Cerulean Winds Aspen Project Limited

Aspen Offshore Wind Farm

Offshore Environmental Impact Assessment Report

Volume 3, Appendix 16.1: Marine Archaeology and Cultural Heritage Technical Report

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Summary

Wessex Archaeology has been commissioned by GoBe Consultants Limited (GoBe) to prepare a marine heritage desk-based assessment in relation to the marine heritage environment for the offshore components, hereafter 'the Proposed Development' of the Aspen Offshore Wind Farm, hereafter 'the Project'. The Proposed Development consists of the Aspen Array Area and the associated Offshore Transmission Cable Corridor (OTC Corridor). The Aspen Array Area is located into Scottish Territorial Waters (up to 12 nautical miles (nm)) to landfall North of Stonehaven.

The aim of this desk-based assessment is to assess the known and potential marine heritage resource within the study area. The assessment has established that there are the following marine heritage assets:

- potential for prehistoric archaeological material;
- known shipwrecks;
- potential for additional currently unknown maritime and aviation seabed features to exist.

There is potential for the proposed activities to impact the known and as yet unknown archaeological sites related to palaeogeography, shipwrecks and aircraft crash sites.

Acknowledgements

This project was commissioned by GoBe and the assistance of Emily Marshall, Phil New, and the rest of the GoBe team throughout the project is gratefully acknowledgement in this regard.

Data was provided by the United Kingdom Hydrographic Office, Canmore and Aberdeenshire Council. Wessex Archaeology is grateful to the staff of all the above organisations for their assistance during the project.

The report was researched and compiled by Kirsten Pollé, with illustrations prepared by Amy Wright. The paleogeographic assessment was undertaken by Beccy Scott. Andrea Hamel managed the project on behalf of Wessex Archaeology.

Aspen Offshore Wind Farm

Marine Archaeological Technical Report

1 INTRODUCTION

1.1 Project Background

1.1.1 Wessex Archaeology has been commissioned by GoBe to prepare a marine heritage desk-based assessment for the offshore components, hereafter 'the Proposed Development', of the Aspen Offshore Wind Farm, hereafter 'the Project'. The Proposed Development consists of the Aspen Array Area and the associated Offshore Transmission Cable Corridor (OTC Corridor). which is located north of Stonehaven on the east coast of Scotland.

1.1.2 This technical report covers the Aspen Array Area and the OTC Corridor (Figure 1**).** This technical report will inform the marine archaeology and cultural heritage chapter of the Offshore Environmental Impact Assessment Report (Offshore EIAR).

1.1.3 The archaeological technical report assesses the baseline marine historic environment of the Proposed Development and considers potential impacts associated with activity to the seaward of Mean High Water (MHW). The Aspen Array Area is located within Scottish Territorial Waters (up to 12 nautical miles (nm) to landfall), and within the Scottish Exclusive Economic Zone (EEZ) beyond 12 nm.

1.2 Development Proposal

1.2.1 The Project consists of Aspen Array Area, with associated OTC Corridor and onshore infrastructure to connect to the National Grid. The OTCs will make landfall in the region of Stonehaven. The site boundary for the Aspen Array Area covers 333 km^2, whilst the offshore OTC Corridor covers an area of 713 km^2.

1.2.2 The impacts of the Proposed Development are assessed in the Offshore EIAR.

1.3 Scope of Document

1.3.1 The purpose of this assessment is to determine, as far as possible from existing information, the nature, extent and significance of the known and potential marine archaeological resource within the boundary of the Proposed Development.

1.4 Aims

1.4.1 The aim of this marine heritage desk-based assessment is to characterise the known and potential marine heritage baseline within the proposed development site boundary and the study area to inform the Offshore EIAR. The specific aims of this assessment are:

- to provide details of relevant legislation, national and local planning policy, and best practice guidance;
- to outline the known and potential marine heritage resource within the proposed development site boundary and study areas based on a review of existing information;

- to assess the significance of the known and potential marine heritage resource through weighted consideration of their valued components.

1.5 Copyright

1.5.1 This report may contain material that is non-Wessex Archaeology copyright (e.g. Ordnance Survey, British Geological Survey (BGS), Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licence, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the Copyright, Designs and Patents Act 1988 with regards to multiple copying and electronic dissemination of the report.

2 LEGISLATION, GUIDANCE AND POLICY

2.1 Introduction

2.1.1 The following section provides a summary of the national, regional and local planning and legislative framework that governs the treatment of the marine historic environment in the planning process.

2.1.2 The study area is partially located within Scotland's Territorial Waters, which extend 12 nm from the coastline and partially within the Scottish EEZ beyond 12 nm on the UK continental shelf within the North Sea (**Figure 1**).

2.1.3 Further details on legislation and/or policy are present in **Annex 2.**

2.2 Marine Legislation

2.2.1 Historic Environment Scotland (HES) is responsible for the archaeological resource within Scotland's Territorial Waters (up to 12 nm) and acts as consultee for the resource in the Scottish EEZ.

2.2.2 The Marine Directorate - Licencing Organisation Team (MD-LOT) is responsible for licencing, regulating and planning marine activities in Scottish Territorial Water's (up to 12 nm) and in the Scottish offshore region (between 12 nm and 200 nm) under the Marine and Coastal Access Act 2009.

2.2.3 Further details on legislation, policy and guidance are provided in **Annex 2.**

2.2.4 The following relevant legislation applies within Marine Directorate's licencing area:

- Marine (Scotland) Act 2010;
- Protection of Wrecks Act 1973: Section Two;
- Ancient Monuments and Archaeological Areas Act 1979 (as amended);
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

2.2.5 The Marine (Scotland) Act 2010 is the primary legislation relevant to marine development within Scottish Territorial Waters. The Marine (Scotland) Act 2010 provides a framework to achieve sustainable development in Scottish waters, implementing marine planning, licensing, conservation and enforcement. It is the responsibility of the Scottish Ministers and

public authorities to act to protect and enhance the marine biodiversity and the preservation of marine historic assets of national importance.

2.2.6 Marine historic assets may also be designated under the Marine (Scotland) Act 2010 (Section 73) and the Ancient Monuments and Archaeological Areas Act 1979 (Part II). Military wrecks and aircraft remains may be protected under the Protection of Military Remains Act 1986. Ownership of any wreck remains is determined in accordance with the Merchant Shipping Act 1995.

2.2.7 Within the Scottish EEZ the following legislation applies:

- Marine and Coastal Access Act 2009;
- Protection of Military Remains Act 1986; and
- Merchant Shipping Act 1995.

2.3 International Conventions

2.3.1 The United Nations Educational, Scientific and Cultural Organisation (UNESCO) Convention on the Protection of the Underwater Cultural Heritage was concluded in 2001 and is a comprehensive attempt to codify the law internationally with regards to underwater cultural heritage. The UK has not ratified the Convention but has stated that it has adopted the Annex of the Convention, which governs the conduct of archaeological investigations, as best practice for archaeology. Although the UK is not a signatory, the Convention entered into force on 2 January 2009 having been signed or ratified by 20 member states. It has since been ratified or accepted by an additional 79 member states.

2.4 Marine Policy

2.4.1 The UK Marine Policy Statement (MPS) was adopted in 2011 by all UK Administrations in March 2011 as part of a new system of marine planning being introduced across UK seas (Department for Environment, Food and Rural Affairs (Defra) (HM Government, 2011). The statement was intended to facilitate and support the formulation of Marine Plans, ensuring that marine resources are used in a sustainable way in line with high level marine objectives.

2.4.2 The Marine (Scotland) Act 2010 is the primary legislation relevant to marine development plans within Scottish Territorial Waters. Under this legislation, Scottish Ministers adopted a National Marine Plan (Marine Scotland, 2015). The National Marine Plan sets out a single framework for sustainable development within Scotland's marine area. General Policy 6 for the Historic Environment states, "development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance" and also notes the requirement for development proposals to provide "information on the significance of known heritage assets and the potential for new discoveries to arise". Proposals should demonstrate how any adverse impacts will be avoided, or, if not possible, minimised and mitigated.

2.4.3 The Scottish Marine Regions Order 2015 identifies 11 Scottish Marine Regions and 10 Offshore Marine Regions for the purposes of regional marine planning and establishes their boundaries. The Proposed Development (Offshore) is located partially within the Moray Firth Scottish Marine Region and partially within the Fladen and Moray Offshore Marine Region.

2.5 Marine Guidance

2.5.1 The following relevant guidance applies to the Project and is taken from current best practice:

- Military Aircraft Crash Sites: Guidance on their significance and future management (English Heritage (now Historic England) 2002);
- The Code of Practice for Seabed Developers (Joint Nautical Archaeology Policy Committee (JNAPC) and The Crown Estate 2006;
- Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology Ltd 2007);
- Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now Historic England) 2008);
- Our Seas - A shared resource: High level marine objectives (HM Government 2009);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble & Leather 2011);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (Bates et al. 2013);
- Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate 2014);
- Standard and guidance for archaeological advice by historic environment services (CIfA 2014b);
- Standard and guidance for historic environment desk-based assessment (Chartered Institute for Archaeologists (CIfA) 2014a);
- Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England 2015);
- Designation Policy and Selection Guidance (Historic Environment Scotland 2019); and
- Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate 2021).

3 METHODOLOGY

3.1 Introduction

3.1.1 The methodology follows the best practice professional guidance outlined by the Chartered Institute for Archaeologists' (CIfA) Standard and guidance for historic environment desk-based assessment (2014a, last updated 2020).

3.2 Study Area(S)

3.2.1 The Study Area is divided into two areas, the Aspen Array Area and the OTC Corridor (Figure 1)**.** The Aspen Array Area study area is defined by the Proposed Development footprint, with an additional 500 m buffer. The OTC Corridor study area is defined by the Proposed Development footprint, with an additional 1000 m buffer.

3.2.2 These buffers have been used to capture the relevant data on designated and non-designated marine archaeological seabed assets, and to provide the necessary context for understanding archaeological potential and heritage significance of receptors that may be affected by the Proposed Development.

