CALEDONIA
Offshore Wind Farm

Code: UKCAL-CWF-CON-EIA-RPT-00002-2010

Volume 2 Proposed Development (Offshore)

Chapter 10 Marine Archaeology and Cultural Heritage

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Volume 2 Chapter 10 Marine Archaeology and Cultural Heritage

Code	UKCAL-CWF-CON-EIA-RPT-00002-2010
Revision	Issued
Date	18 October 2024

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Acronyms and Abbreviations

AEZ	Archaeological Exclusion Zone
BGS	British Geological Survey
CaP	Cable Plan
CIA	Cumulative Impact Assessment
CMS	Construction Method Statement
DEFRA	Department for Environment, Food and Rural Affairs
DP	Decommissioning Programme
DSLP	Development Specification and Layout Plan
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
GSA	Geophysical Study Area
HDD	Horizontal Directional Drilling
HES	Historic Environment Scotland
HER	Historic Environment Records
HMPA	Historic Marine Protected Area
JNAPC	Joint Nautical Archaeology Policy Committee
JUV	Jack-up Vessel
Mag.	Magnetometer
MBES	Multibeam Echo Sounder
MD-LOT	Marine Directorate - Licensing Operations Team
MEDIN	Marine Environment Data and Information Network

MHWS	Mean High Water Springs
MPA	Marine Protected Area
NMP	National Marine Plan
O&M	Operation and Maintenance
OECC	Offshore Export Cable Corridor
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
PAD	Protocol for Archaeological Discoveries
ROV	Remotely Operated Vehicle
SBP	Sub-Bottom Profiler
SSC	Suspended Sediment Concentrations
SSS	Sidescan Sonar
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UXO	Unexploded Ordnance
WA	Wessex Archaeology
WSI	Written Schemes of Investigation
WTG	Wind Turbine Generator

Executive Summary

This Marine Archaeology and Cultural Heritage Chapter of the Caledonia Offshore Wind Farm (OWF) Environmental Impact Assessment Report (EIAR) presents an overview of the existing marine environmental characteristics, up to Mean High Water Springs (MHWS), for:

- Known and potential palaeogeographic features related to submerged prehistoric landscapes;
- Known and potential maritime and aviation archaeology receptors identified as seabed features, inclusive of designated/protected sites; and
- Known and potential intertidal archaeology receptors.

The Marine Study Area has been determined as the whole of the Proposed Development (Offshore) (Caledonia OWF (Array Area) and Offshore Export Cable Corridor (OECC)) to MHWS with an additional 1km buffer to provide context for maritime and aviation archaeology receptors from documentary sources which may have poor positional accuracy within the non-site-specific datasets used. Within this, the Geophysical Study Area comprises the coverage of datasets for sidescan sonar, multibeam echosounder, marine magnetometer and sub-bottom profiler data sets. These were used to assess the presence of seabed and sub-seabed (palaeogeographic) features of archaeological potential within the study area.

The baseline palaeolandscape assessment resulted in the identification of a total of four shallow geological units, none of which are considered to be of archaeological potential. No individual palaeogeographic features of archaeological potential were identified within the Marine Study Area. The area considered of highest potential for palaeogeographic features is between landfall and the -20m bathymetric contour.

The documentary sources for maritime and aviation archaeology identified 22 recorded wreck and obstruction sites within the Marine Study Area for the Caledonia OWF, including two designated sites. Eight recorded wreck or aircraft crash sites were identified within the OECC, one of which may be designated if aircraft material is identified at its location in the future. Assessment of the site-specific geophysical surveys integrated with the documentary sources identified a total of 716 features listed as being of possible archaeological potential within the geophysical survey extents, discriminated as follows:

- 21 A1 anomalies (anthropogenic origin of archaeological interest);
- 104 A2_h anomalies (anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest of a modern feature);
- 570 A2_l anomalies (anomaly of possible anthropogenic origin but interpretation is uncertain; may be anthropogenic or a natural feature);
- 17 A3 records (historic record of possible archaeological interest with no corresponding geophysical anomaly); and
- 4 U2 anomalies (known non-archaeological feature / feature of non-archaeological interest).

The Design Envelope has been assessed to identify the worst case scenarios which may impact on the known and potential Marine Archaeology and Cultural Heritage receptors. Both direct

and indirect impacts on the receptors have been identified, and where necessary review of other EIAR chapters with relevant information has been completed. The following impacts have been identified:

- Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts during pre-construction seabed preparation, and construction activities;
- Indirect disturbance to marine historic environment assets caused by seabed preparation for seabed foundations, cable burial methods and/or cable protection due to changes in seabed levels from suspended sediment concentrations and/or scour;
- Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts during operation and maintenance (O&M) activities;
- Indirect disturbance to marine historic environment assets during O&M caused by installed seabed foundations, cables and/or cable protection due to changes in seabed levels from suspended sediment concentrations and/or scour; and
- Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts during decommissioning activities.

Marine Archaeology and Cultural Heritage receptors are a finite resource which cannot be replaced once impacted and so their sensitivity is defined as high. It is therefore important to reduce the magnitude of any impact to reduce the overall significance of effect. The assessment has outlined the range of mitigation measures embedded within the design of the Proposed Development (Offshore) which reduce the magnitude the above impacts to occur. These measures mean that the results of this impact assessment are that the Proposed Development (Offshore) is likely to have a negligible to minor impact upon the identified receptors, which is not considered significant in Environmental Impact Assessment terms.

10 Marine Archaeology and Cultural Heritage

10.1 Introduction

10.1.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) identifies the potential effects on marine archaeology and cultural heritage associated with the construction, operation and maintenance (O&M), and decommissioning of the Proposed Development (Offshore). This includes both the Caledonia Offshore Wind Farm (OWF) (i.e., Array Area) as well as the Caledonia Offshore Export Cable Corridor (OECC) seaward of Mean High Water Spring (MHWS).

10.1.1.2 This chapter is supported by the following Technical Appendix:

- Volume 7B, Appendix 10-1: Marine Archaeology Technical Report.

10.1.1.3 The following supporting studies relate to and should be read in conjunction with this chapter:

- Volume 2, Chapter 2: Marine and Coastal Processes; and
- Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage.

10.2 Legislation, Policy and Guidance

10.2.1.1 Volume 1, Chapter 2: Legislation and Policy, of this EIAR sets out the policy and legislation associated with the Proposed Development (Offshore).

10.2.1.2 Legislation and Policy that relate to the marine archaeology and cultural heritage assessment are identified and described in Table 10-1. Additional guidance is outlined below the table.

Table 10-1: Legislation and Policy.

Relevant Legislation and Policy	Description
Marine (Scotland) Act 2010 (Scottish Parliament, 2010[1])	This is the primary legislation relevant to marine development within Scottish inshore waters. The Marine (Scotland) Act 2010 provides a framework to achieve sustainable development in Scottish inshore 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. Marine historic assets of national importance which are located within Scottish inshore waters, can be designated as Historic Marine Protected Areas (HMPAs). In Scotland, HMPAs have replaced Section 1 of the Protection of Wrecks Act 1973, which provides protection for designated shipwrecks in the UK. Military wrecks and aircraft are further addressed through the Protection of Military Remains Act 1986.
Protection of Wrecks Act 1973: Section 2 (UK Parliament, 1973[2])	It is an offence to carry out certain activities in a defined area surrounding a wreck that has been designated, unless a licence for those activities has been obtained from the Government. There are no protected wrecks under the Protection of Wrecks Act 1973 within the Marine Study Area.
Ancient Monuments and Archaeological Areas Act 1979 (Part II) (UK Parliament, 1979[3])	It is a criminal offence to carry out any works on, or near to, a Scheduled Monument without Scheduled Monument Consent. Both terrestrial and maritime sites, including wrecks, may be designated under this Act. There are no scheduled ancient monuments within the Marine Study Area.
Protection of Military Remains Act 1986 (UK Parliament, 1986[4])	This Act provides protection for the wreckage of military aircraft and designated military vessels. The Act provides for two types of protection: 'protected places' and 'controlled sites'. Military aircraft are automatically protected, although vessels have to be specifically designated. The primary reason for designation is to protect as a 'war grave' the last resting place of servicemen; however, the Act does not require the loss of the vessel to have occurred during the war. There are two protected places or controlled sites within the Marine Study Area, HMS *Lynx* and HMS *Exmouth*.
Merchant Shipping Act 1995 (UK Parliament, 1995[5])	All wreck material recovered from UK waters must be declared to the Receiver of Wreck who acts to settle questions of ownership and salvage. 'Wreck' refers to all items of flotsam, jetsam, derelict, and lagan found in or on the shores of the sea or any tidal water.

