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 9	Broch	Remains of an Iron Age broch which has been heavily disturbed and altered. The structure has an internal diameter of c.9m and overlooks the beach at the Dam of Hoxa. There is also evidence for settlement around the broch.	Iron Age	Medium	None (370m from BMH location and route to it)	Avoidance	None
F-SR 10	Settlement	A circular mound measuring c.19m in diameter and c.1.5m high, with internal stone-built structural elements. Interpreted as being part of a settlement associated with the nearby broch.	Iron Age	Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 11	Military Camp	Small military camp. Now redeveloped as an amenity area.	Modern	Negligible	None (outwith landfall corridor and BMH location)	None required	None
F-SR 12	Farmstead, Pier	Two unroofed buildings with a slipway nearby. A number of building footings are visible around the buildings	Post-medieval	Low	None (300m from BMH location and route to it)	Avoidance	None
F-SR 13	Farmstead	A range of conjoined buildings, with a corn-drying kiln. Buildings converted into a modern cottage.	Post-medieval	Low	Minor – is an occupied house, even though only 20m from BMH location and route to it.	Avoidance by micro-siting	None
F-SR 14	Boathouse	A ruinous, rectangular drystone structure on the cliff edge. A possible boathouse.	Post-medieval	Negligible-Low	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 15	Enclosure	A sub-circular structure. 30m in diameter, defined by an earthen and stone bank. Located on a small, low-lying promontory.	Prehistoric	Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 16	Farmstead	Two buildings, three structures and two enclosures.	Post-medieval	Low	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 17	Boundary	An earthen bank, c.50m in length, at the boundary between rough pasture and the foreshore.	Post-medieval	Negligible	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 18	Farmstead	A single building and enclosure depicted on the 1st Edition OS map, which appear to be no longer extant.	Post-medieval	Negligible	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 19	Chambered Cairn	A Neolithic chambered cairn known locally as "The Wart", c.9.5m in diameter. Human bones removed during the excavation of 1870.	Neolithic	Medium	None (outwith landfall corridor and BMH location)	Avoidance	None
F-SR 31	Stone Spread	A spread of stone in the coastal section. No discernible pattern or structure.	Uncertain	Low	None (200m from BMH location and route to it)	Avoidance	None
F-SR 32	Structure	Modern, stone-built structure at base of coastal section. Appears to be associated with F-SR 13	Modern	Negligible	None (80m from BMH location and route to it)	Avoidance	None
F-SR 33	Culvert	Stone built culvert with breeze block additions	Post-medieval/ Modern	Negligible	None (Xm from BMH location and route to it)	Avoidance	None

©ORCA 2021

Table A 2.23: Impact appraisal of marine sites identified within the marine corridor of Route 2.12.

Name	Description	Circumstance of loss	Date Lost	Importance	Magnitude of Impact	Mitigation	Significance of Effect
Unknown (4)	Small wreck	-	-	Unknown	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Unknown (5)	wreck	-	-	Unknown	Medium	Avoidance with 30m exclusion zone	None
Sykes	Sloop of Hull. Wood. Cargo of timber and iron.	Wrecked in Pan Hope Bay.	22/05/1788	Medium	Medium	Review of marine geophysical data for the route has not identified contacts or anomalies that indicate presence in the corridor; Instatement of marine PAD	Minor / Negligible
Unknown (6)	Unknown	Most likely relates to UB 116	-	High	Medium	Avoidance with 50m exclusion zone	None
UB-116	German UB class U Boat Steel. 651 tons. 36 crew, all lost.	Sunk by controlled mine	26/10/1918	High	Medium	Avoidance with 50m exclusion zone	None
Boom Defence	Anti-submarine Booms 'a' And 'b'	Shown on chart within ADM 137/1074	WW1 & WW2	Medium (in terms of the defence) Low (in terms of what remains)	Medium	Mine anchors and anchors for boom nets, iron or steel clump weights and square concrete block weights all identified, but they are of no real historic value and would not suffer from the proximity of the cable An ROV survey along the route would determine if the contacts were rocks or anchors	Negligible
Boom Defence And Minefield	Anti-destroyer boom and mine lines	Shown on chart within ADM 137/1074	WW1 & WW2	Medium (in terms of the defence) Low (in terms of what remains)	Medium	Mine anchors and anchors for boom nets, iron or steel clump weights and square concrete block weights all identified, but they are of no real historic value and would not suffer from the proximity of the cable An ROV survey along the route would determine if the contacts were rocks or anchors	Negligible

9.3 Appendix 3: Walkover survey photographic register

(Photographic images can be supplied on request.)