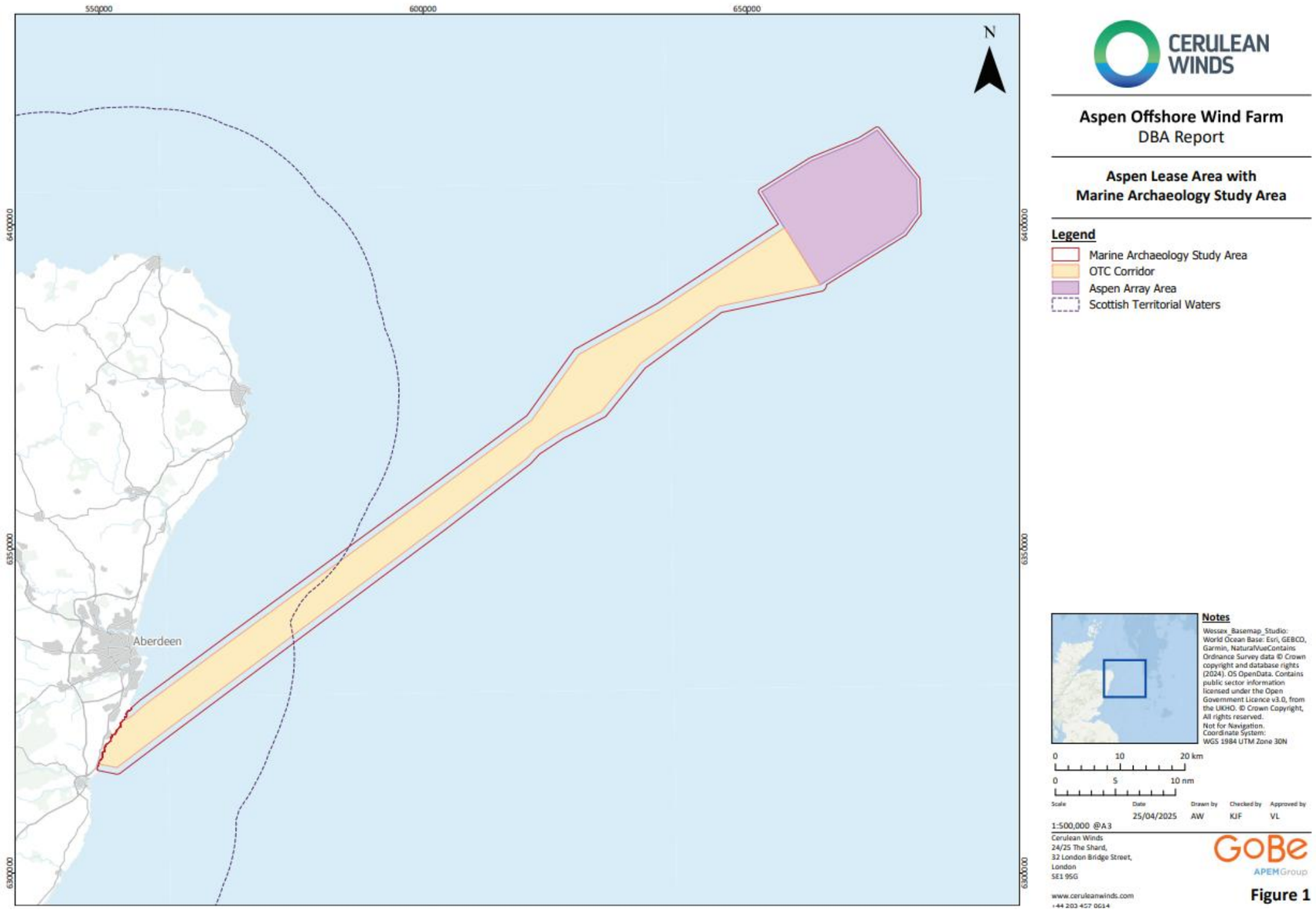

Figure 1 Aspen Lease Area with Marine Archaeology Study Area

3.3 Archaeological Desk-based Assessment

Key Themes

3.3.1 The methodology follows the best practice professional guidance outlined by the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment (2014a, updated 2020).

3.3.2 The marine themes relevant to marine archaeological baseline as assessed in this report are:

- Seabed prehistory (for example, palaeochannels and other features that contain prehistoric sediment, and derived Palaeolithic artefacts e.g. handaxes);
- Seabed features, including maritime sites (such as shipwrecks and associated material including cargo, obstructions and fishermen's fasteners) and aviation sites (aircraft crash sites and associated debris);
- Intertidal heritage assets; and
- Setting of marine heritage assets from offshore activities.

Data Sources

3.3.3 Baseline conditions have been established by undertaking a desktop review of published information and through engagement with relevant organisations. The data sources used to inform the baseline description and assessment include:

- United Kingdom Hydrographic Office (UKHO) data for charted wrecks and obstructions;
- Canmore Historic Environment Records (HER) maintained by Historic Environment Scotland (HES), comprising data for marine archaeological sites;
- Aberdeenshire Council HER, comprising a database of all recorded marine archaeological sites within the offshore;
- relevant mapping including Admiralty Charts, British Geological Survey (BGS), Ordnance Survey and historic maps;
- relevant documentary sources and grey literature held by Wessex Archaeology, and those available through the Archaeology Data Service and other websites (presented in the 'References'); and
- HES dataset including listed buildings.

Data Structure

3.3.4 This chapter is supported by a Geographic Information System (GIS) using ArcGIS Pro 3.2.1, incorporating the positional information of the various data sources listed above, allowing the data to be spatially analysed. The data were subsequently compiled into gazetteers of the maritime and aviation resources within the study area.

3.3.5 For the purposes of this report, the gazetteer (**Annex 4** to **Annex 5**) is compiled and illustrated in WGS89 UTM31N. Information relating to marine archaeology and cultural

heritage assets that did not include location or positional information were also used to inform the marine archaeological baselines assessment where relevant.

Chronology

3.3.6 Archaeological material is generally studied within a framework of 'periods' or 'ages' that reflect the activities and cultural changes taking place over time. All dates are referred to as BCE (Before Common Era), BP (Before Present) or AD (Anno Domini) within the text. BCE refers to calibrated radiocarbon chronology that can be considered equivalent to calendar years. BP dates are used for periods of time older than circa 10,000 years ago.

3.3.7 A list of the main archaeological periods for Scotland is referred to in the text, along with their broadly defined dates are presented in **Annex 1**, which reflects the archaeological record documented from coastal and marine contexts.

Seabed Prehistory

3.3.8 The baseline assessment for palaeogeography was based on a range of secondary sources, including academic papers, monographs, geological information (e.g. BGS mapping), and previous work undertaken by Wessex Archaeology within the Scottish sea area and the wider region. This baseline for the palaeogeographic assessment aids in producing a stratigraphy for the study area, assigning archaeological potential to identified units, and informing future sampling strategies.

Seabed Features: Maritime and Aviation Sites

3.3.9 Maritime archaeological sites can be considered to comprise two broad categories; the remains of vessels that have been lost as a result of stranding, foundering, collision, enemy action and other causes, and those sites that consist of vessel-related material. Wreck related debris includes (but is not limited to) equipment lost overboard or deliberately jettisoned such as fishing gear, ammunition and anchors or the only surviving remains of a vessel such as its cargo or a ballast mound. Shipwrecks on the seabed provide an insight on the types of vessels used in the past, the nature of shipping activity in the wider area and the changing usage of the marine environment through different periods. Such remains are considered more likely in sediments which promote the preservation of wreck sites (e.g. finer grained sediments that are not subject to high levels of mobility), particularly where such sediments have seen limited, recent disturbance.

3.3.10 Marine aviation archaeology sites comprise the remains or associated remains of military and civilian aircraft that have been lost at sea. Evidence is divided into three primary time periods based on major technological advances in aircraft design: Pre-1939; 1939-1945; and post-1945.

3.3.11 The baseline summary for maritime and aviation archaeology was assessed by means of accessing any records of sites, find spots, wrecks, casualties, and seabed features obtained from the UKHO, Canmore, HES and HERs located within the study area. This was further supplemented by a review of relevant primary and secondary source material to provide an indication on the nature of maritime and aviation activity across the region. As well as summarising the known archaeological resource, the baseline assessment underlines the potential for encountering unknown shipwreck and aviation material within the study area.

3.3.12 The data obtained were reviewed and those located within the study area were extracted and compiled to form a gazetteer as part of the known baseline. These were added to the project GIS and will be used to inform the geophysical assessment.

3.3.13 Data relating to Recorded Losses were also extracted from the Canmore, HES and HER data sources. Recorded Losses are records for ships or aircraft that are known to have wrecked or crashed offshore, but for which the exact locations are not known. Recorded Losses are often grouped by area into Maritime Named Locations. For example, a Recorded Loss within this dataset may be based on the loss of a vessel off the coast at ‘’Stonehaven’ or associated with a known navigational hazard such as a sand bank or rocks (which may give rise to a falsely precise geographic coordinate for the record). The positional data of these records is unreliable and serves only to provide an indication of the types of vessels that passed through the area and the wrecking incidents that are known to have occurred in the general region. Whilst the remains of these vessels and aircraft are expected to exist somewhere on the seafloor, their location is unknown.

3.3.14 Details regarding Recorded Losses, whose Named Locations happen to intersect with the study area, are presented in a gazetteer format (**Annex 4** and **Annex 5**). These records have retained their original identification assigned by the Canmore and HER for ease of cross-referencing. The gazetteer does not include positional data due to the inherent inaccuracies therein and, as they signify the potential maritime and aviation resource, they are not mapped or illustrated.

Intertidal Archaeology

3.3.15 Since the assessment of the onshore archaeological elements of the Proposed Development will cover above landward of Mean Low Water Springs (MLWS), there is overlap between the onshore assessment and marine data collection within the intertidal area between MLWS and MHWS. However, although intertidal sites have been reviewed for their contribution to the potential in the marine area, intertidal heritage assets are not included in the gazetteer, as they will be presented in the terrestrial assessment.

3.4 Geophysical and Geotechnical Methodology

3.4.1 A geophysical survey has been undertaken in the OTC Corridor and in the Aspen Array Area. An archaeological assessment of the geophysical survey data in the OTC corridor will be undertaken following the submission of the EIAR. However, the data available for review for the Aspen Array Area that is currently available has been assessed as not suitable for archaeological assessment. When additional geophysical data is available for the Aspen Array Area, it should undergo archaeological assessment, the methodology for which will be set out in the mitigation measures in the Offshore EIAR and the Written Scheme of Investigation (WSI).

3.4.2 It is anticipated that further geotechnical surveying will take place later in 2025, following submission of the Offshore EIAR. Mitigation measures outlined in the Offshore EIAR and WSI will detail methodologies for archaeological assessment of geotechnical data, and results of assessment will form stand alone report(s).

3.5 Assessment of Setting

3.5.1 The setting of the known sites should be taken into consideration. Although the sites are underwater and have limited views, they are a part of a wider historical context. An emphasis on the wider military conflict due to the many wrecks caused by the First and Second World Wars and the military landscape of their loss location along the north coastline generally shows the significance of the North Sea war channels as well as the convoy routes.

3.6 Determining Value and Sensitivity

3.6.1 This report informs the Offshore EIAR for the Proposed Development. In order to assess the potential impacts of a development upon the marine heritage resource, EIARs typically adopt the conceptual approach known as the 'source-pathway-receptor' model. This approach is based on the identification of the source (i.e. the origin of a potential impact), the pathway (i.e. the means by which the activity could impact a receptor) and the receptor that may be impacted (e.g. known/ potential heritage assets). In order for the significance of any given impact to be fully understood, the sensitivity of any receptors that may be impacted needs to be considered. This section outlines the means by which the sensitivity of marine heritage assets is ascertained.

3.6.2 The capability of a receptor to accommodate change and its ability to recover if affected is a function of its sensitivity. Receptor sensitivity is typically assessed via the following factors:

- Adaptability - the degree to which a receptor can avoid or adapt to an effect;
- Tolerance - the ability of a receptor to accommodate temporary or permanent change without significant adverse impact;
- Recoverability - the temporal scale over and extent to which a receptor will recover following an effect; and
- Value - a measure of the receptor's importance, rarity and worth.

3.6.3 Marine heritage assets cannot typically adapt, tolerate or recover from physical impacts resulting in material damage or loss caused by project activities. Consequently, the sensitivity of each asset is predominantly quantified only by its value.

3.7 Impact Assessment Criteria

Asset Sensitivity

3.7.1 The sensitivity of known marine heritage assets have been assessed in this desk-based assessment on a four-point scale using professional judgement informed by criteria provided in Table 1.

Table 1 Sensitivity/Value Criteria for Marine Heritage Assets

Sensitivity/Value	Sensitivity/Value Criteria
High	• Best known, only example or above average example and / or significant or high potential to contribute to knowledge and understanding and / or engagement. Assets with a demonstrable international or national dimension to their importance are likely to fall within this category; • Wrecked ships and aircraft that are protected under the Protection of Wrecks Act 1973, Ancient Monuments and Archaeological Areas Act 1979 or Protection of Military Remains Act 1986 with an international dimension to their importance, plus as-yet undesignated sites that are demonstrably of equivalent archaeological value; and • Known submerged prehistoric sites and landscapes with the confirmed presence of largely in situ artefactual material or

Sensitivity/Value	Sensitivity/Value Criteria
	paleogeographic features with demonstrable potential to include artefactual and/or paleoenvironmental material, possibly as part of a prehistoric site or landscape
Medium	• Average example and / or moderate potential to contribute to knowledge and understanding and / or engagement; • Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation; and • Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.
Low	• Below average example and / or low potential to contribute to knowledge and understanding and / or engagement; • Includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation; and • Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.
Very Low	• Poor example and / or little or no potential to contribute to knowledge and understanding and / or engagement. Assets with little or no surviving archaeological interest.

3.7.2 Furthermore, On the Importance of Shipwrecks (Wessex Archaeology 2006) report suggests importance can be assessed through the 'BULSI' system, incorporating the following criteria: build, use, loss, survival and investigation. This represents all phases of a ships 'career' and tries to examine the shipwreck through its build and use, the manner in which it was lost and how it has survived and been investigated over time.