Relevant Legislation and Policy	Description
UK Marine Policy Statement (HM Government, 2011[6])	The UK Marine Policy Statement sets out the framework for preparing Marine Plans and making decisions affecting the marine environment. It also states that Marine Plans must ensure a sustainable marine environment that will protect heritage assets.
Scotland's National Marine Plan (Scottish Government, 2015[7])	Scotland's National Marine Plan contains policies and advice concerning the marine historic environment, including that development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance and that as well as designated marine heritage assets there are likely to be a number of undesignated sites of demonstrably equivalent significance, which are yet to be fully recorded or await discovery. It also includes statements on mitigation of offshore development and interaction between developments and assets. Historic assets are considered to have potential for a high degree of interaction with dredging, shipping, and renewables construction among others.
Scottish Marine Regions Order 2015 (Scottish Parliament, 2015[8])	11 Scottish Marine Regions were set up for the purposes of regional marine planning. The part of the Proposed Development (Offshore) within Scottish territorial waters sits within the North East region. No regional North East marine plan has yet been published.
Historic Environment Policy for Scotland 2019 (Historic Environment Scotland (HES), 2019[9])	This states that decisions affecting any part of the historic environment require understanding of its significance and consideration of avoiding or minimising detrimental impacts. Designation Policy and Selection Guidance (HES, 2019a[25]) stands alongside Historic Environment Policy for Scotland 2019 and outlines the principles and criteria that underpin the designation of HMPAs.
National Planning Framework 4 (Scottish Government, 2023[10])	This provides a long-term spatial strategy for Scotland's developments 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 policies in National Planning Framework 4 should be read as a whole, and Policy 10 and Policy 32 are particularly relevant to underwater heritage.

10.2.1.3 Numerous sources of UK guidance relevant to marine archaeology and cultural heritage within planning and development processes have been utilised for this technical report, in line with best practice following national, regional and industry specific standards and guidance, as described in chronological order of issue:

- Military Aircraft Crash Sites: Archaeological Guidance on their significance and future management (English Heritage (now Historic England), 2002[11]);
- The Code of Practice for Seabed Developers (Joint Nautical Archaeology Policy Committee and The Crown Estate, 2006[12]);
- Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology, 2007[13]);
- Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now Historic England), 2008[14]);
- Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology and George Lambrick Archaeology and Heritage, 2008[15]);
- Our Seas – A shared resource: High level marine objectives (HM Government, 2009[16]);
- UK Marine Policy Statement (HM Government, 2011[6]);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble and Leather, 2011[17]);
- Ships and Boats: Prehistory to Present – Designation Selection Guide (English Heritage (now Historic England), 2012[18]);
- Marine Geophysics Data Acquisition, Processing and Interpretation Guidance Notes (English Heritage (now Historic England), 2013[19]);
- Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate, 2014[20]);
- Our Place in Time – the Historic Environment Strategy for Scotland (The Scottish Government, 2014[21]);
- Scotland's National Marine Plan (Marine Scotland, 2015[7]);
- Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England, 2015[22]);
- Managing Change in the Historic Environment: Setting (HES, 2016[23]);
- Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland (HES and Scottish Natural Heritage, 2018[24]);

- Marine Protected Areas in the Seas around Scotland – Guidelines on the selection, designation and management of Historic Marine Protected Areas (HES, 2019a[25]);
- Designation Policy and Selection Guidance (HES, 2019b[26]);
- Standard and Guidance for Historic Environment Desk-based Assessment (Chartered Institute for Archaeologists, 2020[27]);
- Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021[28]); and
- Curating the Palaeolithic (Historic England, 2023[29]).

10.3 Stakeholder Engagement

10.3.1 Overview

10.3.1.1 The Offshore Scoping Report (Volume 7, Appendix 2) was submitted to Marine Directorate - Licensing Operations Team (MD-LOT)[i] in September 2022, who then circulated the report to relevant consultees. A Scoping Opinion (Volume 7, Appendix 3) was received from MD-LOT on 13 January 2023. Relevant comments from the Scoping Opinion specific to marine archaeology and cultural heritage are summarised in Table 10-2:.

[i] In 2023, Marine Scotland was renamed Marine Directorate, and thus the marine licensing and consents team is now referred to as Marine Directorate - Licensing Operations Team (MD-LOT).

Table 10-2: Scoping Opinion responses.

Consultee	Comment	Response
MD-LOT	The Scottish Ministers are content with the proposed study area as described in paragraph 14.2.1.1 of the Scoping Report. The Developer sets out the baseline data sources regarding marine archaeology and cultural heritage in Table 14.1 of the Scoping Report. The Scottish Ministers advise that the list of baseline data sources set out in paragraph 14.8.1.1 of the Scoping Report should be broadened for the marine component of the Proposed Development to also include nautical charts and site-specific survey work in line with the HES representation. The HES representation also reiterates the importance that site surveys should be designed so that the presence or absence of submerged or semi-submerged paleo landscapes can be identified.	Site surveys as described in Section 10.4 were undertaken in part to determine the presence or absence of submerged or semi-submerged palaeolandscapes. Admiralty charts have been reviewed as part of the baseline characterisation in Section 10.4.3
MD-LOT	The Scoping Report identifies the Aberdeenshire and Moray Historic Environment Records ("HER") as unavailable. In line with the Aberdeenshire Council representation, the Scottish Ministers advise that the HER is available, and the Developer should include the HER data in the EIAR. If the data is unavailable, the Developer should contact Aberdeenshire Council prior to submission of the EIAR to discuss and agree its approach. The Scottish Ministers are otherwise content with the baseline data sources and the approach to the baseline environment.	The Aberdeenshire and Moray HER dataset has been included within the baseline characterisation in Section 10.4.3.
MD-LOT	In Table 14.3 of the Scoping Report the Developer summarises the potential impacts to marine archaeology and cultural heritage during the different phases of the Proposed Development. The Scottish Ministers agree with the impacts scoped in to and out of the EIAR. However, the Scottish Ministers advise, in line with the HES representation that onshore heritage assets as an impact pathway, should in scoped in for further assessment in the EIAR. Assessment of the impacts of the Proposed Development on onshore heritage assets including A-listed buildings, inventory	Onshore heritage assets are considered in Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage. This offshore EIAR Chapter covers up to MHWS, including intertidal heritage receptors.

Consultee	Comment	Response
	gardens and designed landscapes and scheduled monuments should be included in the EIAR. If these impacts are excluded after assessment, a written explanation of the process and results of the assessment and reasons for their exclusion should be provided in the EIAR.	
MD-LOT	In addition, in line with the Highland Council representation, listed buildings and conservation areas on the coastal edge, from at least Noss Point to Dunbeath Castle should be considered and tested for impacts arising upon their seaward setting. The Scottish Ministers further highlight the Highland Council representation which advises that the Developer should identify all designated sites which may be affected by the Proposed Development. Any assessment should contain a full appreciation of the setting of the historic environment assets and the likely impact on their settings. Where significant impacts are likely, the Developer should provide appropriate visualisations in the EIAR. The Developer must fully address the representations from HES, Aberdeenshire Council and the Highland Council in the EIAR.	Potential impacts from the Proposed Development (Offshore) on the setting of designated cultural heritage assets are considered in Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage.
MD-LOT	With regards to the approach to assessment, the Scottish Ministers highlight the Aberdeenshire Council representation which advises that during any UXO [Unexploded Ordnance] clearance activities there should be provisions for archaeological assessment and recording should a target be identified as not being a UXO but still requires removal.	Provision for this forms part of the embedded mitigation detailed within Section 10.5.6.
MD-LOT	In regard to mitigation, in addition to that set out in paragraph 14.4.1.2 and in line with the HES representation, the Scottish Ministers advise that further mitigation is necessary. Specifically, that the EIAR include: avoidance of known/identified heritage features using Archaeological Exclusion Zones (AEZs) and a pre-defined buffer; archaeological monitoring of works in the intertidal zone at potentially sensitive landfalls, covered by a Written Scheme	This is covered in the embedded mitigation detailed within Section 10.5.6.