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
1	1	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 16	Sand pit	W
1	2	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 16	Sand pit	NE
1	3	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 16	Sand pit, detail of wall	NW
1	4	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 16	Sand pit, detail of wall	NE
1	5	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 17	Wall	S
1	6	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 17	Wall, NE facing elevation	SW
1	7	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 17	Wall	S
1	8	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 18	Mound	W
1	9	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 18	Mound	NE
1	10	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 18	Mound	SW
1	11	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 18	Mound, detail of stone	SW
1	12	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 09	Planticrub	SE
1	13	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 09	Planticrub	NW
1	14	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation, detail gun emplacement	NE
1	15	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation, detail gun emplacement	E
1	16	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation	N
1	17	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation, detail concrete platform	SE
1	18	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation	NE
1	19	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation	SE
1	20	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 19	Military installation , detail bank	SE
1	21	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail main building	W

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
1	22	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail outbuilding	NE
1	23	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail outbuilding	E
1	24	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail main building	N
1	25	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail enclosure to front	E
1	26	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail main building and outbuildings to rear	E
1	27	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 06	Farmstead, detail enclosure to rear	NE
1	28	2.3 Sanday-Shetland	Scuthvie Bay, Sanday	S-Sh 07	Fish house wind generator	E
1	29	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 16	Stone spread	E
1	30	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 19	Structures	SE
1	31	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 19	Structures	NW
1	32	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 19	Structures	SE
1	33	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 19	Structures	E
1	34	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 08	Bay of Stove, general shot with farmstead	NW
1	35	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 18	Stone pile	E
1	36	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 17	Dyke	N
1	37	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 22	Structure	NE
1	38	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 08	Bay of Stove, general shot with farmstead	NW
1	39	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 08	Pier	NW
1	40	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 08	Farmstead	NW
1	41	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 08	Bay of Stove, general shot with farmstead	SE
1	42	2.7 Stronsay-Sanday	Bay of Stove, Sanday	S-S 08	Farmstead	E
2	1	2.11 Hoy-Flotta	Crockness, Hoy	H-F 01	Martello tower	NW
2	2	2.11 Hoy-Flotta	Crockness, Hoy	H-F 01	Martello tower	NE

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
2	3	2.11 Hoy-Flotta	Crockness, Hoy	H-F 01	Martello tower	SE
2	4	2.11 Hoy-Flotta	Crockness, Hoy	H-F 08	Culvert	SW
2	5	2.11 Hoy-Flotta	Crockness, Hoy	H-F 01	Martello tower	NW
2	6	2.11 Hoy-Flotta	Crockness, Hoy	H-F 09	Mooring, fishtrap (?)	NE
2	7	2.11 Hoy-Flotta	Crockness, Hoy	H-F 09	Mooring, fishtrap (?)	NE
2	8	2.11 Hoy-Flotta	Crockness, Hoy	H-F 09	Mooring, fishtrap (?)	E
2	9	2.11 Hoy-Flotta	Crockness, Hoy	H-F 09	Mooring, fishtrap (?), detail	S
2	10	2.11 Hoy-Flotta	Crockness, Hoy	H-F 09	Mooring, fishtrap (?), detail	S
2	11	2.11 Hoy-Flotta	Crockness, Hoy	H-F 05	Pier	E
2	12	2.11 Hoy-Flotta	Crockness, Hoy	H-F 05	Croft	NW
2	13	2.11 Hoy-Flotta	Crockness, Hoy	H-F 05	Croft	NE
2	14	2.11 Hoy-Flotta	Crockness, Hoy	H-F 05	Croft	NE
2	15	2.11 Hoy-Flotta	Crockness, Hoy	H-F 03	Linear feature	SE
2	16	2.11 Hoy-Flotta	Crockness, Hoy	H-F 03	Linear feature	NW
3	1	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 4	Storehouse	S
3	2	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 4	Storehouse	E
3	3	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 5	Pier	NW
3	4	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 14	Possible noust	SW
3	5	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 14	Possible noust	SE
3	6	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 15	Culvert	SW
3	7	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16 / M-R 6	Nousts and winch	SW
3	8	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 6	Winch	NE
3	9	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16	Nousts	SW

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
3	10	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16	Nousts	SW
3	11	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16	Nousts	NE
3	12	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16	Nousts	SW
3	13	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16	Nousts	SE
3	14	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 16	Nousts, detail of wall	NE
3	15	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 2	Burial ground	NE
3	16	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 2	Burial ground	NE
3	17	2.9 Mainland-Rousay	Sands of Evie, Mainland.	M-R 2	Burial ground	NE
3	18	2.9 Mainland-Rousay	Westness, Rousay	-	Westness, general shot showing drystane dyke field boundaries	NE
3	19	2.9 Mainland-Rousay	Westness, Rousay	-	Westness, general shot showing drystane dyke field boundaries	W
3	20	2.9 Mainland-Rousay	Westness, Rousay	M-R 10	Farmstead	E
3	21	2.9 Mainland-Rousay	Westness, Rousay	M-R 10	Farmstead	N
3	22	2.9 Mainland-Rousay	Westness, Rousay	M-R 10	Pier	NW
3	23	2.9 Mainland-Rousay	Westness, Rousay	M-R 10	Farmstead	N
3	24	2.9 Mainland-Rousay	Westness, Rousay	M-R 13	Boundary wall and woods	W
3	25	2.9 Mainland-Rousay	Westness, Rousay	M-R 11	Bbarrow	NW
3	26	2.9 Mainland-Rousay	Westness, Rousay	M-R 10 / M-R 13	General shot with sites M-R 13 and M-R 10	S
3	27	2.9 Mainland-Rousay	Westness, Rousay	M-R 12	Mound	W
3	28	2.9 Mainland-Rousay	Westness, Rousay	M-R 13	House	SW
4	1	2.5 Westray-Eday	Whale Geo, Westray	W-E 15	Trig point	W
4	2	2.5 Westray-Eday	Whale Geo, Westray	W-E 5	Windmill	SW
4	3	2.5 Westray-Eday	Whale Geo, Westray	W-E 5	Windmill	S