3.7.3 To further supplement this approach, the ALSF-funded Marine Class Description and principles of selection for aggregate producing areas project (ALSF 5383), undertaken by Wessex Archaeology (Wessex Archaeology 2008a), proposed a composite timeline that considers wrecks in five distinct date ranges. The timeline considers the broad chronology of shipbuilding, thus drawing out generalisations regarding the age and special value of sites. The timeline is summarised as follows:

Value of an Asset

3.7.4 Historic Environment Scotland has produced Designation Policy and Selection Guidance (2019). The document sets out policies and principles relevant to designation, and how decisions should be informed by an inclusive understanding of the cultural significance of the asset. Annex 5 details Historic Marin Protected Areas, and notes that the cultural significance of a marine historic asset can be found in its artistic, archaeological, architectural, historic, traditional, aesthetic, scientific and/or social interest.

3.7.5 These aspects help to characterise each asset whilst also comparing them to other similar assets. The criteria also enable the potential to contribute to knowledge, understanding and outreach to be assessed.

3.7.6 The value of known marine heritage assets were assessed on a four-point scale using professional judgement informed by criteria provided in Table 1.

3.8 Assumptions and Limitations

Archaeological Data

3.8.1 Data used to compile this chapter comprises secondary information derived from a variety of sources, only some of which have been directly examined for the purposes of this appraisal. The assumption is made that the secondary data, as well as that derived from other secondary sources, are reasonably accurate.

3.8.2 The records held by the UKHO, Canmore, HER and the other sources used in this appraisal are not a record of all surviving cultural heritage assets, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown. In particular, this relates to buried archaeological features.

4 MARINE ARCHAEOLOGICAL ASSESSMENT: PALAEOLANDSCAPE ASSESSMENT

4.1 Geological and Archaeological Potential

4.1.1 The following is an overview of the geological and archaeological history of the broader region of the North Sea, throughout the Pleistocene, through to the Holocene marine transgression. This is based on a range of secondary sources, including academic papers, monographs, geological information (e.g. BGS mapping, BRITICE mapping), and previous work undertaken by Wessex Archaeology across the wider North Sea region. This serves as a baseline for the palaeolandscape assessment, providing a framework for predicting sedimentary units that could be present and their archaeological potential in terms of regional patterns of human colonisation and local extinction over the last million years.

4.1.2 The Proposed Development extends 157 km north-east of Aberdeen, passing 46 km east of Peterhead on the east coast of Scotland. With the exception of the landfall, the environment within the study area is currently fully marine. Although the positions of surrounding shorelines have varied over geological time, a shallow marine basin has been present within the Northern and Central North sea since at least 65 million years ago; the thickness of Quaternary sediments inferred from BGS mapping ranges from a veneer of less than 5 m near shore, up to accumulations in excess of 50 m depth 71 km north-east from landfall.

4.1.3 The human landscapes of the North Sea are preserved within sediments that form part of sub-aerially exposed terrestrial landscapes, which were periodically exposed through marine regression in response to past climate change. During the cold periods of globally-lowered sea level (Glacial-Interglacial cycles), the expanded British and Fennoscandian Ice Sheets coalesced in the northern and central North Sea, and what is now the seabed was exposed as a terrestrial landscape, sea level being lowered by expanded global ice volume. These changes in ice sheet configuration and relative sea level are discussed relative to Marine Isotope Stages (MIS), which are defined in relation to isotope ratios (e.g. ^{18}O to ^{16}O) archived in sediment records that provide evidence for changing climate.

4.1.4 Large areas of the North Sea were therefore periodically and cyclically exposed as a terrestrial environment throughout the Pleistocene (2.5 million - 10 ka) as this ice-sheet expanded and retreated. These huge shifts in palaeogeography have left distinct traces in the geoarchaeological record offshore and onshore; late and early glacial landscapes offshore exhibit the same features that are exploited by hunter-gatherer groups within terrestrial contexts, such as the channel, banks and bars of the river systems that formed routeways through these landscapes for early human groups and the large animals they exploited. These are interspersed with sediments that mark periods when the landscape was inaccessible to humans and they appear not to be present; when the North Sea landscapes were submerged as they are today, or when overlain by expanded ice sheets.

Pre-Anglian (>478 ka; >MIS 12)

4.1.5 In the early Pleistocene, sea level within the North Sea is interpreted to have been much lower, and the Aberdeenshire coastline is likely to have been situated further to the east than at present. This landscape is likely to have been dominated by fluvial/deltaic systems extending east from the present-day shoreline to a potential shallow marine environment in the Central Graben of the North Sea (Lamb *et al.* 2017).

4.1.6 This palaeogeography is likely to have continued in a similar configuration into the Cromerian, where significant fluvial and deltaic deposits from the Ur-Frisia/Eridanos systems dominated the southern North Sea (Cameron et al. 1992). This is represented in the geological record of the wider study area by the Aberdeen Ground Formation, a term which covers a variety of marine, glaciomarine, and deltaic sediments extensive across the central North Sea (Gatliff et al. 1994). However, within the corridor of the proposed development, sediments are largely undifferentiated in current BGS mapping.

4.1.7 The earliest direct evidence for hominin activity in the UK has been dated from the Early-Middle Pleistocene period, at the Lower Palaeolithic sites of Happisburgh, on the Norfolk coast, and Pakefield, on the Suffolk coast, which date from c. 900,000 and 700,000 BP respectively (Parfitt et al. 2005; 2010). To date, no sites of Lower Palaeolithic date have been identified in Scotland (Wessex Archaeology 2018), although early humans were able to survive in southern boreal conditions at Happisburgh. This might imply the existence of arctic or tundra conditions further north in Scotland, preventing colonisation, or that hominin communities simply had not spread this far north. However, significant reworking due to subsequent ice sheet activity in Scotland may have also removed any evidence of hominin activity from this time.

Anglian (MIS 12, c. 478-424 ka) and Hoxnian MIS 11, c. 424 ka - 374 ka)

4.1.8 The Anglian glacial period was the most extensive glaciation of the Pleistocene and saw ice sheets extending further south than at any time in the past 2.5 million years. The exact southern extent of the Anglian glaciation is currently debated, but it is likely to have extended to just north of the present-day River Thames. The post-Anglian palaeogeography of the North Sea was very different; initial erosion of the Wealden-Artois Ridge begun with the catastrophic overspilling of a proglacial lake, whilst the Anglian ice sheet itself pushed the route of the Thames further south to occupy its present course (Gupta et al. 2017; Hamblin et al. 1992).

4.1.9 From this point onwards, access to Britain during fulling temperate high stands was limited. During cooler periods, when sea levels were lowered, the British Isles remained part of a continuous North Sea landscape, through which major arterial rivers flowed, forming routeways exploited by mammalian fauna and hunter-gatherer groups. Specific periods within Glacial-Interglacial cycles from this point onwards became highly significant for tracking hominin colonisation and adaptation, requiring temperatures to be warm enough to

permit colonisation, but ice sheet collapse to be delayed, permitting access across the Southern North Sea.

"Saalian" (MIS 10-6, c. 374 - 130 ka); Ipswichian (MIS 5e, c. 130 - 71 ka) interglacial, and Devensian (MIS 4 -2, c. 71 -11.7 ka) glacial cycles

4.1.10 This cycle of glacial/interglacial and landscape exposure/inundation continued for the remainder of the Pleistocene, with progressive erosion of links across the North Sea to the continent with each cycle Hijma et al. (2012). Geophyscial evidence suggests that after MIS 6, stochastic erosion of these links resulted in a landscape fully dissected in the south by an axial Rhine-Thames valley, potentially hastened by a second pro-glacial flood event in MIS 6 (Gupta et al. 2017).

4.1.11 The sediments mapped within the region likely to preserve evidence for the advance and retreat of several ice sheets into the North Sea from the Eastern Scottish coast at different times during the Quaternary, and to capture transitions between marine, terrestrial, shallow marine and non-marine sedimentary regimes (Ling Bank and Fisher formations; Coal Pit formation; Wee Bankie Formation). Isolated areas of some of these are mapped within the proposed development.

4.1.12 Within the southern North Sea, large areas of periodically exposed landscape were available for hominin colonisation during periods of favourable climate, and faunal remains, artefacts, and even Neanderthal fossils (Hublin et al. 2009) have been recovered from the southern North Sea during dredging activities. These include the significant Early Middle Palaeolithic Levallois lithic assemblages identified from aggregates license Areas 240 off East Anglia (Tizzard et al. 2014; 2015; Wessex Archaeology 2013a; 2013b, Shaw et al. 2023) and Area 447 in the Outer Thames Estuary (Bynoe 2022), as well as faunal material attesting to terrestrial landscapes from across the wider region (Bynoe 2016, 2017).

4.1.13 The proposed development traverses out to an area that acted as an accumulation zone of for accreting and receding ice sheets within the central North Sea basin. Glacio-isostacy effects, combined with rapid melting at specific points, resulted in local sea levels higher than the present day. The ice sheets terminated in a marine environment. Glacial and glacio-marine deposits mapped across the region include those attributed to the Wee Bankie, Marr Bank and Coal Pit Formations (BGS 1986; Gatliff et al. 1994). Current mapping does not allow intervening terrestrial deposits to be identified, but they may survive close to the shore.

4.1.14 In contrast with Northern France, evidence of a hominin presence in Britain during the Ipswichian (MIS 5e) or the early Devensian (MIS 5d-a; Lewis et al., 2011) is limited but not unknown (Wenban-Smith et al. 2010; Wessex Archaeology 2023b; Shaw et al. in prep.). Within the context of early prehistory and submerged palaeogeography, however, substantial areas of the southern North Sea basin would have been dry land during the warming and cooling limbs of the various sub-stages (MIS 5d to 5a) and archaeological sites of this age are relatively abundant in northern France (Lewis et al., 2011; Pettitt and White, 2012). Therefore, the potential exists for human activity to have occurred sporadically both within Britain and in any sub-aerially exposed parts of the southern North Sea basin, during the early Devensian.

4.1.15 Neanderthal populations were replaced across Europe, including in Britain, with the transition to the Upper Palaeolithic. Modern human groups colonised Doggerland and Britain around 34,000 BP (Jacobi and Higham 2011; Bicket and Tizzard 2015). Archaeological evidence for this period is relatively sparse, but submerged palaeolandscapes provide key contextual evidence for artefacts recovered onshore and

close to the modern coast, providing a colonisation context for these human communities. Significantly, the type fossils with typify the British Early Upper Palaeolithic (LRJ points) are widespread around the North Sea, especially Belgium, and demonstrate connectivity across these now submerged landscapes.

4.1.16 Ice retreated from the region by 20 -17 ka BP (Clark et al. 2022). The isostatic impact of deglaciation resulted in sea levels dropping from over 20 m above those of today, to -20 m below modern sea level, and then rising to 4 m above current sea level by the Mid-Holocene. (Shennan et al. 2018; Bradley et al. 2023, Clark et al. 2022). As noted above, the Last Glacial Ice sheet (Clark et al. 2022) terminated here in a marine context. BRITICE mapping interprets two sets of seabed features as glacial moraines; one set runs parallel to the coast, within the corridor of the development, whilst another set runs parallel to the Proposed Development.

4.1.17 Whilst currently direct dating of sea level locally is lacking, broad modelling of palaeotopography suggests that the Proposed Development corridor has been a marine environment since at least 27 ka years ago, with the exception of a narrow strip extending c. 1.5 km east from the coast at Aberdeen, to the -20 m water depth contour.

4.1.18 The earliest evidence of human presence in Scotland is a Later Upper Palaeolithic flint assemblage (c. 14,700 BP) from Howburn Farm, near Biggar in the uppermost Clyde valley (Ballin et al. 2010). Although located a significant distance away (150 km SW of landfall at Aberdeen), this occurrence reflects human movement into the far north soon after climate ameliorated.

4.1.19 Notably, the regional archaeological record now attests to a Late Upper Palaeolithic human presence in the immediate region of the Proposed Development. Milltimber, a site excavated in advance of work on the Aberdeen Western Peripheral Route (**NJ801096**), represents a place that was persistently exploited by Hunter-Gatherer groups in the Mesolithic; a cluster of Late Upper Palaeolithic artefacts were identified within one concentration (Zone 4; Ballin 2016), argued to have Ahrensburgian affinities. These form part of a spread of sites across Scotland, reflecting sporadic incursions by Late Glacial people carrying toolkits that on the continent are generally dated to between 12,220-10,050 cal BP (Hardy et al 2025).