Consultee	Comment	Response
	of Investigation and; implementation of a Protocol for Archaeological Discoveries for works below the low water mark where a watching brief would not be feasible.	
Aberdeenshire Council	Chapter 14 of the scoping report addresses Marine Archaeology, and this was considered by the Council's Archaeology Service which provided the following comment. The Service agrees with the scope of the study area for capturing baseline data relating to designated and non-designated historic environment features. The Service agrees with the key datasets used at this stage for informing the baseline data, as listed in Table 14.1 of the scoping report, however, notes that the Aberdeenshire and Moray Historic Environment Records (HER) have been described as unavailable. The Service notes surprise at this as to its knowledge the HER have been available. It does note though that this does not necessarily affect the baseline data too adversely in this instance but does ask that the HER data be fully included within the EIA assessment going forward, as per the methodology later detailed in this section. The Service also agrees with the proposed project surveys for characterising the marine archaeology and cultural heritage baseline.	The Aberdeenshire and Moray HER dataset has been included within the baseline characterisation in Section 10.4.3.
Aberdeenshire Council	The Service agrees with the Offshore EIA scoping assessment for marine archaeology and cultural heritage, and what critically has been scoped in, as detailed within Table 14.3 of the Scoping Report. The Service has no additional pathways, receptors or potential impacts to be added.	This is noted by the Applicant.
Aberdeenshire Council	The Service agrees with the proposed approach to the EIA and assessment, as detailed in Sections, 14.6 to 14.8 etc. It notes that any subsequent Marine Licence, should this development be minded for approval, granted in relation to UXO clearance activities should ensure there is provision for archaeological assessment and	Provision for this forms part of the embedded mitigation detailed within Section 10.5.6.

Consultee	Comment	Response
	recording, should a target be identified as not being an UXO but which still requires removal.	
Aberdeenshire Council	The Service further notes agreement that transboundary impacts for marine archaeology and cultural heritage can be scoped out of the Offshore EIA. Finally, the Service agrees on the suitability of the proposed embedded mitigation for archaeology and cultural heritage for this proposed development and confirms it has no others to add.	This is noted by the Applicant.
Aberdeenshire Council	Having assessed the Scoping Report and having received comment from the abovementioned consultees, who will also be formally consulted on the EIA, the Planning Service is content with the approach taken and the scope of the assessment, the environmental issues identified, and the methodology proposed.	This is noted by the Applicant.
Historic Environment Scotland	Thank you for your consultation which we received on 30 September 2022 about the above scoping report. We have reviewed the details in terms of our historic environment interests. This covers world heritage sites, scheduled monuments and their settings, category A-listed buildings and their settings, inventory gardens and designed landscapes, inventory battlefields and historic marine protected areas (HMPAs). The relevant local authority archaeological and cultural heritage advisors will also be able to offer advice on the scope of the cultural heritage assessment. This may include heritage assets not covered by our interests, such as unscheduled archaeology, and category B- and C-listed buildings.	This is noted by the Applicant.
Historic Environment Scotland	The scoping report considers Cultural Heritage issues at chapter 14. The applicants propose to consider the marine archaeology in the development area and a buffer of 3km around this. Their scoping of impacts (4.5.1.1 – 4.7.1.1) does not include consideration of setting impacts for on-shore historic environment assets and	Potential impacts from the Proposed Development (Offshore) on the setting of designated cultural heritage assets are considered in Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage.

Consultee	Comment	Response
	focuses on direct and indirect impacts on submarine archaeological remains.	
Historic Environment Scotland	We disagree with the exclusion of onshore heritage assets at paragraph 14.5.1.4. Given the scale of the proposed development and the potential for cumulative impacts with this and adjacent wind farms, assessment of the impacts of the proposed development on these assets, including A-listed buildings, Inventory Gardens & Designed landscapes, and scheduled monuments, should be included in the Environmental Impact Assessment. If they are excluded after assessment, a written explanation of the process and results of the assessment, and reasons for their exclusion, should be provided.	Onshore heritage assets are considered in Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage. This EIAR chapter covers up to MHWS, including intertidal heritage receptors.
Historic Environment Scotland	We are content with the proposed study area for the marine archaeology, as described in paragraph 14.2.1.1. We advise that the list of baseline sources should be broadened for the marine component of the proposal to also include nautical charts and site-specific survey work, as intimated in section 14.8.1 of the scoping report. We welcome that the site surveys will be undertaken in a way that allows for archaeological assessment and analysis, and we would reinforce that it is important that the survey should be designed so that the presence or absence of submerged or semi-submerged paleo landscapes can also be identified, particularly in the intertidal zone.	The Offshore Scoping Report (Volume 7, Appendix 2) study area was a 3km buffer to enable a general context to be established prior to any project specific surveys relating to marine archaeology. It did not specify a buffer for the EIAR. As the EIAR utilises archaeologically assessed datasets from the project specific marine geophysical surveys there is a greater level of understanding of the known and potential marine archaeology within the development area, and so the cultural heritage baseline is presented with a 1km buffer in line with wider professional practice for similar developments. Additional data sources such as nautical charts and site-specific surveys as described in Section 10.4 have been utilised for this assessment. The site surveys have been undertaken in part to determine the presence

Consultee	Comment	Response
		or absence of submerged or semi-submerged palaeolandscapes.
Historic Environment Scotland	"In due course, if the scheme continues to involve works below MHWS that would also require a marine licence, then we would expect the EIAR to result in a proposed mitigation strategy for marine assets that builds on the mitigation as set out in paragraph 14.4.1.2 and encompasses the following elements: ▪ Avoidance of known/identified heritage features using AEZs and a pre-defined buffer; ▪ Archaeological monitoring of works in the intertidal zone at potentially sensitive landfalls, covered by a Written Scheme of Investigation (WSI); ▪ Implementation of a Protocol for Archaeological Discoveries (PAD) for works below the low water mark where a watching brief would not be feasible.	Provision for this forms part of the embedded mitigation detailed within Section 10.5.6.
Historic Environment Scotland	Guidance about national policy can be found in our 'Managing Change in the Historic Environment' series available online at www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/managing-change-in-the-historic-environment-guidance-notes. Technical advice is available on our Technical Conservation website at https://conservation.historic-scotland.gov.uk/	This is noted by the Applicant.
The Highland Council	The EIAR needs to identify all designated sites which may be affected by the development either directly or indirectly. This will require you to identify: ▪ Submerged Palaeolandscape Deposits, Archaeological Sites and Artefacts; ▪ The architectural heritage (Conservation Areas, Listed Buildings); ▪ The archaeological heritage (Scheduled Monuments, Historic Battlefields, offshore wrecks, vessels and structures);	Onshore heritage assets are considered in Volume 5, chapter 5: Chapter Terrestrial Archaeology and Cultural Heritage. This EIAR chapter covers up to MHWS, including intertidal heritage receptors. The site surveys were undertaken in part to determine the presence or absence of

Consultee	Comment	Response
	▪ The landscape (including designations such as National Scenic Areas, Special Landscape Areas, Gardens and Designed Landscapes, and general setting of the development; and ▪ The inter-relationship between the above factors	submerged or semi-submerged palaeolandscapes.
The Highland Council	We would expect any assessment to contain a full appreciation of the setting of these historic environment assets and the likely impact on their settings. It would be helpful if, where the assessment finds that significant impacts are likely, appropriate visualisations such as photomontage and wireframe views of the development in relation to the sites and their settings could be provided. Visualisations illustrating views both from the asset towards the proposed development and views towards the asset with the development in the background would be helpful.	Potential impacts from the Proposed Development (Offshore) on the setting of designated cultural heritage assets are considered in Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage, while visualisations and wirelines are presented as part of Volume 2, Chapter 12: Seascape, Landscape and Visual Impact Assessment.
The Highland Council	The Councils Historic Environment Team have suggested that listed buildings and conservation areas on the coastal edge, from at least Noss Point to Dunbeath Castle (as the closest section geographically) be considered and tested for impacts arising upon their seaward setting. As the scheme progresses the Councils Historic Environment Team should be consulted further on the impact on heritage assets outwith the remit of HES.	This is noted by the Applicant. Potential impacts from the Proposed Development (Offshore) on the setting of designated cultural heritage assets are considered in Volume 5, Chapter 5: Terrestrial Archaeology and Cultural Heritage, while visualisations and wirelines are presented as part of Volume 2, Chapter 12: Seascape, Landscape and Visual Impact Assessment.