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
4	4	2.5 Westray-Eday	Whale Geo, Westray	W-E 12	Farmstead	S
4	5	2.5 Westray-Eday	Whale Geo, Westray	W-E 13	Farmstead	NW
4	6	2.5 Westray-Eday	Whale Geo, Westray	W-E 12	Farmstead	NW
4	7	2.5 Westray-Eday	Whale Geo, Westray	W-E 12	Farmstead	N
4	8	2.5 Westray-Eday	Whale Geo, Westray	W-E 10	Culvert	NW
4	9	2.5 Westray-Eday	Whale Geo, Westray	W-E 3	Nousts	SW
4	10	2.5 Westray-Eday	Whale Geo, Westray	W-E 3	Nousts	SW
4	11	2.5 Westray-Eday	Whale Geo, Westray	W-E 3	Nousts	SW
4	12	2.5 Westray-Eday	Whale Geo, Westray	W-E 3	Nousts	N
4	13	2.5 Westray-Eday	Whale Geo, Westray	W-E 3	Nousts	S
4	14	2.5 Westray-Eday	Whale Geo, Westray	W-E 11	Farmstead	W
4	15	2.5 Westray-Eday	Whale Geo, Westray	W-E 14	Stone spread	NW
5	1	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 1	Pier	NW
5	2	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 1	Pier	NW
5	3	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post-office from Site F-SR 1, pier	SE
5	4	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office	E
5	5	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office	NE
5	6	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office	W
5	7	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office	SW
5	8	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office	SE
5	9	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office, detail	SE
5	10	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office, interior	SE
5	11	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 20	Farmstead, post office, interior	SE
5	12	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 25	Well	SE

©ORCA 2021

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
5	13	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 23	Structure	SE
5	14	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead	S
5	15	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead	S
5	16	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead, pier	N
5	17	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead	E
5	18	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead, corner stone detail	E
5	19	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead, interior	NE
5	20	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead, interior	NE
5	21	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead	W
5	22	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead	SW
5	23	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 21	Farmstead	SW
5	24	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 24	Mound	SE
5	25	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 23	Structure	N
5	26	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 22	Structure	SE
5	27	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 26	Pillars	NW
5	28	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 26	Pillars	SW
5	29	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 27	Pillars	W
5	30	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 28	Wall	S
5	31	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 28	Wall	SW
5	32	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Pier	N
5	33	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Pier	NW
5	34	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Outbuilding	S
5	35	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Outbuilding	W
5	36	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Structures	S

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
5	37	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Structures	SW
5	38	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 3	Observation posts, structure 1	NE
5	39	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 3	Observation posts, structure 1	NW
5	40	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 3	Observation posts, structure 2	SW
5	41	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 3	Observation posts, structure 2, interior	SW
5	42	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 3	Observation posts, structure 2	NE
5	43	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Structure 2	NW
5	44	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Structure 2	SW
5	45	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Structure 3	SE
5	46	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 2	Structure 3	NW
5	47	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 29	Concrete platform	SE
5	48	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 29	Pit	SE
5	49	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 30	Farmstead	W
5	50	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	NE
5	51	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	E
5	52	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	E
5	53	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	SE
5	54	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead, detail horse engine gears	E
5	55	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	SE
5	56	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	SE
5	57	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	S
5	58	2.12 Flotta-South Ronaldsay	Pan Hope, Flotta	F-SR 4	Farmstead	NW
5	59	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, track	SE
5	60	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, turbine	SE

©ORCA 2021

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
5	61	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, track	SE
5	62	2.11 Hoy-Flotta	Weddel, Flotta	H-F 11	Structure	SE
5	63	2.11 Hoy-Flotta	Weddel, Flotta	H-F 11	Structure	SW
5	64	2.11 Hoy-Flotta	Weddel, Flotta	H-F 11	Structure	SE
5	65	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield path	SW
5	66	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield path	NE
5	67	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, runway	NW
5	68	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, runway	SE
5	69	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, hellipad	NE
5	70	2.11 Hoy-Flotta	Weddel, Flotta	H-F 7	Airfield, terminal building	SE
6	1	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 9	General view of the Dam of Hoxa	NE
6	2	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 9	General view of the Dam of Hoxa	NE
6	3	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 12	Unroofed buildings & slipway	N
6	4	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view of the Dam of Hoxa	E
6	5	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 33	Watercourse running into culvert from pond	S
6	6	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	Track between ponds	SE
6	7	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	View across east pond	NE
6	8	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	View to south of west pond	SW
6	9	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view south of ponds	E
6	10	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view south of ponds	S
6	11	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view south of ponds	SW
6	12	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	Disturbed area south of ponds	SW
6	13	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view south of ponds	W
6	14	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view south of ponds	NW