4.1.20 Relative Sea Level modelling undertaken by Wessex Archaeology (2018) suggests after 7000 BP sea levels were relatively higher than now for the entire region (c. 4 m above present) and were located further inland than they are at present. Mesolithic evidence is abundant in Aberdeenshire inland, and lithic assemblages show coastal links in terms of raw material use (Masser 2011; Wessex Archaeology 2018).

4.1.21 After the Holocene marine transgression, the archaeological potential of the North Sea, including the study area, shifts to the maritime history of the UK, which is presented in Section 4.2.85.

4.2 Geophysical and Geotechnical Palaeogeographic Assessment

4.2.1 Much of the offshore marine mapping for the proposed development is undifferentiated. Glacial and glacio-marine deposits mapped across the region include those attributed to the Wee Bankie, Marr Bank and Coal Pit Formations (BGS 1986; Gatliff et al. 1994), but most are not separated out. Quaternary sediments are distributed all along the Proposed Development route, exceeding 50 m thickness past the 70 km point from land. Current mapping does not allow intervening terrestrial deposits to be identified, but they may survive close to the shore.

4.3 Palaeogeographic Potential

4.3.1 Due to the interpreted geological and relative sea-level history of the region, it is anticipated that potential for submerged, terrestrial palaeolandscape features and prehistoric archaeological evidence is highest between present-day sea level and the -20 m bathymetric contour.

4.3.2 Given the lack of direct tie points to accurately model regional glacio-isostacy, it is suggested here that this area of potential be extended to the – 50 m bathymetric contour.

Value

4.3.3 Current geological mapping is largely undifferentiated along the Proposed Development. The underlying bedrock predates the evolution of early hominins, and has no archaeological potential. Quaternary sediments have accumulated along the route, reaching depths in excess of 50 m thickness. Current mapping does not allow intervening terrestrial deposits to be identified within these undifferentiated units, which are assumed to be largely glacial and glacio-marine in origin, but they may survive close to the shore.

4.3.4 Currently there are no known submerged prehistoric sites recorded in North-East Scotland, however the potential for encountering these in coastal environments is potentially high, particularly along early Holocene inundated coastlines. Relative Sea Level (RSL) models for this area of the north-east Scottish coast suggest potential for submerged palaeolandscapes prior to around 7000 BP, from Aberdeenshire to Angus.

4.3.5 Where present, glacial and glacio-marine deposits will have been deposited at points when ice sheets covered the study area and humans would not have been present. Whilst not of direct archaeological potential, dating such sediments allows a regional picture of changing climate and environment to be established; defining climatic windows within which humans may have been able to rapidly colonise terrestrial landscapes.

4.3.6 In the intertidal and nearshore areas of the coastline, early Holocene geomorphology can be preserved on or beneath the current sea level. These palaeolandscape features could include fluvial and estuarine features, or dune systems. Such features, if identifiable, could preserve hunter-gatherer archaeology, and palaeoenvironmental evidence. Such evidence of the environmental conditions under which humans were able to colonise this area of North-East Scotland is key to understanding human responses to past climate change. Such features have been identified at intertidal sites in Western Scotland (e.g. Hardy et al., 2015, Ballin et al., 2010; Hardy et al. 2025).

4.3.7 The overlying seabed sediment is modern in age and not considered of archaeological potential in itself. However it has the potential to cover archaeological sites (e.g. shipwrecks) in areas where it is mobile and achieves sufficient thickness.

5 MARINE ARCHAEOLOGICAL ASSESSMENT: MARITIME AND AVIATION SITES

5.1 Introduction

5.1.1 The following assessment of the maritime cultural heritage resource is based on records of known shipwrecks, aircraft crash sites and obstructions. This section will address the results for both the Aspen Array Area and the OTC Corridor and are presented on Figure 2.

5.2 Designated Maritime and Aviation Sites

5.2.1 There are no designated maritime or aviation assets that have been identified from the desk-based assessment within the Study Areas of the Aspen Array Area and the OTC Corridor.

5.3 Known Wrecks

Aspen Array Area

5.3.1 There are two known wrecks in the Aspen Array Area (Figure 2).

5.3.2 The first record, **2001,** refers to the HMS *Hawke* and it was a British Cruiser, built at the Chatham Dockyard in 1893. The ship was classified in the Edgar class and the only ship of its class that has not survived the war. On 15 October 1914 HMS *Hawke* was torpedoed by a German submarine (U9) and sunk. Only a few survived this disaster. The second record, **2002,** refers to the wreckage of the *Anna Lind*. The *Anna Lind* was a Danish motor vessel built in 1962. The reason for its loss remains unknown and only six people survived the sinking of the ship. According to Canmore record (Canmore_321985) it sank very quickly. Sonar images of the wreck were used to determine the measurements of the ship (60 x 15 x 10 m).

OTC Corridor

5.3.3 There are several wrecks and obstructions found in the OTC Corridor study area.

5.3.4 There are 21 records referring to wrecks (Figure 2). Five records refer to ships that were lost during Word War One. Record **2017** and **2022** refer to ships who were lost by mines. Record **2012** and **2021** refer to a steam ship and a steam trawler who were lost by gunfire from a German submarine and the last record, **2018**, refer to a trawler that was captured by a German submarine and sunk by explosive charges. Records **2007, 2008, 2016, 2020** and **2025** are modern but retained in the gazetteer because they form a seabed hazard. The records contain wreckages of (wooden) fishing vessels and a steam trawler.

5.3.5 Record **2004**, **2005** and **2016** refer to two live obstructions. The first **2004** is an unidentified obstruction, located in July 1975 during a pipeline survey. The second record **2005** is a possible unidentified obstruction standing one metre high. The third record **2016** refers to containers that was lost overboard from MV Cometa in 1994, measuring 6.1 x 2.4 x 2.4 m. The obstruction was not located in the most recent survey in 2010 and has been amended to 'dead'. One record, **2026**, refers to a findspot of an iron cannon. This cannon was reported in 2014 and discovered in a crack in the rock at the mount of a cave near the sea bed.

5.3.6 The other records refer to unidentified wreckages, found between 1996 and 2022. The sites are always submerged and lying at various depths between 23 m and 95 m.

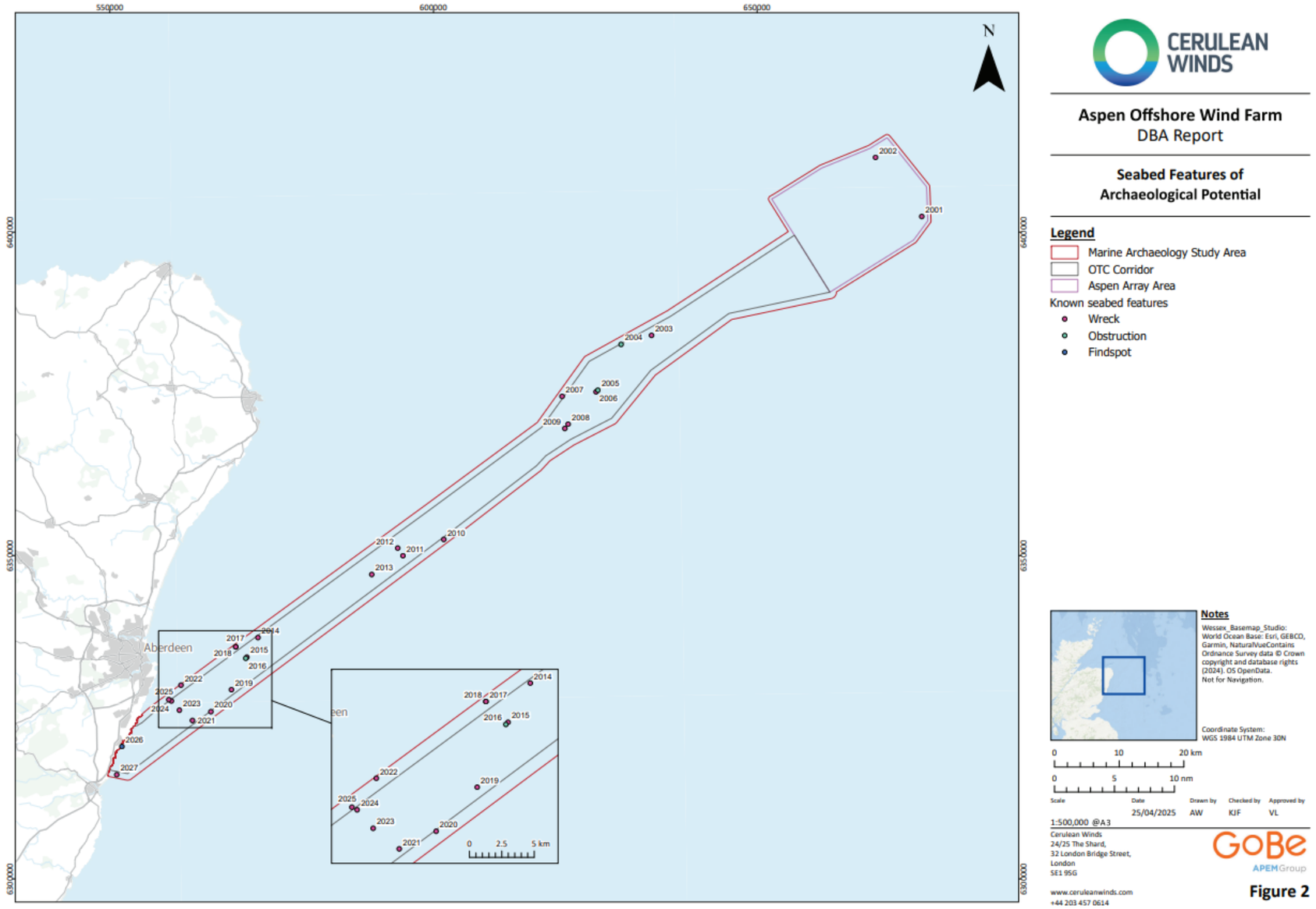

Figure 2 Seabed Features of Archaeological Potential

5.4 Maritime Archaeological Potential

Introduction and General Historical Background

5.4.1 The assessment of potential for the discovery of shipwreck, shipwreck-derived, aircraft and aircraft-derived material within the study area draws on the results of the desk-based research combined with further research of the wider area.

5.4.2 There is potential for discoveries of maritime craft from the Mesolithic to the modern period. Post-medieval and modern wrecks, as they were generally made of more substantial material, are more likely to have been discovered through surveys undertaken by the UKHO and others, and thus recorded in the archaeological record. However, there is still potential for the discovery of previously unrecorded wreck sites, particularly of wooden wrecks, broken up wrecks or partially buried wrecks that are more difficult to detect through geophysical survey.

5.4.3 Maritime archaeological finds from the medieval period and earlier will be of national interest and will hold special significance. Any post medieval finds would also be of special interest, but such finds are more common than those of earlier dates. More examples of boats and ships exist from the modern period; therefore, more discrimination would be required to determine the importance of any remains discovered. Due to the considerable changes in ship/boat building during this period, any remains discovered showing evidence of this could be considered as being of particular interest.

5.4.4 The losses attributed to the two World Wars have been considered as significant due to the magnitude of the loss endured by all countries involved and for their potential to be categorised as war graves under the Protection of Military Remains Act 1986.

Prehistoric Potential

5.4.5 The evidence for Mesolithic (8,500-4,100 BCE) maritime craft is very sparse with the earliest example in Northern Europe coming in the form of a logboat from Pesse, Netherlands (c. 7,920 - 6,740 BC; McGrail 2004, 173). Towards the end of the Mesolithic period, it is likely that these types of craft could have been used within the study area and the wider region. The landscape of the study area would have been subject to a great change during sea level inundation during the Mesolithic period and developing coasts and seascapes are a key aspect of this archaeological period.