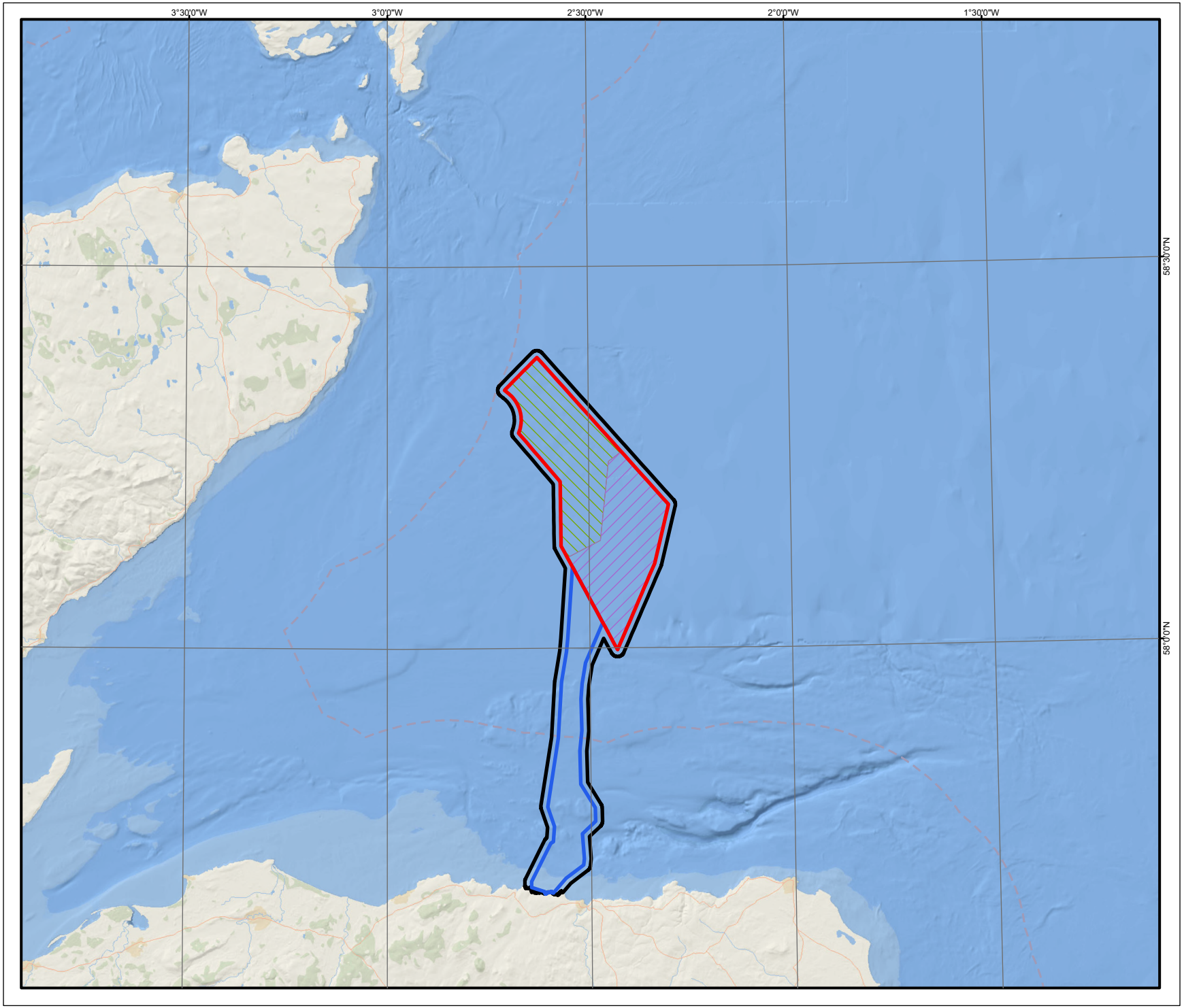
10.4 Baseline Characterisation

10.4.1 Study Area

10.4.1.1 The Marine Study Area (MSA) for the assessment has been defined on the basis of the area over which potential direct and indirect effects of the Proposed Development (Offshore) are predicted to occur on marine heritage receptors during construction, operation & maintenance (O&M), and decommissioning.

10.4.1.2 The MSA comprises the extents of the Proposed Development (Offshore) including the Caledonia OWF and the Caledonia OECC up to MHWS, with an additional 1km buffer (Figure 10-1). This wider area has been used to capture the relevant data on designated and non-designated marine archaeological assets, and to provide the necessary context for understanding archaeological potential and heritage significance of receptors that may be affected by the Proposed Development (Offshore).

10.4.1.3 In addition to this there is a second study area related to the archaeological assessment of the geophysical survey data, known as the Geophysical Study Area (GSA) (Figure 10-2). This area is entirely within the MSA and is defined by the extents of the geophysical datasets' coverage.



- Marine Study Area
- Caledonia OWF
- Caledonia OECC
- Caledonia North Site
- Caledonia South Site
- UK 12 nautical mile limit

0 5 10 15 20 km

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	28/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

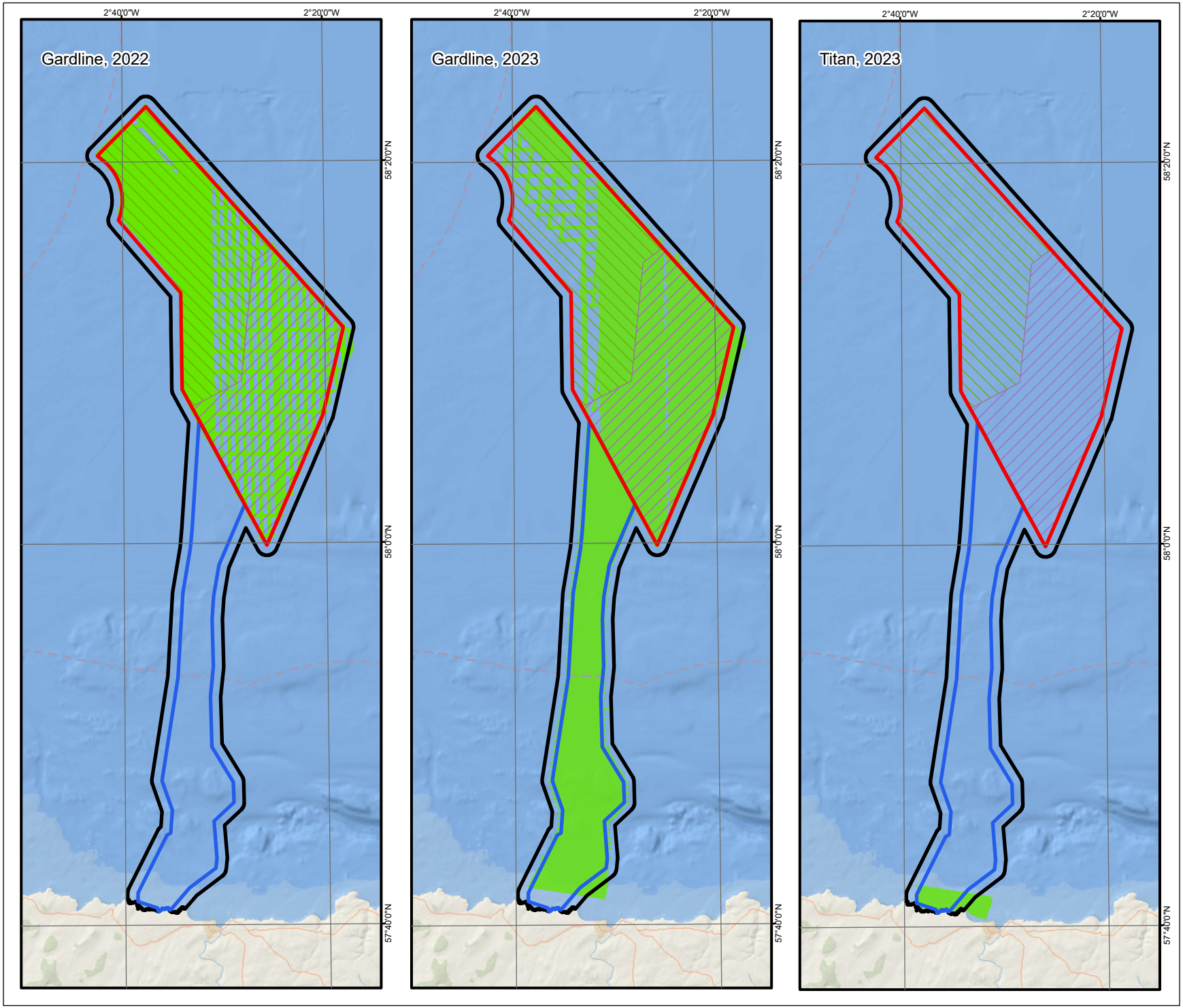
wessex archaeology

CONTRACTOR DRAWING NO: 257360_01	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-1: Location of Proposed Development (Offshore) and Marine Study Area

STATUS: For Review	SCALE: 1:750,000	
DRAWING NUMBER: N/A	SHEET NO: 01 of 01	REV: N/A



Marine Study Area
Caledonia OWF
Caledonia OECC
Caledonia North Site
Caledonia South Site
UK 12 nautical mile limit
Extents of Geophysical Surveys

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	27/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

wessex archaeology

CONTRACTOR DRAWING NO: 257360_EIA_02	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-2: Extents of Geophysical Surveys

STATUS: Approved	SCALE: 1:500,000	
DRAWING NUMBER: N/A	SHEET NO: 01 of 01	REV: N/A

10.4.2 Data Sources

Methodology

10.4.2.1 The baseline data within the MSA used to inform the marine archaeology and cultural heritage assessment includes known wrecks and obstructions, identified geophysical receptors within the GSA, and the potential for further maritime and aviation archaeological receptors. Full details are presented in Volume 7B, Appendix 10-1: Marine Archaeology Technical Report, which contains the full gazetteer of anomalies and baseline context for this EIAR chapter. The section below presents an overview of the baseline.