©ORCA 2021

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
6	15	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view of the Dam of Hoxa	W
6	16	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 13	General view of the Dam of Hoxa	W
6	17	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay		General view of the Dam of Hoxa	SW
6	18	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 13	General view of the Dam of Hoxa	SW
6	19	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 31	Stone tumble of coastal slope	S
6	20	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 31	Stone tumble of coastal slope	S
6	21	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 13	Dwelling with corn-drying kiln	W
6	22	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 32	Structure	S
6	23	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 13	Dwelling with corn-drying kiln	W
6	24	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 13	Dwelling with corn-drying kiln	W
6	25	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	Revetting stones west of dwelling	SW
6	26	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view across the Dam of Hoxa	NW
6	27	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	-	General view of the Dam of Hoxa	W
6	28	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 12	Unroofed buildings & slipway	NW
6	29	2.12 Flotta-South Ronaldsay	Dam of Hoxa, South Ronaldsay	F-SR 12	Unroofed buildings & slipway	NW
7	1	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view along beach at Heatherhouse	W
7	2	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view along beach from Heatherhouse	E
7	3	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	M-S 2	Possible remains of former croft at Heatherhouse	S
7	4	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view of coastal slope	S
7	5	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view of coastal slope	S
7	6	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view along beach at proposed BMH location	SW
7	7	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view along beach	NE
7	8	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view along beach	NE

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
7	9	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view above beach at proposed BMH location	NE
7	10	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view southeast of Heatherhouse	SW
7	11	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view southeast of Heatherhouse	W
7	12	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view of Heatherhouse	SW
7	13	2.10 Mainland-Shapinsay	Sand of Heatherhouse, Mainland	-	General view southeast of Heatherhouse	SE
8	1	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 6	General view of location from trackway	SE
8	2	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 6	General view of location	NE
8	3	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 6	General view of location	E
8	4	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	-	General view along beach at Pool of Haroldsgarth	W
8	5	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	-	General view along beach at Pool of Haroldsgarth	E
8	6	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 8	General view of mound	SE
8	7	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 8	General view of mound	S
8	8	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 8	General view of mound	E
8	9	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 8	General view of mound	NW
8	10	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 8	General view of mound	N
8	11	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	M-S 7	General view of gap in wave cut platform	W
8	12	2.10 Mainland-Shapinsay	Bay of Sandgarth, Shapinsay	-	General view along coast from Broad Geo	N
9	1	2.5 Westray-Eday	Cusbay, Eday	W-E 7	Croft	SE
9	2	2.5 Westray-Eday	Cusbay, Eday	W-E 7	Croft	NW
9	3	2.5 Westray-Eday	Cusbay, Eday	W-E 16	Farmstead	NW
9	4	2.5 Westray-Eday	Cusbay, Eday	W-E 16	Farmstead	NE
9	5	2.5 Westray-Eday	Cusbay, Eday	W-E 16	Farmstead	SW

©ORCA 2021

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
9	6	2.5 Westray-Eday	Cusbay, Eday	W-E 16	Farmstead	NW
9	7	2.5 Westray-Eday	Cusbay, Eday	W-E 18	Structure	E
9	8	2.5 Westray-Eday	Cusbay, Eday	W-E 18	Structure	N
9	9	2.5 Westray-Eday	Cusbay, Eday	W-E 17	Dyke	SE
9	10	2.5 Westray-Eday	Cusbay, Eday	W-E 19	Farmstead	NE
9	11	2.5 Westray-Eday	Cusbay, Eday	W-E 20	Enclosures	SW
9	12	2.5 Westray-Eday	Cusbay, Eday	W-E 20	Enclosures	N
9	13	2.5 Westray-Eday	Cusbay, Eday	W-E 20	Enclosures	NE
9	14	2.5 Westray-Eday	Cusbay, Eday	W-E 20	Enclosures	SE
9	15	2.5 Westray-Eday	Cusbay, Eday	W-E 21	Stone piles	E
9	16	2.5 Westray-Eday	Cusbay, Eday	W-E 21	Stone piles	SE
9	17	2.6 Eday-Sanday	Bay of London, Eday	E-S 2	Road	NE
9	18	2.6 Eday-Sanday	Bay of London, Eday	E-S 2	Road	N
9	19	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Mounds	S
9	20	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Mounds	NW
9	21	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Mounds	NE
9	22	2.6 Eday-Sanday	Bay of London, Eday	E-S 12	Bank	SW
9	23	2.6 Eday-Sanday	Bay of London, Eday	E-S 2	Road	S
9	24	2.6 Eday-Sanday	Bay of London, Eday	E-S 2	Road	S
9	25	2.6 Eday-Sanday	Bay of London, Eday	E-S 2	Road	N
9	26	2.6 Eday-Sanday	Bay of London, Eday	E-S 6	Mound	N
9	27	2.6 Eday-Sanday	Bay of London, Eday	E-S 6	Mound	NW
9	28	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Farmstead	NW
9	29	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Farmstead	SE