5.4.6 Although generally believed to be used for transport and fishing in inland and sheltered waters, ethnographic evidence suggests that logboats have been modified for sea journeys in calm conditions (Wessex Archaeology 2010, 50). Other simple craft seen in later contexts, such as the hide boat, may also have been used, although their light construction would make them much less likely to survive in the archaeological record.

5.4.7 The earliest archaeological evidence for Scotland comprises around the last 15,000 years and reflects Later Upper Palaeolithic and Early Mesolithic human activity at various locations across Scotland (Saville *et. al.* 2012) in periods when (now-inundated) coastal land was more extensive than today, due to lower global sea-levels following the end of the last ice age (Fitch 2022).

5.4.8 Nearshore areas around Scotland's coasts retain higher potential for encountering Late Pleistocene and Early Holocene submerged palaeolandscapes. For example, the landfall areas there is potential for the presence of as yet undiscovered *in situ* palaeolandscape deposits (e.g. peats, estuarine and low-energy coastal sediments of archaeological interest), and prehistoric sites and finds located within the inundated nearshore

palaeogeography. Any prehistoric discoveries will be regarded of national importance, above or below sea level.

5.4.9 By the Neolithic (4,100-2,500 BCE), the coastline and sea-level was very similar to that of the present day. Marine traffic passing through the study area would most likely have been related to trade and the movement of people, using such craft as logboats and hide boats. The comparatively low frequency of this activity compared with later periods, together with the rate of survival of these vessels built from organic materials, would suggest that the likelihood for archaeological remains to survive within the study area is low; however, there is still potential for the preservation of Neolithic watercraft to exist buried within seabed sediments, although the discovery of such material would be exceptionally rare.

5.4.10 The Bronze Age (2,500-800 BCE) saw greater technological advances within Britain and north-west Europe, that brought greater human interaction, resulting in the transference of materials, belief, concept, traditions, and ideas, either reciprocal or forced (Agbe-Davies and Bauer 2010, 15-20). The maritime industry and boat building technology also advanced significantly during this period. The development from simple dugout boats into modified dugouts and plank-built boats is an example of this. The evidence for continental trade during this period is vast and widespread suggesting that regular organised crossings of the open ocean around Britain occurred during this time. It is suggested that the Bronze Age sewn plank boat recovered from Dover, Kent is an example of the type of vessel that could have been involved within this seafaring trade network (Clark 2004, 210).

5.4.11 The study area has produced no evidence for maritime activity from either the Neolithic or the Bronze Age periods to date. Logboats provide the only archaeological evidence in the UK directly relating to watercraft during the Neolithic period (Wessex Archaeology 2010, 50). However, the lack of finds to date does not suggest a sterile time for maritime activity. Bronze Age and Iron Age pits and structures were discovered and excavated in 2008 / 2009 in North Kessock. Production of axe and spear heads, gouges, knives and sickles were found. Further along the coastline excavations at Sculptors Cave at Covesea (SCARF 2018) uncovered objects of the late Bronze Age that included arm rings, ring money, pottery and worked bone. These finds and locations suggest prehistoric industry and settlement along the north-east of Scotland, which could suggest increased feasibility for the discovery of maritime activity in either the Neolithic or Bronze Age.

5.4.12 There is very little evidence for seafaring within Britain during the Iron Age (800 BCE - AD 400), however, the distribution of artefact types and the variety of examples found across north-west Europe suggests a high level of cross-channel trade and it is clear that from at least the Iron Age onwards, seagoing vessels passed through the study area. Evidence in Portmahomack shows Iron Age pits and metalworking technology.

Roman potential

5.4.13 The Roman period (AD 77-211) brought with it considerable changes in many aspects of life within Britain. The evidence of this is widespread and can be seen in the archaeological record by way of the influx of new styles and materials. This is also believed to be the case in terms of maritime technology, which included the development of more substantial wooden vessels (Nayling & McGrail 2004). The more substantial construction would have a better chance of survival in harsher ocean environments. However, no Roman remains have been discovered within the study area to date.

5.4.14 Along with the scale and variety of maritime activity that was being undertaken within north-west Europe, some of the most important maritime technological advances occurred during the Medieval period (AD 400-1500). The key advances within the region during these

periods were the development of several phases of specialised boat building techniques, each of which came from the influence of foreign technologies and ideas. For example, the Saxon settlers that succeeded the Roman occupation introduced a network of trade and migration routes that extended throughout the seas around the British Isles, as evidenced by Scandinavian-style clinker-built vessels during the early medieval period. Pictish monastic settlements found in the region, as well as a Viking hoard and burials c. AD1000 in Portmahomack (SCARF 2016), suggest extensive coastal vessel trading networks along the eastern side of the country.

5.4.15 The archaeological record also suggests another introduction into Northern European shipbuilding by the Saxon people and later the Vikings. This comes by way of specialised vessels for specific tasks. Larger boats with the capability of carrying more cargo 50-60 tons sometimes became prevalent within the Hanseatic trading league. At this same time sleeker, shallow drafted and quicker vessels were used for aggressive actions on other boats and even the invasion of coastal settlements across Europe and the British Isles. There is a very low level of maritime finds from this period within the British Isles which is surprising given the amount of international trade that was passing through Britain. The rarity of the remains means that any maritime material deemed to be of this period discovered within the study area would be considered to be of special interest.

Medieval Potential

5.4.16 The medieval period brought with it further advances in shipbuilding technology to the British Isles. The carvel planking technique, believed to have originated from Iberian shipbuilders, allowed for stronger hulled vessels capable of taking a variety of full-rigged sail plans, which meant longer ocean voyages and more cargo carrying capacity. These maritime advances meant vessels could transport goods, people, and ideas to new colonies around the world, creating the first global trade network. The only evidence for this new style of ship within Northern Europe is the iconographic evidence of cogs and hulcs (a towed ship design) depicted on town seals and coins, along with the extremely rare examples of partial timbers.

5.4.17 The scarcity of evidence for maritime losses during the medieval period is mostly due to the lack of accurate navigation records being taken when and where losses occur. This is why there is an apparent gap in the records given by shipping registers of the time. However, it goes without saying that the level of trade and transport traffic on the seas at this time would have been high, inaccuracies in positioning make it impossible to map where and when these wrecks might have occurred with the necessary accuracy to locate them today. This, coupled with the time period that any shipwrecks would have to survive within the harsh ocean environment, is why very few examples of medieval vessels survive within the archaeological record to date. Therefore, if any remains of a medieval date were discovered within the study area they would be of special interest.

Post-medieval and Modern Potential

5.4.18 The post medieval and modern periods are undoubtedly one of the most dramatic in terms of development in shipbuilding. It was during this period that metal became prevalent in ship construction, starting as composite vessels where metal replaced some of the wooden parts to vessels built entirely of iron or steel. In parallel to this physical development, was the change from sail to mostly steam power then later diesel engines as new technologies provided the means of propulsion that powered the vessels of the Industrial Revolution.

5.4.19 The recording of vessel losses became much more reliable during the modern period which is why the weighting of vessel losses for this period is so high, and not surprisingly, there

are numerous vessels in the Canmore and HER dataset for Recorded Losses dating to the 19th century and modern periods.

5.4.20 During the latter part of the 19th century the Aberdeen fleet gradually moved offshore and into trawling. Chief amongst the offshore catch was the herring, and the herring boom from the 1870s and the First World War brought seasonally hectic activity to the port. By 1910, 217 of the Scottish fleet of 320 steam trawlers operated out of Aberdeen.

5.4.21 Between 1815-1850 Peterhead's herring fleet also grew more than fivefold, with a corresponding development of the harbour for both trade and fishing, along with the wider town, and its commercial operations.

5.4.22 The modern period is also characterised by the two World Wars of the 20th century, which saw a sudden rise in military activity for two relatively short periods attracting intensive enemy action throughout both wars. This took the form of attacks by submarine, aircraft, with fishing trawlers being machine gunned by German planes, and most commonly mines.

5.4.23 The combination of more accurate casualty recordings and the more favourable preservation potential of metal hulled vessels mean that the confidence level that can be ascribed to this assessment of the modern period on the basis of the known resource is higher than that of preceding periods. However, for much of the 19th century and to some extent, the early to mid-20th century (particularly the two World Wars) the quality of positional information being recorded was variable. This is still the case today with many of the smaller fishing vessels working areas on bearings and distances from known locations, rather than relying on modern navigation aids that they all are carrying. Additionally, the partial use of wooden hulled vessels, particularly of small local craft which are unlikely to have been viewed to merit recording when lost, may also be present in the study area.

Navigational Hazards

5.4.24 The coastline along the study area experiences southward coastal flow, and north-easterly winds. Strong currents coupled with shallow waters which react quickly to changing conditions, create extreme weather conditions. The northeast coastline of Scotland is home to rugged and rocky extending outcrops, that with turbulent waters make navigation difficult (Marine Scotland 2020).

5.4.25 Predominantly vessels would have hugged the coastline to avoid the tide and currents of the North Sea, that make collisions with rocks and muddy sand banks that extend into the sea treacherous to passing vessels, especially during times of adverse weather.

Seabed (or potential for preservation)

5.4.26 The seabed consists mostly of sand and sandy mud with areas of Coarse sediment (gravel mixed with sand (Scottish government 2025). The overlying seabed sediment is of modern age and has a low archaeological potential, however it has a high potential to cover archaeological sites, like shipwrecks. The consistency of these layers (sandy mut and sand) has potential to create a concealing layer around shipwrecks or other seabed features and therefore protecting them from physical, biological and chemical decrease. For instance, the muddy layers create a vacuum around shipwrecks where oxygen levels are low, preventing the wood from decaying and increasing the preservation of the object. Furthermore, according to the assessment of the paleogeographic potential the intertidal and nearshore areas of the coastline has a change that early Holocene geomorphology can be preserved on or beneath the current sea level. All in all, the potential for preservation of different Marine Heritage Assets will be high.

Recorded Losses

5.4.27 Recorded Losses can be considered as an indication of the potential for archaeological maritime remains to exist within the study areas and the type and number of wrecks that could be present. These records relate to vessels reportedly lost but for which no physical wreck remains have ever been identified and therefore this section will not be divided in the different study areas but the records will be discussed for the whole Proposed Development Site Boundary.

5.4.28 The records consist of a range of vessel type including barques, brigs, fishing vessels, schooners, sloops, steam trawlers, submarines and steamships and many unknown vessels. The reason of loss of these vessels varies from being wrecked, to stranded on rocks, wrecked, caught on fire, foundered, ran aground collisions or sunk by gunfire from another vessel. The wrecks are lost between the 19th century and 20th century. The records contribute to the potential for further discovery of wrecks undertaking different maritime activities, such as commercial, leisure and wartime.

5.4.29 A list of Recorded Losses can be found in **Annex 4** and **5**.

Overview of Archaeological Potential

5.4.30 A maritime site may comprise an articulated or partially articulated shipwreck and/or associated debris or infrastructure. Debris can comprise a single artefact through to an entire scatter of material that was either accidentally or deliberately lost from a vessel.

5.4.31 Many vessels were lost without a record being made and sometimes even records that were created have since been lost (Cant 2013). Consequently, in addition to the charted maritime sites and Recorded Losses, there is also the considerable potential for the discovery of archaeological material of a maritime nature, currently uncharted, to exist within the study area.

5.4.32 Based on the known Recorded Losses there is potential for encountering marine heritage assets from the post-medieval time to the modern time. The records show Recorded Losses (like wreckages and cannons), dating from the post-medieval time until the modern age. There is also potential to encounter unknown wreck sites dating from the Mesolithic to modern times.

5.5 Aviation Archaeological Potential

Aspen Area Array

5.5.1 There are currently no known aviation sites within the Aspen Array study area, however the study area still has the potential for finding aircraft remnants. Maritime aircraft crash sites can retain a significant amount of material, whilst being an ephemeral target to identify, with the potential for *in situ* human remains. Aircraft crash sites are often difficult to identify through archaeological assessments of geophysical survey, although experience indicates material from the site, such as engines or other material may be recorded as small obstructions or anomalies.