Desk Study

10.4.2.2 The data sources that have been used to inform this marine archaeology and cultural heritage chapter of the EIAR are presented within Table 10-3.

Table 10-3: Summary of key publicly available datasets for marine archaeology and cultural heritage.

Title	Author	Year
United Kingdom Hydrographic Office (UKHO) Wreck Database	UKHO[30]	2024
Canmore (National Record of the Historic Environment for Scotland)	HES[31]	2024
Aberdeenshire Council Archaeology Service Historic Environment Record (HER) (for both Aberdeenshire and Moray)	Aberdeenshire Council[32]	2024
British Geological Survey (BGS) GeoIndex Offshore	BGS[33]	2024
HES' Scheduled Monuments (including protected wrecks)	HES[34]	2024
Scottish Government (Marine Directorate)'s protected wrecks	Marine Directorate[35]	2024
Admiralty chart 0115	UKHO[36]	2024

Site-specific Surveys

10.4.2.3 Site-specific surveys were carried out to collect data to inform the assessment of marine archaeology and cultural heritage. These surveys are detailed in Table 10-4.

10.4.2.4 The geophysical survey scope included the acquisition of Multibeam (MBES), sidescan sonar (SSS), magnetometer (Mag.) and sub-bottom profiler (SBP) data. The outputs of the site-specific survey are summarised in Volume 7B, Appendix 10-1: Marine Archaeology Technical Report, and this was used to

directly inform the baseline characterisation and impact assessment presented within the EIAR.

10.4.2.5 An archaeological assessment of geophysical survey data within the GSA (Figure 10-2), including MBES, SSS, Mag. and SBP data was undertaken to supplement the baseline characterisation for marine archaeology and cultural heritage. For each dataset three separate campaigns of survey were completed, covering different parts of the Proposed Development (Offshore) which led to near full coverage of the area with at least one dataset for each sensor. Full details are provided in Volume 7B, Appendix 10-1: Marine Archaeology Technical Report.

Table 10-4: Summary of site-specific surveys undertaken to inform marine archaeology and cultural heritage.

Survey	Summary	Coverage of Proposed Development (Offshore) MSA
MBES (2022)	Archaeological assessment of MBES geophysical survey data from 2022 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
MBES (2023)	Archaeological assessment of MBES geophysical survey data from 2023 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
MBES (2023)	Archaeological assessment of MBES geophysical survey data from 2023 Titan survey campaign	Data captured nearshore section of the Caledonia OECC
SSS (2022)	Archaeological assessment of SSS geophysical survey data from 2022 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
SSS (2023)	Archaeological assessment of SSS geophysical survey data from 2023 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
SSS (2023)	Archaeological assessment of SSS geophysical survey data from 2023 Titan survey campaign	Data captured nearshore section of the Caledonia OECC
Mag. (2022)	Archaeological assessment of Mag. geophysical survey data from 2022 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
Mag. (2023)	Archaeological assessment of Mag. geophysical survey data from 2023 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
Mag. (2023)	Archaeological assessment of Mag. geophysical survey data from 2023 Titan survey campaign	Data captured nearshore section of the Caledonia OECC

Survey	Summary	Coverage of Proposed Development (Offshore) MSA
SBP (2022)	Archaeological assessment of SBP geophysical survey data from 2022 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
SBP (2023)	Archaeological assessment of SBP geophysical survey data from 2023 Gardline survey campaign	Data captured over the Proposed Development (Offshore)
SBP (2023)	Archaeological assessment of SBP geophysical survey data from 2023 Titan survey campaign	Data captured nearshore section of the Caledonia OECC

10.4.3 Baseline Description

10.4.3.1 A summary of the marine archaeology and cultural heritage baseline environment is provided in the following sections. Full details of the analysis undertaken to develop the marine archaeology and cultural heritage baseline is provided in Volume 7B, Appendix 10-1: Marine Archaeology Technical Report.

Designated Sites

10.4.3.2 There are two sites with statutory designations under the Protection of Military Remains Act (1986[4]) present within the MSA. These consist of two shipwrecks, the controlled site HMS *Exmouth* (WA 70093) and the protected place HMS *Lynx* (WA 70175 with associated debris field WA 70174). A second entry for HMS *Lynx* identified as WA 70173 is probably a relic record and not identified in the geophysical survey datasets, but has been kept in as a precaution. HMS *Lynx* is within the Caledonia OWF, while HMS *Exmouth* is within the MSA buffer around the Caledonia OWF.

10.4.3.1 HMS *Exmouth* was built in 1934 at Portsmouth Dockyard as an E class destroyer for the Royal Navy. It was sunk with the loss of all 189 crew on 21 January 1940 by U-22. The wreck is listed in the UKHO record as being generally intact but collapsing, with evidence of the torpedo hit on the starboard bow. The original ship was 104.5m in length with a beam of 10.2m. Previous surveys have shown an anomaly of 76m length and 65m width, on an orientation of 110 degrees for the bow. As the wreck location was not covered by the GSA (it is within the buffer around the Caledonia OWF rather than within the Caledonia OWF itself) further description is not possible. Its controlled site status gives it a Restricted Area for works with a radius of 750m around the central point of the wreck.

10.4.3.2 HMS *Lynx* was completed in 1914 by the London & Glasgow Shipbuilding Company in Glasgow as an *Acasta* class destroyer. On 9 August 1915 the ship

struck a mine laid by the German surface raider *Meteor* and sank with the loss of 63 of the crew of 89. The wreck is listed on the UKHO record as having the stern and bow sections missing and an area of debris north of the wreck site. The geophysical assessment of this wreck and associated debris field is provided in the Seabed Features section below.

10.4.3.3 There are no sites located within the MSA that have statutory designations under the Protection of Wrecks Act 1973[2]; Section 2, Marine (Scotland) Act 2010[1], or the Ancient Monuments and Archaeological Areas Act (1979[3]).

10.4.3.4 If there were any aircraft material from crashed military aircraft identified within the MSA, it would automatically be legally protected under the Protection of Military Remains Act (1986[4]). One located record of an aircraft crash is present within the documentary sources gazetteer (WA 70365) within the Caledonia OECC; this has been listed as 'dead' by the UKHO as no material was found on more recent surveys but there is the potential for buried remains within the seabed sediments. Further detail on potential aircraft material elsewhere in the MSA is discussed in the Seabed Features section below.

Palaeogeography

Summary

10.4.3.5 There are currently no known submerged prehistoric assets within the GSA in large part due to significant data gaps in shallow coastal waters, with potential constrained by increased water depths in the northern North Sea (Bicket and Tizzard, 2015[37]; Dawson *et al*., 2017[38]).

10.4.3.6 Hominids and humans have occupied the British Isles at various times, with the earliest occupation extending back to around one million years (Parfitt *et al*., 2010[39]), with coastal areas clearly attracting human populations, including landscapes that are now submerged (Bailey *et al*., 2020[40]).

10.4.3.7 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[41]), 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[42]).

10.4.3.8 Nearshore areas around Scotland's coasts retain higher potential for encountering Late Pleistocene and Early Holocene submerged palaeolandscapes. For example, within the Caledonia OECC and Landfall Site there is potential for the presence of as yet undiscovered *in situ* palaeolandscape deposits (such as peats, estuarine and low-energy coastal sediments of archaeological interest), and prehistoric sites and finds located within the inundated nearshore palaeogeography. Therefore, the potential for submerged palaeolandscape features and prehistoric archaeological evidence is highest between present-day sea level and the -20m bathymetric contour.

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

10.4.3.9 The archaeological assessment of SBP data identified no distinct palaeogeographic features of archaeological potential from within the GSA. The area assessed is interpreted to be covered by a veneer of modern seabed sediment, which in itself is not considered to be of archaeological potential, however, has the potential to cover sites (e.g., wreck remains) where it attains sufficient thickness.

Archaeological Potential

10.4.3.10 The assessment of SBP data shows that the geology within this area either pre-date the earliest occupation of humans in the areas or consists of subglacial units and therefore not considered to be of archaeological potential. However, modern seabed sediments covering the area, have the potential to contain *in situ* and derived archaeological material.