Batch	Frame	Route	Landfall Location	Site	Description	Direction of Shot
9	30	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Farmstead	W
9	31	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Farmstead	SE
9	32	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Farmstead	E
9	33	2.6 Eday-Sanday	Bay of London, Eday	E-S 7	Farmstead	SW
10	1	2.7 Stronsay-Sanday	Links Ness, Stronsay	S-S 23	Slipway	N
10	2	2.7 Stronsay-Sanday	Links Ness, Stronsay	S-S 24	Structure	W
10	3	2.7 Stronsay-Sanday	Links Ness, Stronsay	S-S 1	Farmstead	W
10	4	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	Farmstead	S
10	5	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	Farmstead	NE
10	6	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	Farmstead	NW
10	7	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	General site shot	NW
10	8	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	General site shot	SE
10	9	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	Drystane dyke	NE
10	10	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	General site shot	NW
10	11	2.7 Stronsay-Sanday	Links Ness, Stronsay	-	General shot of beach at Stursy with seal cubs	W

©ORCA 2021

9.4 Appendix 4: Marine geophysical survey image files

Appendix 4: Route 2.3 Survey Data Reviewed

Table A 4.1: Route 2.3 MBES Image Files.

Route 2.3 MBES Image Files
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_1_1_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_1_2_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_1_3_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_10_16_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_10_17_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_10_18_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_11_18_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_11_19_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_12_19_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_12_20_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_13_20_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_13_21_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_14_21_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_15_21_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_15_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_16_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_17_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_18_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_19_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_2_2_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_2_3_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_2_4_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_2_5_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_20_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_21_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_22_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_23_21_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_23_22_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_3_4_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_3_5_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_3_6_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_3_7_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_4_7_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_4_8_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_4_9_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_5_10_issue1.tif

©ORCA 2021

Route 2.3 MBES Image Files
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_5_11_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_5_9_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_6_11_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_6_12_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_6_13_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_7_12_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_7_13_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_7_14_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_8_14_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_8_15_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_8_16_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_9_15_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_9_16_issue1.tif
2636_203_FV_VK_FTV_MBES_LAT_0pt25m_9_17_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_1_1_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_1_2_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_2_2_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_2_3_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_2_4_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_3_4_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_3_5_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_4_5_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_5_5_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_GRADIENT_1m_6_5_issue1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_1_1.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_1_2.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_2_2.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_2_3.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_2_4.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_3_4.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_3_5.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_4_5.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_5_5.tif
2636_203_FV_VK_FTV_MBES_LIDAR_LAT_1m_issue1_6_5.tif

©ORCA 2021

Table A 4.2: Route 2.3 SSS Image Files.

Route 2.3 SSS Image Files
2636_203_GEO_FTV_SSS_HF_0pt1m_issue1.tif
2636_203_GEO_VK_SSS_HF_0pt1m_issue1.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0023_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0023_C0020.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0022_C0022.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0022_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0021_C0022.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0021_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0020_C0022.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0020_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0019_C0022.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0019_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0018_C0022.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0018_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0017_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0016_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0015_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0014_C0021.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0014_C0020.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0013_C0020.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0012_C0020.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0012_C0019.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0012_C0018.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0011_C0019.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0011_C0018.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0011_C0017.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0010_C0018.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0010_C0017.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0010_C0016.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0009_C0016.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0009_C0015.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0008_C0015.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0008_C0014.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0007_C0014.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0007_C0013.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0007_C0012.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0006_C0013.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0006_C0012.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0006_C0011.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0006_C0010.tif

©ORCA 2021

Route 2.3 SSS Image Files
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0005_C0011.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0005_C0010.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0005_C0009.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0004_C0009.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0004_C0008.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0004_C0007.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0003_C0007.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0003_C0006.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0003_C0005.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0003_C0004.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0002_C0005.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0002_C0004.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0002_C0003.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0002_C0002.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0001_C0003.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0001_C0002.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0001_C0001.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0001_C0000.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0000_C0001.tif
2636_GEO_203_FV_SSS_HF_0.1mpp_issue1R0000_C0000.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0014_C0012.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0013_C0013.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0013_C0012.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0012_C0013.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0012_C0012.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0011_C0013.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0011_C0012.tif
2636_20210721_203_FV_SSS_LF_0.1mpp_issue1R0010_C0012.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0009_C0012.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0008_C0012.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0008_C0011.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0007_C0012.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0007_C0011.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0007_C0010.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0006_C0011.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0006_C0010.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0006_C0009.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0005_C0009.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0005_C0008.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0004_C0008.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0004_C0007.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0003_C0007.tif

©ORCA 2021

Route 2.3 SSS Image Files
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0003_C0006.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0002_C0005.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0002_C0004.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0002_C0003.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0001_C0003.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0001_C0002.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0001_C0001.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0001_C0000.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0000_C0001.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0000_C0000.tif
2636_GEO_203_FV_SSS_LF_0.1mpp_issue1R0003_C0005.tif

Table A 4.3: Route 2.3 Mag Image Files.

Route 2.3 Mag Image Files
2636_203_GEO_VK_FV_FTV_MAG_TFAS_0pt3m_issue1.tif
2636_203_GEO_VK_FV_FTV_MAG_TF_0pt3m_issue1.tif

©ORCA 2021

Appendix 4: Route 2.5 Survey Data Reviewed

Table A 4.4: Route 2.5 MBES Image Files.