Aspen Array Area and OTC Corridor

5.5.2 There are currently no known aviation sites within the Aspen Array Area and OTC Corridor study areas.

Recorded Losses

5.5.3 According to the Canmore data, there are five recorded losses dedicated to aviation within the search area. These are aircraft that are known to have been lost off the coast, however

the crash site location on the seabed has not been found, and therefore the position in the records only indicates potential for discoveries of related material in the wider area.

5.5.4 The Aberdeenshire HER provide an additional aviation recorded loss close to the Scottish Coast.

Overview of Archaeological Potential

5.5.5 Marine aviation archaeology receptors comprise the remains or associated remains of military and civilian aircraft that have been lost at sea (Wessex Archaeology, 2008b). Evidence is divided into three primary time periods based on major technological advances in aircraft design: Pre-1939; 1939-1945; and post-1945.

5.5.6 There were a number of airfields in the vicinity of the proposed development during the Second World War, with Royal Air Force (RAF) Banff located on the northern Aberdeenshire coast, along with wider activity from Axis forces based in Norway undertaking missions to mainland Scotland, and maritime patrol activities from both sides throughout the period. The remains of crashed military aircraft are protected under the Protection of Military Remains Act 1986 (PMRA) and cannot be disturbed without a licence obtained from the Joint Casualty and Compassionate Centre (JCCC), part of the Ministry of Defence (MoD).

5.5.7 There is also potential for the discovery of previously unknown aircraft material, particularly in relation to Second World War. Aircraft crash sites are also difficult to identify through archaeological assessments of geophysical survey, although past experience indicates material from the site, such as engines or other material may be recorded as small obstructions or anomalies. Furthermore, the positions of aircraft crash sites at sea are rarely recorded with any degree of accuracy and the vast majority were based solely on eyewitness estimations or the discovery of wreckage on the surface of the sea, both of which can lead to erroneous assumptions. Therefore, the presence and distribution of aircraft wrecks within the study area should not be underestimated.

5.5.8 A guidance note published by English Heritage (now Historic England) entitled Military Aircraft Crash Sites (English Heritage (now Historic England), 2002) outlined a case for recognising the importance of aircraft crash sites, specifically with regard to existing and planned development proposals which may have an impact on such sites. The guidance note argues that aircraft crash sites not only have significance for remembrance and commemoration, but also have an implicit cultural value as historic artefacts, providing information on the aircraft itself and also the circumstances of its loss (ibid.: 2). All aircraft that crashed while in military service are automatically protected under the Protection of Military Remains Act 1986.

5.5.9 There is the potential for aircraft crash sites dating from the early 1900s to the present day. Early aircraft construction was characterised by lightweight aircraft, constructed of canvas covered wooden frames. These aircraft were extremely fragile and were known to break up mid-flight. The fragility of these airframes alongside the relative scarcity of flights over water mean that any aircraft remains dating to this period are rare.

5.5.10 The regular use of aircraft over the battlefields of the Western Front by the end of the First World War, however, prompted the mass-production of fixed wing aircraft in large numbers, spurring technological advances in aircraft design. A total of 28 fixed wing aircraft and 15 airships were lost by the German Imperial Air Service and Navy during the raids on the UK mainland during the First World War (Wessex Archaeology 2009, 65) and a further 34 aircraft from the British Home Defence Squadrons are also recorded to have been lost

during this period (Holyoak 2002, 659). It is possible that some of these losses occurred at sea, particularly within regions that attracted intense aircraft hostility such as the East Coast.

5.5.11 During the interwar period, civil aviation increased significantly, with overseas services established to a number of European and worldwide destinations (Wessex Archaeology 2009, 16). The Department of Transport's Air Accident Investigation Branch (AAIB) records 20 civil aircraft losses at sea between 1920 and 1939, though this is not regarded as being a comprehensive record (Wessex Archaeology 2009, 65). Technological advances in aircraft design during this period meant that the low-powered wood and cloth bi-planes of the early 20th century had been replaced by high-powered monoplanes made of aluminium by 1939 (Wessex Archaeology 2009, 65).

5.5.12 During the Second World War, aircraft activity increased drastically and the highest potential for aircraft material on the seafloor is from this period. By the Second World War, aircraft were more heavily built and therefore material from their crash sites is more likely to survive in the archaeological record.

5.5.13 During the Second World War airpower became increasingly important at a strategic and operational level. Forming the frontier between the Allies and Axis, the North Sea became a significant focus for a high volume of aviation activity in the First World War with hostile aircraft activity particularly concentrated off the east and south coasts of the UK (Wessex Archaeology 2008b, 16).

5.5.14 The Aircraft Crash Sites at Sea project (Wessex Archaeology 2008b) considered a selection of sources which may be considered to indicate the potential for aircraft remains of this period to exist within the study area. One of the most complete sources of information was provided by published aviation researcher Ross McNeill, who identified 11,090 RAF aircraft losses in the North Atlantic, North Sea, English Channel, Irish Sea and Biscay areas between 1939 and 1990, the majority of which occurred during the Second World War (Wessex Archaeology 2008b, 18).

5.5.15 After the Second World War, there is still potential for aircraft to have been lost in the area, however any military losses during this period are more likely to have been lost due to training accidents rather than combat operations (Wessex Archaeology 2008b, 166), and civilian losses are likely to have been reported and recorded.

6 MARINE ARCHAEOLOGICAL ASSESSMENT: INTERTIDAL AND COASTAL HERITAGE ASSETS

6.1 Data Assessment

6.1.1 The HES data shows two areas of interest**.** These areas are defined as areas of special architectural or historic interests and therefore of high value. The first area, HES_CA441, is a conservation area called Muchalls and the second area, HES monument (SM12468), is a promontory fortof likely Iron Age date with a later phase of use as a 20th century defensive military site. Around the 20th century a defensive military site was established at this place.

6.1.2 Other records show evidence of different structures, like havens, fishing stations and World War Two remains, like an observer post and anti-tank blocks.

6.2 Potential for Heritage Assets Within the Intertidal Zone

6.2.1 Records show there is activity in the intertidal area dating from the Iron Age to the late 19th century. There is the potential for further (unknown) intertidal and coast heritage assets to

be located within the intertidal zone of the OTC Corridor study area. These assets may be of a maritime nature, relating to coastal infrastructure, or may represent individual finds.

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ANNEXES

Annex 1 Terminology Glossary

Term	Definition
Archaeological Exclusion Zone (AEZ)	An area around a heritage asset in which construction activities and anchoring are prohibited in order to avoid impacts to the asset.
Archaeological interest	There will be archaeological interest in a heritage asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.
Aspen Array Area	The red line boundary area within which the wind turbine generators (WTGs), inter-array cables (IACs) and the Offshore Substation Platform (OSP) are proposed.
Environmental Impact Assessment	A procedure to be followed for certain types of projects to ensure that decisions are made in full knowledge of any likely significant effects on the environment.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated and undesignated assets.
High Water Mark (HWM)	The line of high water of ordinary or medium tides of the sea or tidal river or estuary
Historic environment	All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora.
Historic environment record (HER)	Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.
Offshore Transmission Cable corridor (OTC Corridor)	The area between the array area and the landfall, within which the offshore export cables will be installed along with cable protection and other temporary works for construction.
Significance	The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

Chronology

Where referred to in the text, the main archaeological periods are broadly defined by the following date ranges (adopted from ScARF Panel Reports Chronology and Downloads | The Scottish Archaeological Research Framework (scarf.scot)):

Palaeolithic and Mesolithic	12,700 BCE – 4,100 BCE
Mesolithic	8,500 – 4,100 BCE
Neolithic	4,100 – 2,500 BCE
Bronze Age	2,500 - 800 BCE
Iron Age	800 BCE – AD 400
Roman	AD 77 - 211
Early Medieval	AD 400 – 1100
Medieval	AD 1100 – 1500
Post-medieval	AD 1500 – 1800
19th Century	AD 1800 – 1899
Modern	1900 – present day

The geological periods and associated Marine Isotope Stages (MIS) are defined by the following date ranges:

Period	**Date range**	**MIS**
Holocene	11,700 – present day	1
Weichselian	115,000 – 11,700 BP	5d – 2
Eemian	130,000 – 115,000 BP	5e
Saalian	374,000 – 130,000 BP	10 – 6
Holsteinian	424,000 – 374,000 BP	11
Elsterian	478,000 – 424,000 BP	12
Cromerian	>478,000 BP	>12

Annex 2 Legislative, Policy and Guidance

Global Policy and Legislation

Legislation/Policy	Summary
The World Heritage Convention 1972	The Convention provides for the identification, protection, conservation and presentation of cultural and natural sites of 'outstanding universal value' for inscription on the World Heritage List. The Convention sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The 1972 UNESCO World Heritage Convention was ratified by the UK in 1984 and the UK currently has 29 World Heritage Sites.
The United Nations Convention on the Law of the Sea 1982	UNCLOS 1982 was ratified by the UK in 1997. Article 149 applies only to those archaeological and historical objects that lie outside national jurisdiction and stipulates that 'all objects of an archaeological and historical nature found in the Area shall be preserved or disposed of for the benefit of mankind as a whole, particular regard being paid to the preferential rights of the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin'. Article 303 stipulates that 'states have the duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose'. Article 303 also provides for coastal states to exert a degree of control over the archaeological heritage to 24 nm, though the UK has not introduced any measures to implement this right.
International Council of Monuments and Sites Charter on the Protection and Management of Underwater Cultural Heritage 1996 (the Sofia Charter)	The Charter upon which the Annex of the UNESCO Convention is largely based includes a series of statements regarding best practice, intending 'to ensure that all investigations are explicit in their aims, methodology and anticipated results so that the intention of each project is transparent to all'. The UK is a member of the International Council of Monuments and Sites.
UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001)	The UNESCO Convention was concluded in 2001 and is a comprehensive attempt to codify the law internationally with regards to underwater archaeological heritage. The UK abstained in the vote on the final draft of the Convention, however, it has stated that it has adopted the Annex of the Convention, which governs the conduct of archaeological investigations, as best practice for archaeology. Although the UK is not a signatory, the convention entered into force on 2nd January 2009 having been signed or ratified by 20 member states.

European Policy and Legislation

Legislation/Policy	Summary
The European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (The Valletta Convention)	The Articles of the Valletta Convention tackle various aspects. Article 1 deals with the inventorying and protection of sites and areas; Article 2 deals with the mandatory reporting of chance finds and providing for 'archaeological reserves' on land or underwater; Article 3 promotes high standards for all archaeological work undertaken by suitably qualified people; Article 4 requires the conservation of excavated sites and the safe-keeping of finds; and Article 5 is concerned with consultation that should take place between planning authorities and developers to avoid damage to archaeological remains. The Valletta Convention was ratified by the UK Government in 2000 and came into force in 2001. The convention binds the UK to implement protective measures for the archaeological heritage within the jurisdiction of each party, including sea areas. Insofar as the UK exerts jurisdiction over the Continental Shelf, then it would appear that the provisions of the Valletta Convention apply to that jurisdiction.
The European Landscape Convention 2000	The European Landscape Convention became binding on the UK from 1 March 2007. Its principal clauses require the Government to protect and manage landscapes and to integrate landscape into regional and town planning policies including its cultural, environmental, agricultural, social and economic policies. The Convention applies to the entire territory of the UK and includes land, inland water and marine areas. It is not regarded as applying to sea areas regulated by the UK that lie beyond territorial waters.
European Directives for Environmental Impact Assessments (2014/52/EU)	The EIA Directive entered into force on 15 May 2014 to simplify the rules for assessing the potential effects of projects on the environment. The newly amended directive replaces former directives (85/337/EEC; 97/11/EC; 2003/35/EC; 2009/31/EC; 2011/92/EU) and Member States must apply these from 16 May 2017 at the latest.