Seabed Features

Caledonia OWF

10.4.3.11 In addition to the two designated sites above, a further 20 features from documented sources were present in the MSA covering the Caledonia OWF and a 1km buffer. These have been compiled from the UKHO, Canmore and HER datasets and enhanced following the archaeological assessment of marine geophysical data into gazetteers, with each feature allotted a unique ID number (see Volume 7B, Appendix 10-1: Marine Archaeology Technical Report). They include: the wreck of a Second World War German U-Boat U-309 (WA 70240); three steamship wrecks of *Dalveen* (WA 70233), *Makalla* (WA 70136) and *Tekla* (in two main pieces, WA 70097 and WA 70100; and two associated debris fields WA 70099 and WA 70101); and two early 20th century trawlers including one sunk while in service with the Royal Navy (HMS *Jasper*, WA 70200).

10.4.3.12 The UKHO location of the German U-Boat U-309 had a corresponding anomaly (WA 70240) classified as a wreck, measuring 65.9 x 11.2 x 4.2m and with a magnetic amplitude of 693nT. There were two pieces of debris associated with this anomaly: WA 70238 measuring 4.1 x 3.1 x 0.8m and WA 70239 measuring 2.1 x 1.3 x 0.5m. This U-Boat was sunk following a depth charge attack by HMCS *St John* on 16 February 1945. The UKHO report (UKHO 1176) notes that the wreck is intact with bows to the north-east and the conning tower intact.

10.4.3.13 Anomalies located at the recorded locations of the wrecks of the *Makalla* and the *Tekla* were identified within the geophysical assessment. The *Tekla* was observed in the SSS and MBES in two main pieces (WA 70097 and WA 70100) measuring 36.3 x 20.3 x 1.7m and 62.5 x 16.9 x 2.5m respectively; and two associated debris fields (WA 70099 and WA 70101) measuring 20.5 x 8.8 x 2.8m and 4.4 x 3.1m respectively. WA 70100 was also observed in the Mag.

data. The anomaly related to the wreck of the *Makalla* (WA 70136) measured 101.2 x 22.7 x 2.0m and was identified within the SSS data.

10.4.3.14 An anomaly (WA 70200) was identified as a wreck on the SSS, MBES and Mag. datasets at the UKHO location of the wreck of HMS *Jasper,* a requisitioned fishing trawler converted into a minesweeper and sunk by a mine on 26 August 1915 with the loss of 11 crew. This anomaly measured 65.5 x 25.4 x 3.7m and had a magnetic amplitude of 36nT.

10.4.3.15 An anomaly (WA 70157) classified as a wreck was identified at the UKHO location for an unknown wreck (UKHO 58699), measuring 102.7 x 22.1 x 6.7m and with a magnetic amplitude of 282nT. This wreck has three associated debris fields around it (WA 70155, WA 70156 and WA70158), measuring 15.5 x 3.7 x 0.6m, 37.1 x 6.2 x 0.9m and 33.6 x 8.3 x 1.1m respectively.

10.4.3.16 Two further locations of UKHO unknown wrecks (UKHO 79582 and UKHO 71122) had anomalies classified as wrecks at that location within the SSS and MBES geophysical datasets, respectively WA 70160, measuring 38.5 x 12.8 x 2.0m, and WA 70137, measuring 75.1 x 30.8 x 2.6m. The wreck anomaly WA 70160 had a piece of associated debris WA 70161, measuring 10.1 x 8.6 x 0.7m. None of these had any associated Mag. anomaly.

10.4.3.17 The UKHO listed wrecks for the steamship *Dalveen* (WA 70233), early 20th century trawler *Commander Boyle* (WA 70222), three unnamed wrecks (WA 70102, WA 70159 and WA 70173) and four recorded obstructions/foul ground (WA 70011, WA 70117, WA 70218 and WA 70257) did not have corresponding anomalies identified in the geophysical assessment, either because the survey extents did not cover their positions within the buffer around the Caledonia OWF or because no anomalous features were identified within the survey datasets from that location.

10.4.3.18 A further one recorded obstruction identified as modern (WA 70123) and two fishing vessels dating to the second half of the 20th century (WA 70024 with potentially associated debris field 70025 and WA 70103) were identified in the geophysical assessment.

10.4.3.19 In total 301 anomalies with archaeological potential were identified in the archaeological assessment of the geophysical survey data within the Caledonia OWF, some of which related to the individual documented source features. These were allotted a 70000s gazetteer number and categorised as follows:

- 18 A1 anomalies (anthropogenic origin of archaeological interest);
- 22 A2_h anomalies (anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest of a modern feature);
- 247 A2_l anomalies (anomaly of possible anthropogenic origin but interpretation is uncertain; may be anthropogenic or a natural feature);

- Ten A3 records (historic record of possible archaeological interest with no corresponding geophysical anomaly); and
- Four U2 anomalies (known non-archaeological feature / feature of non-archaeological interest).

10.4.3.20 The A2_h and A2_l categories are further classified by interpreted type, which further aids in assigning archaeological potential and importance, with differentiations done on professional experience and judgement. Further explanation of these classifications and information is presented within the Technical Report (see Volume 7B, Appendix 10-1: Marine Archaeology Technical Report). Table 10-5 shows the breakdown of these classifications.

Table 10-5: Classifications of A2_h and A2_l anomalies within the Caledonia OWF.

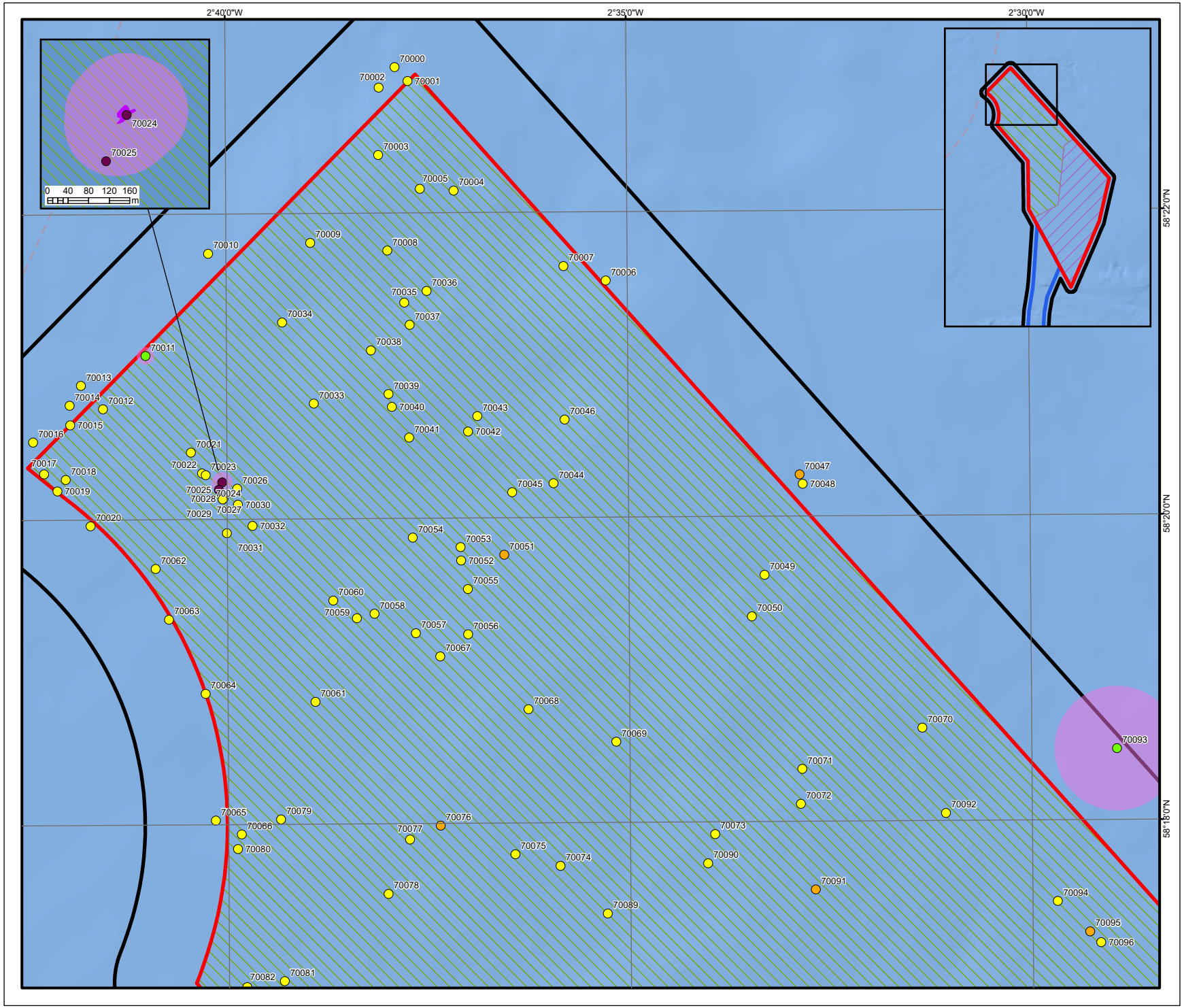
Classification	Archaeological Category	Caledonia OWF	Caledonia OWF Buffer	Total
Dark reflector	A2_l	140	18	158
Debris	A2_h	3		3
Debris Field	A2_h	3	1	4
Linear Debris	A2_h	12		12
Linear Debris	A2_l	3	1	4
Magnetic	A2_h	3		3
Magnetic	A2_l	28	2	30
Mound	A2_l	7	2	9
Seabed disturbance	A2_l	45	1	46

10.4.3.21 The A3 category reflects a documented feature which was covered by the geophysical survey but had no corresponding geophysical anomaly. This does not mean that there is necessarily no archaeological material there, as it may be buried in seabed sediments and so not picked up by the surveys, or that was outwith the coverage of the geophysical surveys within the MSA buffer for the Caledonia OWF.