Route 2.5 MBES Image Files
2636_205_VK_MBES_LAT_0pt25m_1_1_issue1.tif
2636_205_VK_MBES_LAT_0pt25m_1_2_issue1.tif
2636_205_VK_MBES_LAT_0pt25m_2_1_issue1.tif
2636_205_VK_MBES_LAT_0pt25m_2_2_issue1.tif

Table A 4.5: Route 2.5 SSS Image Files.

Route 2.5 SSS Image Files
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0003.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0002.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0001.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0000.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0003.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0002.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0001.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0005.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0004.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0003.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0005.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0004.tif
2636_205_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0003.tif

Table A 4.6: Route 2.5 Mag Image Files.

Route 2.5 Mag Image Files
2636_205_GEO_VK_MAG_TFAS_0p3m_issue1.tif
2636_205_GEO_VK_MAG_RES_0p3m_issue1.tif

©ORCA 2021

Appendix 4: Route 2.6 Survey Data Reviewed

Table A 4.7: Route 2.6 MBES Image Files.

Route 2.6 MBES Image Files
2636_206_VK_MBES_LAT_0pt25m_issue1.tif

Table A 4.8: Route 2.6 SSS Image Files.

Route 2.6 SSS Image Files
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0004.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0003.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0004.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0003.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0002.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0001.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0002.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0001.tif
2636_206_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0000.tif

Table A 4.9: Route 2.6 Mag Image Files.

Route 2.6 Mag Image Files
2636_206_GEO_VK_MAG_TFAS_0p3m_issue1.tif
2636_206_GEO_VK_MAG_RES_0p3m_issue1.tif

©ORCA 2021

Appendix 4: Route 2.7 Survey Data Reviewed

Table A 4.10: Route 2.7 MBES Image Files.

Route 2.7 MBES Image Files
2636_207_MBES_LAT_1m_issue1.tif
2636_207_VK_MBES_LAT_0pt25m_issue1.tif

Table A 4.11: Route 2.7 SSS Image Files.

Route 2.7 SSS Image Files
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0004_C0000.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0001.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0000.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0001.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0000.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0002.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0001.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0002.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0001.tif
2636_207_GEO_VK_SSS_HF_0pt1m_issue1_R0004_C0001.tif

Table A 4.12: Route 2.7 Mag Image Files.

Route 2.7 Mag Image Files
2636_207_UXO_VK_MAG_TFAS_0p3m_issue2.tif
2636_207_GEO_VK_MAG_TFAS_0p3m_issue1.tif
2636_207_UXO_VK_MAG_RES_0p3m_issue2.tif
2636_207_GEO_VK_MAG_RES_0p3m_issue1.tif
Sanday_2_07_PartA_D_MVG_DVG2_color1.tif
Sanday_2_07_PartA_D_MVG_DVG2_color2.tif
Sanday_2_07_PartA_D_MVG_DVG_color2.tif
Sanday_2_07_PartA_D_MVG_DVG_color1.tif
Sanday_2_07_PartA_D_MVG_color2.tif
Sanday_2_07_PartA_D_MVG_color1.tif
Sanday_2_07_PartA_D_MVG_AS_color1.tif
Sanday_2_07_PartA_D_MVG_AS_color2.tif
Sanday_2_07_PartA_D_TFL.tif
Stronsay_2_07_PartD_E_TFL.tif
Stronsay_2_07_PartD_E_MVG_DVG2_color1.tif
Stronsay_2_07_PartD_E_MVG_DVG2_color2.tif
Stronsay_2_07_PartD_E_MVG_DVG_color1.tif
Stronsay_2_07_PartD_E_MVG_DVG_color2.tif

©ORCA 2021

Route 2.7 Mag Image Files
Stronsay_2_07_PartD_E_MVG_color1.tif
Stronsay_2_07_PartD_E_MVG_color2.tif
Stronsay_2_07_PartD_E_MVG_AS_color1.tif
Stronsay_2_07_PartD_E_MVG_AS_color2.tif
Stronsay_2_07_PartA_C_TFL_scale.tif
Stronsay_2_07_PartA_C_TFL.tif
Stronsay_2_07_PartA_C_MVG_DVG2_color2.tif
Stronsay_2_07_PartA_C_MVG_DVG2_color1.tif
Stronsay_2_07_PartA_C_MVG_DVG_color1.tif
Stronsay_2_07_PartA_C_MVG_DVG_color2.tif
Stronsay_2_07_PartA_C_MVG_color1.tif
Stronsay_2_07_PartA_C_MVG_color2.tif
Stronsay_2_07_PartA_C_MVG_AS_color2.tif
Stronsay_2_07_PartA_C_MVG_AS_color1.tif
Sanday_2_07_PartA_D_MVG_DVG2_color1.tif
Sanday_2_07_PartA_D_MVG_DVG2_color2.tif
Sanday_2_07_PartA_D_MVG_DVG_color2.tif
Sanday_2_07_PartA_D_MVG_DVG_color1.tif
Sanday_2_07_PartA_D_MVG_color2.tif
Sanday_2_07_PartA_D_MVG_color1.tif
Sanday_2_07_PartA_D_MVG_AS_color1.tif
Sanday_2_07_PartA_D_MVG_AS_color2.tif
Sanday_2_07_PartA_D_TFL.tif
Stronsay_2_07_PartD_E_TFL.tif
Stronsay_2_07_PartD_E_MVG_DVG2_color1.tif
Stronsay_2_07_PartD_E_MVG_DVG2_color2.tif
Stronsay_2_07_PartD_E_MVG_DVG_color1.tif
Stronsay_2_07_PartD_E_MVG_DVG_color2.tif
Stronsay_2_07_PartD_E_MVG_color1.tif
Stronsay_2_07_PartD_E_MVG_color2.tif
Stronsay_2_07_PartD_E_MVG_AS_color1.tif
Stronsay_2_07_PartD_E_MVG_AS_color2.tif
Stronsay_2_07_PartA_C_TFL.tif
Stronsay_2_07_PartA_C_MVG_DVG2_color2.tif
Stronsay_2_07_PartA_C_MVG_DVG2_color1.tif
Stronsay_2_07_PartA_C_MVG_DVG_color1.tif
Stronsay_2_07_PartA_C_MVG_DVG_color2.tif
Stronsay_2_07_PartA_C_MVG_color1.tif
Stronsay_2_07_PartA_C_MVG_color2.tif
Stronsay_2_07_PartA_C_MVG_AS_color2.tif
Stronsay_2_07_PartA_C_MVG_AS_color1.tif