Scottish Policy and Legislation

Legislation/Policy	Summary
Marine and Coastal Access Act 2009	Scottish Ministers are responsible for marine planning, licensing and conservation over the Scottish Marine Area from 12 nm to 200 nm offshore. The inshore area (to 12 nm) is covered by Scottish Legislation.
Marine (Scotland) Act 2010	The Marine (Scotland) Act 2010 provides a framework to achieve sustainable development in Scottish waters, implementing marine planning, licensing, conservation and enforcement. This Act replaces the Protection of Wrecks Act 1973, and is the responsibility of the Scottish Ministers and public authorities to act as best to protect and enhance the marine biodiversity and the preservation of 'a marine historic asset of national importance located, or believed to be located, in the area'.
Protection of Wrecks Act 1973: Section Two	Section Two provides protection for wrecks that are designated as dangerous due to their contents and is administered by the Maritime and Coastguard Agency through the Receiver of Wreck.
Ancient Monuments and Archaeological Act 1979 (as amended)	This Act is primarily land based, but in recent years it has also been used to provide some level of protection for underwater sites. Scheduled Monuments and Areas of Archaeological Importance (AAIs or their equivalent) are afforded statutory protection by the Secretary of State, and consent is required for any major works. The law is administered by Historic England and the Department of Culture, Media and Sport.
Protection of Military Remains Act 1986	Under the Protection of Military Remains Act 1986, all aircraft that have crashed in military service are automatically protected. Maritime vessels lost during military service are not automatically protected although the Ministry of Defence (MoD) has powers to protect any vessel that was in military service when lost. The MoD can designate 'controlled sites' around wrecks whose position is known and can designate named vessels as 'protected places' even if the position of the wreck is not known. It is not necessary to demonstrate the presence of human remains at either 'controlled sites' or 'protected places'. Beyond the 12 nm limit the Merchant Shipping Act 1995 covers wreck found or taken into possession outside UK waters and stipulates that, if brought into UK waters, finds must be reported to the Receiver of Wreck. The provisions of the Protection of Military Remains Act 1986 regarding Controlled Sites are applicable in international waters, though they are only enforceable with respect to British-controlled ships, British citizens and British companies.
Merchant Shipping Act 1995	This Act sets out the procedures for determining the ownership of underwater finds that turn out to be 'wreck', defined as any flotsam, jetsam, derelict and lagan found in or on the shores of the sea or any tidal water. It includes ship, aircraft, hovercraft, parts of these, their cargo or equipment. If any such finds are brought ashore, the salvor is required to give notice to the Receiver of Wreck that he/she has found or taken possession of them and, as directed by the Receiver, either hold them pending the Receiver's order or deliver them to the Receiver. The act is administered by the Maritime and Coastguard Agency (MCA).

Legislation/Policy	Summary
National Planning Framework for Scotland 4 2023	Long term spatial strategy for Scotland's development including the protection of the environment, with a focus on the conservation and enhancement of Scotland's distinctive natural and cultural heritage and a commitment to protect, promote and support the sustainable management of these assets. Policy 7 protects the embodied carbon in the historic built environment. The Policy intent is to protect and enhance historic environment assets and places, and to enable positive change as a catalyst for the regeneration of places. The suite of polcies in NPF4 should be read as a whole, and Policy 10 and Policy 32 are particularly relevant to underwater heritage.

Annex 3 Seabed Features of Archaeological Potential

Notes: Co-ordinates are in WGS84 UTM31N

WA ID	Category	Name	Description	Dimensions on the seabed			Easting	Northing	Associated reference	Location
				Length (m)	Width (m)	Height (m)				
2001	Wreck - non-dangerous (live)	*Anna Lind*	Wreck of an intact Danish motor vessel lost in June 1973. The reason for loss is not known. The length, width and height are based on sonar measurements. The measurements of the 299 gross tonnage ship are based on sonar images. The ship lies in 107 m of water and is always submerged.	60	15	10	675436	6402423	UKHO_2399, Canmore_321985 (and Canmore_309922 although the position is incorrect)	Aspen Array Area
2002	Wreck - non-dangerous (dead)	HMS *Hawke*	Wreck of a British cruiser that was lost in October 1914 having been struck by a torpedo fired from German submarine U9, with a loss of 593 members of the crew. The 7350 gross tonnage ship measured 109.7 x 18.3 x 7.3 m. The wreck is reported as 'dead' and not radar and visually conspicuous.	-	-	-	668291	6411561	Canmore_321986, HER_OF08SE0001 (and Canmore_296986 although the position is incorrect)	Aspen Array Area
2003	Wreck		Wreckage reported at this location. No further information available.	-	-	-	633688	6384042	Canmore_291435, HER_NK75NW0001	OTC Corridor
2004	Obstruction (live)		Unidentified obstruction located in July 1975 during a pipeline survey.	-	-	-	628982	6382643	UKHO_2397, Canmore_321983	OTC Corridor
2005	Obstruction - foul ground (live)		Possible unidentified obstruction standing one metre high.	-	-	-	625395	6375562	UKHO_2413, Canmore_321997	OTC Corridor
2006	Wreck		Wreckage reported at this location. No further information available. This site is located approximately 398 m to the southwest of **2005**.	-	-	-	625114	6375314	Canmore_291576, HER_NK64NE0001	OTC Corridor

WA ID	Category	Name	Description	Dimensions on the seabed			Easting	Northing	Associated reference	Location
				Length (m)	Width (m)	Height (m)				
2007	Wreck - non-dangerous (live)	*Evening Star*	Wreck of an intact British motor fishing vessel lost in January 2007 following an ingress of water. The 118 gross tonnage vessel measured 20.6 m long, with a beam of 6 m and draught of 2.1 m. The wreck site is considered to have a slight magnetic response and has scour present close to it.	21	8	6.2	619869	6374607	UKHO_69129, Canmore_324214	OTC Corridor buffer
2008	Wreck - non-dangerous (live)	*Sharringdale*	Entire wreck of an intact wooden hulled British motor fishing vessel lost in February 1995, lost shortly after a collision with the supply vessel, *Hunteor*. The 50 gross tonnage vessel measured 21.9 m with a beam of 6.7 m and a draught of 2.1 m. The wreck site is located in 81 m of water and is considered to have a slight magnetic response.	18	5	6.7	620803	6370310	UKHO_2417, Canmore_322001	OTC Corridor
2009	Wreck		Wreckage reported at this location. No further information available.	-	-	-	620297	6369642	Canmore_292417, HER_NK64SW0001	OTC Corridor
2010	Wreck - non-dangerous (dead)		Unidentified wreck discovered in September 2009, located in 73 m of water and standing approximately 5.8 m high. The wreck was amended to 'dead' in March 2010 and later re-issued.	-	-	5.8	601594	6352492	UKHO_74136, Canmore_324483	OTC Corridor buffer
2011	Wreck		Wreckage reported at this location. No further information available.	-	-	-	595281	6349970	Canmore_202030, HER_NK32SE0001	OTC Corridor
2012	Wreck - non-dangerous (live)	*Ennismore* (possibly)	Wreck of an intact British steamship lost in December 1917 following a torpedo attack by a German submarine. The 1499 gross tonnage vessel was built in 1880, measuring 79.2 m x 10.4 m x 5.5 m. The upright wreck site is located in 97 m of water and is considered to have a slight magnetic response.	33	8	4.5	594478	6351153	UKHO_2242, Canmore_321915	OTC Corridor

WA ID	Category	Name	Description	Dimensions on the seabed			Easting	Northing	Associated reference	Location
				Length (m)	Width (m)	Height (m)				
2013	Wreck - non-dangerous (live)		Unidentified wreck discovered in 1996, located in 79 m of water and standing 4 m high. The wreck is intact yet highly degraded and is sitting upright with 1.3 m of scour at the north-east end.	33	9	4	590464	6347066	UKHO_2390, Canmore_321977	OTC Corridor
2014	Wreck - non-dangerous (live)		Unidentified intact, yet degraded, wreck discovered in 2010. The site is located in 85 m of water and is standing 5 m high from the seabed. The remains are considered to have a slight magnetic response.	43	7	5	572884	6337314	UKHO_75097, Canmore_324519	OTC Corridor
2015	Wreck - non-dangerous (live)		Unidentified intact and upright wreck discovered in 2005. The site is located in 95 m of water and is standing 5 m high from the seabed. The remains are considered not to have a magnetic response.	50	9	6.6	571168	6334283	UKHO_66665, Canmore_324157	OTC Corridor
2016	Obstruction (dead)		Record for a container that was lost overboard from MV *Cometa* in 1994, measuring 6.1 x 2.4 x 2.4 m. The obstruction was not located in the most recent survey in 2010 and has been amended to 'dead'.	-	-	-	570998	6334116	UKHO_2389, Canmore_321976	OTC Corridor
2017	Wreck - non-dangerous (dead)	*Eriksholm*	Wreck of a Swedish steamship lost in January 1918, having been mined whilst on passage between Methill for Stavanger. The 2632 gross tonnage steel vessel was built in 1901, measuring 95.4 m x 13.7 m x 6.1 m and had a triple expansion engine. The wreck, located in 70 m of water, was not located in the most recent survey in 2010 and has been amended to 'dead'.	-	-	-	569455	6335884	UKHO_2229, Canmore_101751, HER_NK00NE0007	OTC Corridor buffer

WA ID	Category	Name	Description	Dimensions on the seabed			Easting	Northing	Associated reference	Location
				Length (m)	Width (m)	Height (m)				
2018	Wreck - non-dangerous (dead)	*Virgilia*	Wreck of a British trawler lost in June 1917, having been captured by a German submarine and sunk by explosive charges, whilst travelling from fishing grounds to Grimsby. The 209 gross tonnage iron vessel was built in 1900 in Grimsby and measured 35.4 m x 6.5 m x 3.4 m with one triple expansion engine. The wreck, located in 70 m of water, was not located in the most recent survey in 2010 and has been amended to 'dead'.	-	-	-	569455	6335884	UKHO_2230, Canmore_101822	OTC Corridor buffer
2019	Wreck - non-dangerous (live)		Unidentified intact and upright wreck discovered in 2005. The site is located in 74 m of water and is standing 6.7 m high from the seabed. The remains are considered to have a poor magnetic response.	71	12	6.7	568784	6329261	UKHO_66666, Canmore_324158	OTC Corridor
2020	Wreck - non-dangerous (live)	*Viking Queen*	Entire wreck of an intact British motor fishing vessel lost in February 1993 after being abandoned having taken in water during rough weather. The vessel subsequently sank whilst under tow by FV *Loch Maravaig* for Aberdeen. The 15 gross tonnage vessel measured 12.2 m long. The wreck site has minor scour present.	17	11	3	565613	6325856	UKHO_2386, Canmore_321973	OTC Corridor buffer
2021	Wreck - non-dangerous (live)	*Silverburn*	Wreck of an intact and upright British steamship lost in June 1917 having been captured and sunk by gunfire from German submarine UB41, whilst travelling with a cargo of coal from Sunderland to Peterhead. The 284 gross tonnage vessel was built in 1914 in Maryport. The wreck, located in 58 m of water, is considered to have a strong magnetic response.	46	17	5	562762	6324494	UKHO_2224, Canmore_101819	OTC Corridor

WA ID	Category	Name	Description	Dimensions on the seabed			Easting	Northing	Associated reference	Location
				Length (m)	Width (m)	Height (m)				
2022	Wreck - non-dangerous (live)	HMS *Gelsina*	Wreck of a British steam trawler lost in June 1917 having been sunk by a mine off Girdleness. The 227 gross tonnage steel vessel was built in 1915. The stern and mid-section of the wreck are upright however the bow is collapsed and not visible. The wreck, located in 58 m of water, is considered to have a moderate magnetic response.	37.4	11.4	10.4	560992	6329954	UKHO_2226, Canmore_101754, HER_NK00SW0007	OTC Corridor buffer
2023	Wreck - non-dangerous (dead)		Unidentified wreck discovered in 2009. The site is located in 61 m of water and is standing 6.6 m high from the seabed. The wreck was not located in the most recent survey in 2010 and has been amended to 'dead'.	-	-	6.6	560747	6326084	UKHO_73774, Canmore_324457, HER_NP09NW0002	OTC Corridor
2024	Wreck - non-dangerous (live)		Unidentified intact wreck discovered in 2010. The site is located in 47 m of water and is described as intact, degraded, with scour present extending 13.8 m from the site, which has a strong magnetic response.	23	10	2.5	559508	6327511	UKHO_75099, Canmore_324521, HER_NO99NE0009	OTC Corridor
2025	Wreck - non-dangerous (live)	*Luffness*	Entire wreck of an intact and upright British steam trawler lost in January 1958 after being stranded in Aberdeen harbour entrance. The ship was later towed out to sea and sunk. Built in 1935 in Aberdeen, the 254 gross tonnage vessel measured 38.5 x 7.1 m and had one boiler and triple expansion engine. The wreck site has scour present and is considered to have a strong magnetic response.	41	19	6	559107	6327717	UKHO_2133, Canmore_321875	OTC Corridor buffer
2026	Wreck - dangerous (live)		Unidentified dangerous wreck discovered in 2022. Located in 23 m, the site is described as degraded and buried with the stern, bow and boilers visible.	41	8.7	3	551068	6316112	UKHO_99424	OTC Corridor buffer