10.4.3.22 The U2 category reflects a feature known to be non-archaeological in date/origin i.e. are modern wrecks or obstructions. Although these wreck sites do not have archaeological value, they still have social and cultural value, particularly if they are related to losses where crew were also lost as is the case of the *Trident* fishing vessel WA 70024 with associated debris field WA 70025 which sunk in 1974 with the loss of all seven crew. Equally they would be considered navigational hazards for the Proposed Development (Offshore).

Despite their lack of archaeological value, these records will be retained in the gazetteer of seabed assets.

10.4.3.23 Seabed features identified within the Caledonia OWF are presented in Figure 10-3 and Figure 10-6.



Marine Study Area

Caledonia OWF

Caledonia OECC

Caledonia North Site

Caledonia South Site

UK 12 nautical mile limit

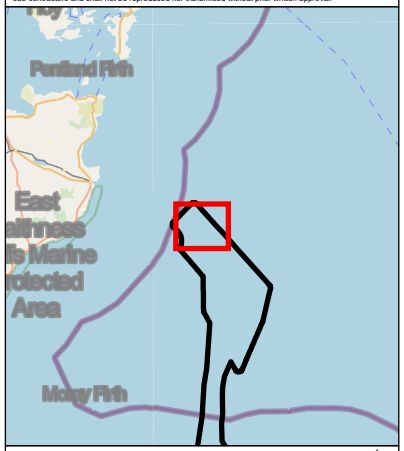
AEZ

Anomalies of archaeological potential

- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- U2 – Known non-archaeological feature / Feature of non-archaeological interest

Seabed feature boundaries

Wreck



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CALEDONIA Offshore Wind Farm

wessex archaeology

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GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-3: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia North Site

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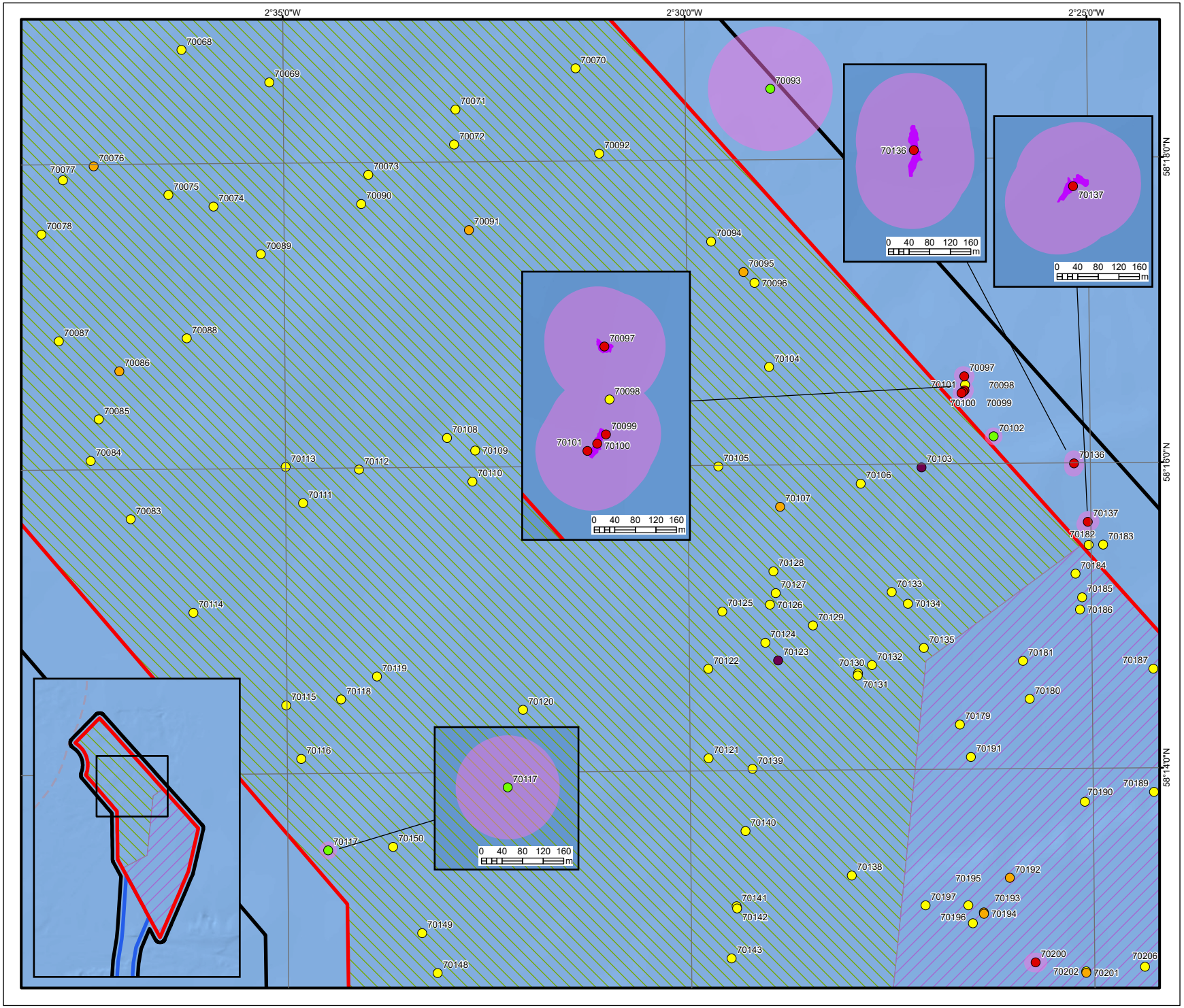


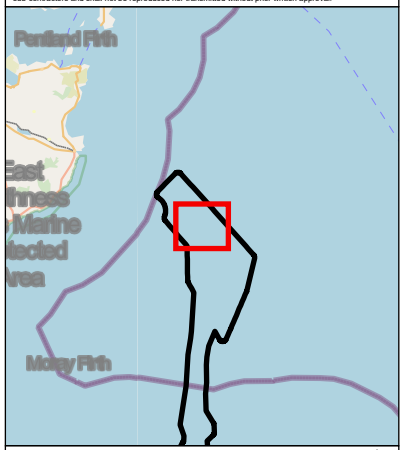
Marine Study Area
Caledonia OWF
Caledonia OECC
Caledonia North Site
Caledonia South Site
UK 12 nautical mile limit
AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- U2 – Known non-archaeological feature / Feature of non-archaeological interest