©ORCA 2021

Appendix 4: Route 2.9 Survey Data Reviewed

Table A 4.13: Route 2.9 MBES Image Files.

Route 2.9 MBES Image Files
2636_209_MBES_LAT_1m_issue1.tif
2636_209_MBES_LAT_1m_issue1.tif
2636_209_VK_MBES_LAT_0pt25m_issue1.tif

Table A 4.14: Route 2.9 SSS Image Files.

Route 2.9 SSS Image Files
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0001.tif
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0001.tif
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0000.tif
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0001.tif
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0000.tif
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0001.tif
2636_209_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0002.tif

Table A 4.15: Route 2.9 Mag Image Files.

Route 2.9 Mag Image Files
2636_209_GEO_VK_MAG_RES_0p3m_issue1.tif
2636_209_GEO_VK_MAG_TFAS_0p3m_issue1.tif

©ORCA 2021

Appendix 4: Route 2.10 Survey Data Reviewed

Table A 4.15: Route 2.10 MBES Image Files.

Route 2.10 MBES Image Files
2636_210_VK_MBES_LAT_0pt25m_1_1_issue1.tif
2636_210_VK_MBES_LAT_0pt25m_1_2_issue1.tif
2636_210_VK_MBES_LAT_0pt25m_2_1_issue1.tif
2636_210_VK_MBES_LAT_0pt25m_2_2_issue1.tif

Table A 4.16: Route 2.10 SSS Image Files.

Route 2.10 SSS Image Files
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0004_C0000.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0001.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0003_C0000.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0002.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0001.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0000.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0002.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0001.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0002.tif
2636_210_GEO_VK_SSS_HF_0pt1m_issue1_R0004_C0001.tif

Table A 4.17: Route 2.10 Mag Image Files.

Route 2.10 Mag Image Files
2636_210_GEO_VK_MAG_TFAS_0p3m_issue1.tif
2636_210_GEO_VK_MAG_RES_0p3m_issue1.tif

©ORCA 2021

Appendix 4: Route 2.11 Survey Data Reviewed

Table A 4.18: Route 2.11 MBES Image Files.

Route 2.11 MBES Image Files
2636_211_VK_MBES_LAT_0pt25m_issue1.tif
2636_211_VK_MBES_LAT_1m_issue1.tif
2636_211_MBES_LAT_1m_issue2.tif
2636_211_MBES_LAT_1m_issue2.tif
2636_211_VK_MBES_LAT_0pt25m_issue2.tif

Table A 4.19: Route 2.11 SSS Image Files.

Route 2.11 SSS Image Files
2636_211_GEO_VK_SSS_HF_0pt1m_issue1.tif

Table A 4.20: Route 2.11 Mag Image Files.

Route 2.11 Mag Image Files
2636_211_GEO_VK_MAG_TFAS_0p3m_issue2.tif
2636_211_GEO_VK_MAG_RES_0p3m_issue2.tif

©ORCA 2021

Appendix 4: Route 2.12 Survey Data Reviewed

Table A 4.21: Route 2.12 MBES Image Files.

Route 2.12 MBES Image Files
2636_212_MBES_LAT_1m_issue1.tif
2636_212_VK_MBES_LAT_0pt25m_issue1.tif

Table A 4.22: Route 2.12 SSS Image Files.

Route 2.12 SSS Image Files
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0005.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0004.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0003.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0002_C0002.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0006.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0005.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0004.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0003.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0002.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0001.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0001_C0000.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0002.tif
2636_212_GEO_VK_SSS_HF_0pt1m_issue1_R0000_C0001.tif

Table A 4.23: Route 2.12 Mag, MVG and TFL Image Files.