WA ID	Category	Name	Description	Dimensions on the seabed			Easting	Northing	Associated reference	Location
				Length (m)	Width (m)	Height (m)				
2027	Findspot		Reported location of an iron cannon. The cannon measures 1.2 x 0.2 m. The cannon was reported in 2014 and discovered in a crack in the rock at the mouth of a cave near the seabed. The depth was approximately 10 m.	-	-	-	551867	6320469	HER_NO99SW0051	OTC Corridor buffer

Annex 4 Maritime Recorded Losses

Canmore ID	HER ID	Name	Nationality	Type of craft	Construction	Built	Lost	Manner of loss	Journey / Activity	Cargo
329561		Unknown		Fishing vessel			1768	Foundered		
329795		Unknown	Britain, Torry	Fishing vessel			1782	Foundered		
328765		Unknown		Fishing vessel			1787	Foundered		
327075		Unknown		Sloop			1809	Foundered		
326912		*Catharina*	Norway, Christiania	Brigantine			1811			Timber
326787	NK10NW8011	*Jane*		Unknown craft			1828	Stranded on coast		
272424	NO99NW0114	*Douglas*	Britain, Aberdeen	Brigantine			1829	Stranded on rocks		Coal
326955	NO99NE0006	*Hind*		Unknown craft			1829	Caught fire after cargo ignited)		Lime
312658	NP09NW0001	*Marion*	Britain, Leith	Sloop			1836			Salt
329599		Unknown		Unknown craft			1837	Foundered		
206343	NO99SW0035	*Aberdeenshire*	Britain	Unknown craft			1838			
274615	NO99SW0050	*Carl Johann*	Poland, Stettin (Szczecin)	Unknown craft	Wood		1838	Driven ashore		Timber
274613	NO99SW0047	*Sarah*	USA, Boston	Unknown craft			1838			
326986		Unknown	Netherlands	Unknown craft			1838	Foundered		
275451	NO99NW0094	*Mary And Isabella*		Smack			1843	Ran aground on coast	Wick for Leith	
329981		Unknown		Fishing vessel			1847	Foundered		
272815	NK42NW8001	*Victoria*	Britain, Perth	Schooner			1849			
273629	NO99SE0003	*Amelia*	Norway, Christiania	Unknown craft			1854	Collision with *Abyssinia*	Destination Stavanger	Salt
283848		*Salus*		Unknown craft			1857			
283819	NO99SW8014	*Vibilia*					1857			Deals
284579	NO99SW0049	*Eliza*		Unknown craft			1860	Wrecked		
197399	NO99SW0036	*Helene*	Germany, Bremen	Schooner			1860	Stranded	St Petersburg for Peterhead	Bones
327203		Unknown		Unknown craft			1863			Timber
285368	NK10NW0001	Unknown		Unknown craft			1863			Timber

Canmore ID	HER ID	Name	Nationality	Type of craft	Construction	Built	Lost	Manner of loss	Journey / Activity	Cargo
292737	NK42NW0002	*Jean and Catherine*	Britain, Peterhead	Schooner	Wood		1864	Abandoned		
206457	NK10NW0006	*Wave*	Britain, Peterhead	Schooner	Wood		1864	Foundered	Sunderland for Peterhead	Coal
297847		Unknown		Unknown craft			1867			
312797		Unknown		Unknown craft			1867			
326968	NP09NE0004	*Jane*	Britain, Jersey	Barque			1868	Foundered		Bone ash, bones
250107	NO99SW0039	*Kinloss*	Britain, Aberdeen	Schooner	Wood		1868	Stranded	Sunderland for Aberdeen	Coal
327388		Unknown		Fishing vessel			1869	Wrecked due to landslide		
255942	NO99SW0041	*Scotia*	Norway, Grimstad	Brig		1866	1870	Stranded	Sheleftd for Grimstadt	Ballast
255966	NO99NW0112	*City of Aberdeen*	Britain, Aberdeen	Steamship	Iron		1871	Foundered in poor weather	London to Aberdeen	
258809		*Balaklava*		Schooner	Wood		1873	Foundered in poor weather	Liverpool for Newcastle	Salt
262692	NO99SE0004	*Jeune Catherine*	France, Dunkirk	Lugger			1873	Abandoned	Dunkirk for Iceland	Salt
257958	NO99SW0042	*John Murray*	Britain, Exeter	Schooner	Wood		1875	Wrecked on rocks	Chatham for Seaham	Ballast
312098	NO88NE0468	*Pleidaes*	Norway, Arendal	Steamship			1875	Collision		
265515	NK85NW0001	*Primus*		Barque			1875	Abandoned with broken rudder and leaking	Umea for London	Deals and battens
257963		*Superior*	Sweden, Copenhagen	Brig	Wood		1875	Wrecked on rocks	Hull for Copenhagen	Coal
261099	NO99SW8010	*Volunteer*		Unknown craft			1875			
259112	NO99SW0045	*Christine Maria*	Germany, Danzig (Gdansk)	Brig			1876	Wrecked		

Canmore ID	HER ID	Name	Nationality	Type of craft	Construction	Built	Lost	Manner of loss	Journey / Activity	Cargo
258490	NO99SW0044	*Johanna*	Germany, Danzig (Gdansk)	Barque	Wood		1876	Stranded		
312748		Unknown		Unknown craft			1876	Wrecked on rocks		
326012		Unknown		Unknown craft			1876	Wrecked on rocks		
267892	NK85NW0002	*Jessie*	Britain, Dundee	Schooner			1880	Abandoned in poor weather	St David's for Konigsberg	Coal
268473	NK64NW0005	*John Hannah*	Britain, Ramsgate	Brigantine			1881	Foundered		
260778	NK00SE0002	*Stephensons*	Britain, North Shields	Steamship	Wood		1882	Collision with *Loch Garry*	Fishing out of Leith	Ballast
198875	NO99NW0100	*Dunstaffnage*	Britain, Liverpool	Unknown craft (full-rigged)	Iron		1883	Stranded		Ballast
252683	NO99NW0110	*Garrawalt*	Britain, Aberdeen	Steamship	Iron	1882	1887	Stranded on a rock	Sunderland to Aberdeen	Coal
	NO99SW0040	*Isabella*	Britain, Banff	Schooner	Wood		1888	Stranded on coast	Sunderland for Banff	Coal and whiting
312711		*Louise*	Norway, Sandefjord	Brig	Wood	1857	1891	Wrecked		Planks
207070	NK00SE0001	*John Lewis*		Lugger	Wood		1894	Collision with *Leader*	Fishing out of Aberdeen	Ballast
206242		*Elizabeth*		Unknown craft			19th century			
312572		*Frederick II*		Unknown craft			19th century			
283363		*Hibernia*		Unknown craft			19th century			
200232	NO99NE0002	*Prince Consort*	Britain, South Shields	Paddle Steam Trawler	Iron	1874	1900	Collision		Ballast
207274		*Glenavah*	Britain, Fraserburgh	Ketch	Wood	1882	1901	Foundered		Coal
200381	NO99SW0037	*Two sisters*	Britain, Great Yarmouth	Ketch	Wood	1857	1903	Stranded		Box wood

Canmore ID	HER ID	Name	Nationality	Type of craft	Construction	Built	Lost	Manner of loss	Journey / Activity	Cargo
201075	NO99NW0104	*War Cry*	Britain, Peterhead	Dandy	Wood		1914	Stranded on rocks		Coal
207721	NK64NW0001	*Lappland*	Sweden	Steamship			1915	WWI torpedoed by German submarine U14	Narvik for Middlesbrough	Iron ore
298309	NK21SW0001	*Mercury*	Britain, Hull	Steam Trawler	Steel		1915	WWI sunk by gunfire from a submarine		
198933	NO99NW0102	*Teutonia*	Norway, Langesund	Barque	Wood		1915	Wrecked on rocks	Sandefjord for Leith	Pit props
207727, 101756	NK10SW0002	U40	Germany	Submarine			1915	WWI torpedoed by British submarine C24 with decoy trawler *Taranaki*.		
198935	NK10SW0001	HMT *Xerxes*	Britain, Swansea	Steam Trawler (requisitioned)	Steel		1915	WWI mined (or in collision)	Minesweeper	
201129	NO99SW0038	*Cecilie*	Britain, Inverness	Schooner	Wood		1916	Stranded on rocks		Coal
208201	NP09NW0003	*Alwyn*	Britain, Aberdeen	Ketch	Wood		1917	WWI captured and sunk by German submarine		
208052	NK32SW0001	*Belvoir Castle*	Britain, Grimsby	Steam Trawler	Steel	1899	1917	WWII scuttled by German submarine UC44	Fishing	
101822	NK00NE0008	*Virgilia*	Britain, Grimsby	Fishing trawler	Iron		1917	WWI captured and sunk by German submarine UC77.		
292836		*Adventure* (Possibly)		Trawler			1922			
292297	NK64NW0004	*Countess Of Seafield*	Britain, Peterhead	Lugger			1922	Caught fire		
312712		*Lustre Gem*		Steam Drifter	Wood	1907	1924	Foundered		
292295	NK64NW0002	*Kitty*	Britain, Peterhead	Motor yawl		1911	1931			

Canmore ID	HER ID	Name	Nationality	Type of craft	Construction	Built	Lost	Manner of loss	Journey / Activity	Cargo
208261	NK10NE0001	*Raindrop*	Britain, Aberdeen	Steam Trawler	Steel		1931	Collision with *Rydal Force*		
298371	NK10NW0003	*Braconash*	Britain, Aberdeen	Trawler	Steel		1932	Collision with *Strathleven*		
312773	NO99SW8011	*Venetia*	Britain, Aberdeen	Trawler	Iron	1899	1933	Stranded		
312569	NP09NE0002	*Annie Christie*	Britain, Aberdeen	Auxilliary motor yawl			1934	Collision with *David Buchan*	Lost 3 miles off Cove, Cove Bay	
292299	NK74NW0002	*Cassandra*	Britain, Aberdeen	Trawler	Steel		1935	Foundered		
208427	NK10NW0004	HMT *Fort Royal*	Britain, Aberdeen	Steam Trawler (requisitioned)			1940	WWII sunk be German aircraft	Minesweeper	
101750	NK42NW0003	*St Clement*	Britain, Aberdeen	Steamship	Steel	1928	1941	WWII German aircraft		General
125919	NO99NW0092	*Alirmay*		Fishing vessel			1949	Stranded in dense fog	Seine net fishing vessel	
292296	NK64NW0003	*Brighter Hope II*	Britain, Kirkaldy	Steamship	Wood		1963			
292417		Unknown		Unknown craft			Unknown			
291435		Unknown		Unknown craft			Unknown			
324754		Unknown		Unknown craft			Unknown			
291576		Unknown		Unknown craft			Unknown			
202030		Unknown		Unknown craft			Unknown			

Annex 5 Aviation Recorded Losses

Canmore ID	HER ID	Type of aircraft	Nationality	Lost	Manner of loss
329834	NK10NW0008	Hawker Hurricane I (V7066)	British	10 April 1941	Shot down by Do17 off Aberdeen
298374		Bristol Beaufighter IC	British	13 January 1942	Ditched off Aberdeen
329518	NK10NW0007	Handley Page Hampden Torpedo Bomber (P1207)	British	27 October 1943	Ran out of fuel and ditched
312814		Miles Martinet	British	28 March 1944	Crashed into the sea off Garron Point
312567	NO99NE0004	Fairey Barracuda	British	19 June 1946	Crashed into the sea off Findon

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