Route 2.12 Mag, MVG and TFL Image Files
Ronaldsey_2_12_TFL_PartB.tif
Ronaldsey_2_12_TFL_PartA_D.tif
Ronaldsey_2_12_MVG_PartB_color2.tif
Ronaldsey_2_12_MVG_PartB_color1.tif
Ronaldsey_2_12_MVG_PartA_D_color2.tif
Ronaldsey_2_12_MVG_PartA_D_color1.tif
Ronaldsey_2_12_MVG_DVG_PartB_color2.tif
Ronaldsey_2_12_MVG_DVG_PartB_color1.tif
Ronaldsey_2_12_MVG_DVG_PartA_D_color2.tif
Ronaldsey_2_12_MVG_DVG_PartA_D_color1.tif
Ronaldsey_2_12_MVG_DVG2_PartB_color2.tif
Ronaldsey_2_12_MVG_DVG2_PartB_color1.tif
Ronaldsey_2_12_MVG_DVG2_PartA_D_color2.tif
Ronaldsey_2_12_MVG_DVG2_PartA_D_color1.tif
Ronaldsey_2_12_MVG_AS_PartB_color2.tif
Ronaldsey_2_12_MVG_AS_PartB_color1.tif
Ronaldsey_2_12_MVG_AS_PartA_D_color2.tif

©ORCA 2021

Route 2.12 Mag, MVG and TFL Image Files
Ronaldsey_2_12_MVG_AS_PartA_D_color1.tif
Flotta_2_12_PartC_TFL.tif
Flotta_2_12_PartC_MVG_DVG_color2.tif
Flotta_2_12_PartC_MVG_DVG_color1.tif
Flotta_2_12_PartC_MVG_DVG2_color2.tif
Flotta_2_12_PartC_MVG_DVG2_color1.tif
Flotta_2_12_PartC_MVG_color2.tif
Flotta_2_12_PartC_MVG_color1.tif
Flotta_2_12_PartC_MVG_AS_color2.tif
Flotta_2_12_PartC_MVG_AS_color1.tif
Flotta_2_12_PartA_E_TFL.tif
Flotta_2_12_PartA_E_MVG_DVG_color2.tif
Flotta_2_12_PartA_E_MVG_DVG_color1.tif
Flotta_2_12_PartA_E_MVG_DVG2_color2.tif
Flotta_2_12_PartA_E_MVG_DVG2_color1.tif
Flotta_2_12_PartA_E_MVG_color2.tif
Flotta_2_12_PartA_E_MVG_color1.tif
Flotta_2_12_PartA_E_MVG_AS_color2.tif
Flotta_2_12_PartA_E_MVG_AS_color1.tif
2636_212_UXO_VK_MAG_TFAS_0p3m_issue2.tif
2636_212_UXO_VK_MAG_RES_0p3m_issue2.tif
2636_212_GEO_VK_MAG_TFAS_0p3m_issue2.tif
2636_212_GEO_VK_MAG_RES_0p3m_issue2.tif
Ronaldsey_2_12_TFL_PartB.tif
Ronaldsey_2_12_TFL_PartA_D.tif
Ronaldsey_2_12_MVG_PartB_color2.tif
Ronaldsey_2_12_MVG_PartB_color1.tif
Ronaldsey_2_12_MVG_PartA_D_color2.tif
Ronaldsey_2_12_MVG_PartA_D_color1.tif
Ronaldsey_2_12_MVG_DVG_PartB_color2.tif
Ronaldsey_2_12_MVG_DVG_PartB_color1.tif
Ronaldsey_2_12_MVG_DVG_PartA_D_color2.tif
Ronaldsey_2_12_MVG_DVG_PartA_D_color1.tif
Ronaldsey_2_12_MVG_DVG2_PartB_color2.tif
Ronaldsey_2_12_MVG_DVG2_PartB_color1.tif
Ronaldsey_2_12_MVG_DVG2_PartA_D_color2.tif
Ronaldsey_2_12_MVG_DVG2_PartA_D_color1.tif
Ronaldsey_2_12_MVG_AS_PartB_color2.tif
Ronaldsey_2_12_MVG_AS_PartB_color1.tif
Ronaldsey_2_12_MVG_AS_PartA_D_color2.tif
Ronaldsey_2_12_MVG_AS_PartA_D_color1.tif
Flotta_2_12_PartC_TFL.tif

©ORCA 2021

Route 2.12 Mag, MVG and TFL Image Files
Flotta_2_12_PartC_MVG_DVG_color2.tif
Flotta_2_12_PartC_MVG_DVG_color1.tif
Flotta_2_12_PartC_MVG_DVG2_color2.tif
Flotta_2_12_PartC_MVG_DVG2_color1.tif
Flotta_2_12_PartC_MVG_color2.tif
Flotta_2_12_PartC_MVG_color1.tif
Flotta_2_12_PartC_MVG_AS_color2.tif
Flotta_2_12_PartC_MVG_AS_color1.tif
Flotta_2_12_PartA_E_TFL.tif
Flotta_2_12_PartA_E_MVG_DVG_color2.tif
Flotta_2_12_PartA_E_MVG_DVG_color1.tif
Flotta_2_12_PartA_E_MVG_DVG2_color2.tif
Flotta_2_12_PartA_E_MVG_DVG2_color1.tif
Flotta_2_12_PartA_E_MVG_color2.tif
Flotta_2_12_PartA_E_MVG_color1.tif
Flotta_2_12_PartA_E_MVG_AS_color2.tif
Flotta_2_12_PartA_E_MVG_AS_color1.tif