Seabed feature boundaries

- Wreck
- Debris field



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DRAWING TITLE

Figure 10-4: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia North Site

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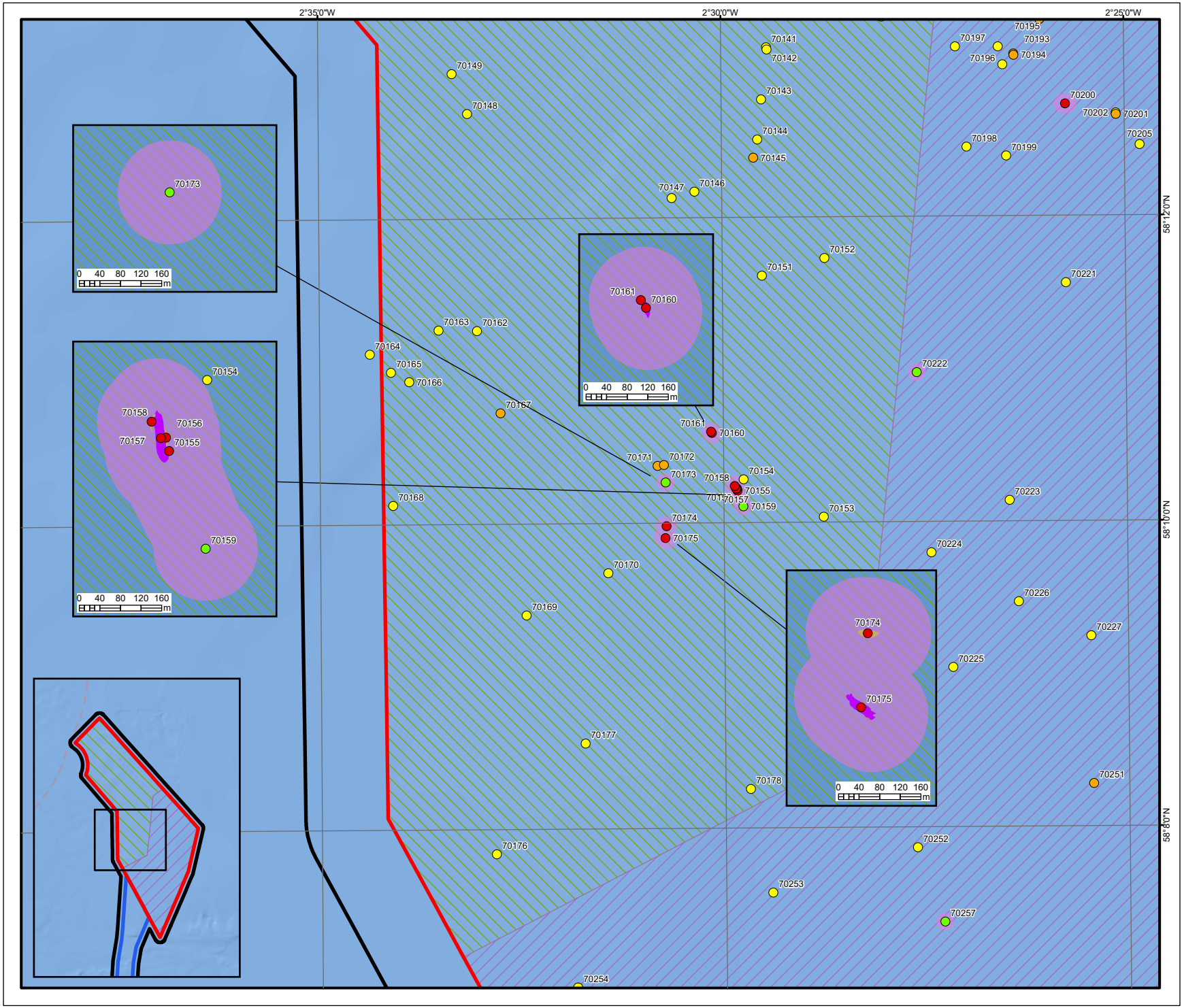


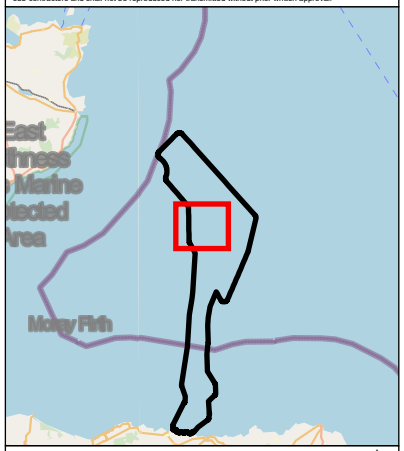
Marine Study Area
Caledonia OWF
Caledonia OECC
Caledonia North Site
Caledonia South Site
UK 12 nautical mile limit
AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly

Seabed feature boundaries

- Wreck
- Debris field



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CALEDONIA Offshore Wind Farm

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Figure 10-5: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia North Site

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For Review	1:62,500

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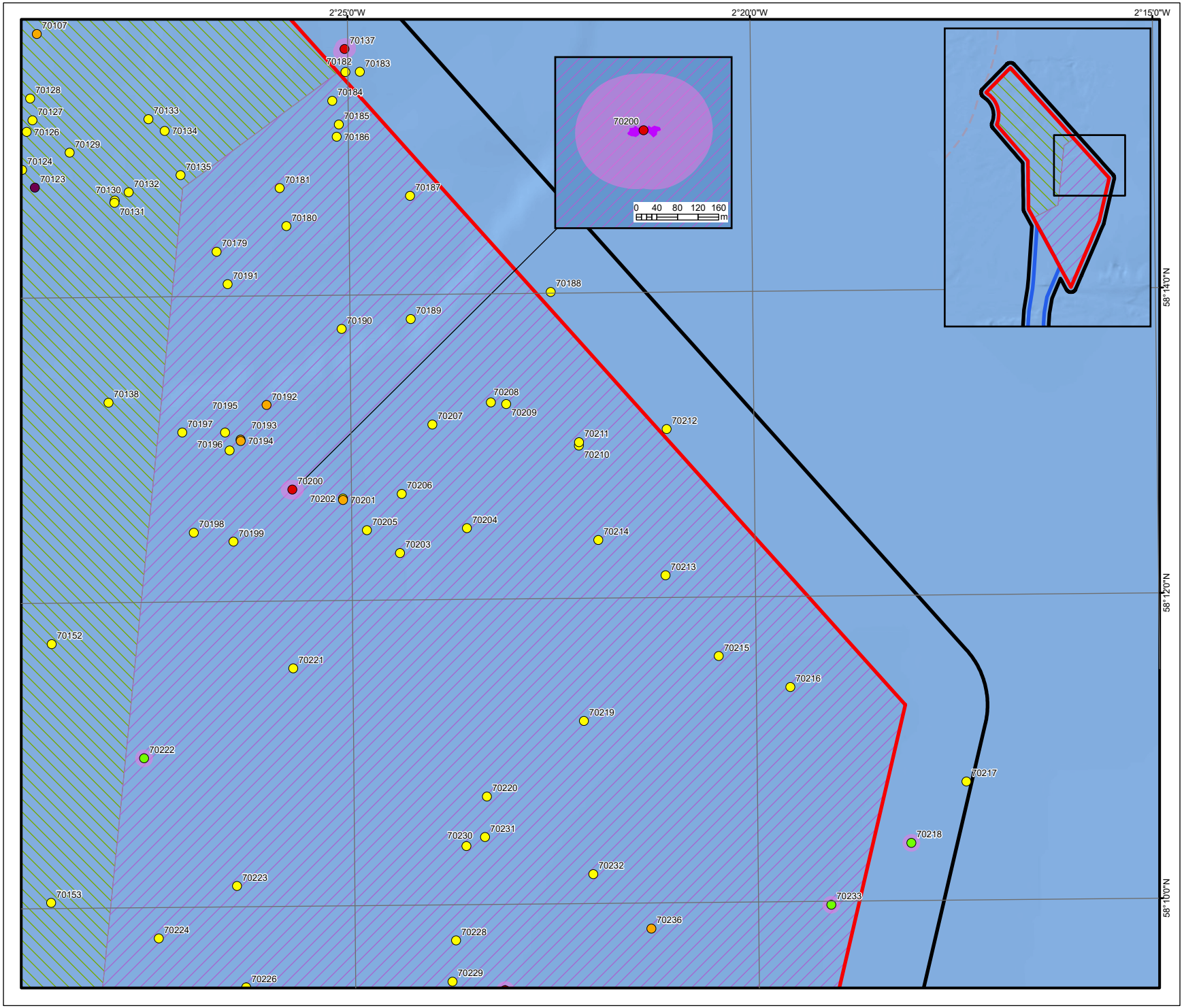

Marine Study Area
Caledonia OWF
Caledonia OECC
Caledonia North Site
Caledonia South Site
UK 12 nautical mile limit
AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly
- U2 – Known non-archaeological feature / Feature of non-archaeological interest

Seabed feature boundaries

Wreck

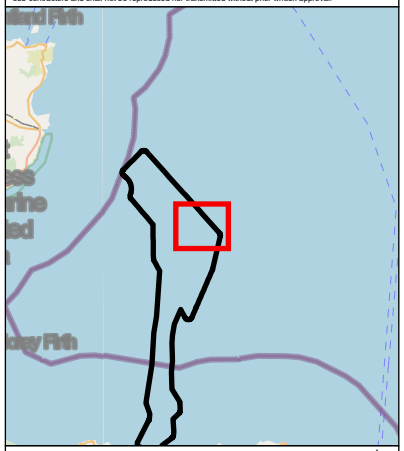

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Figure 10-6: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia South Site

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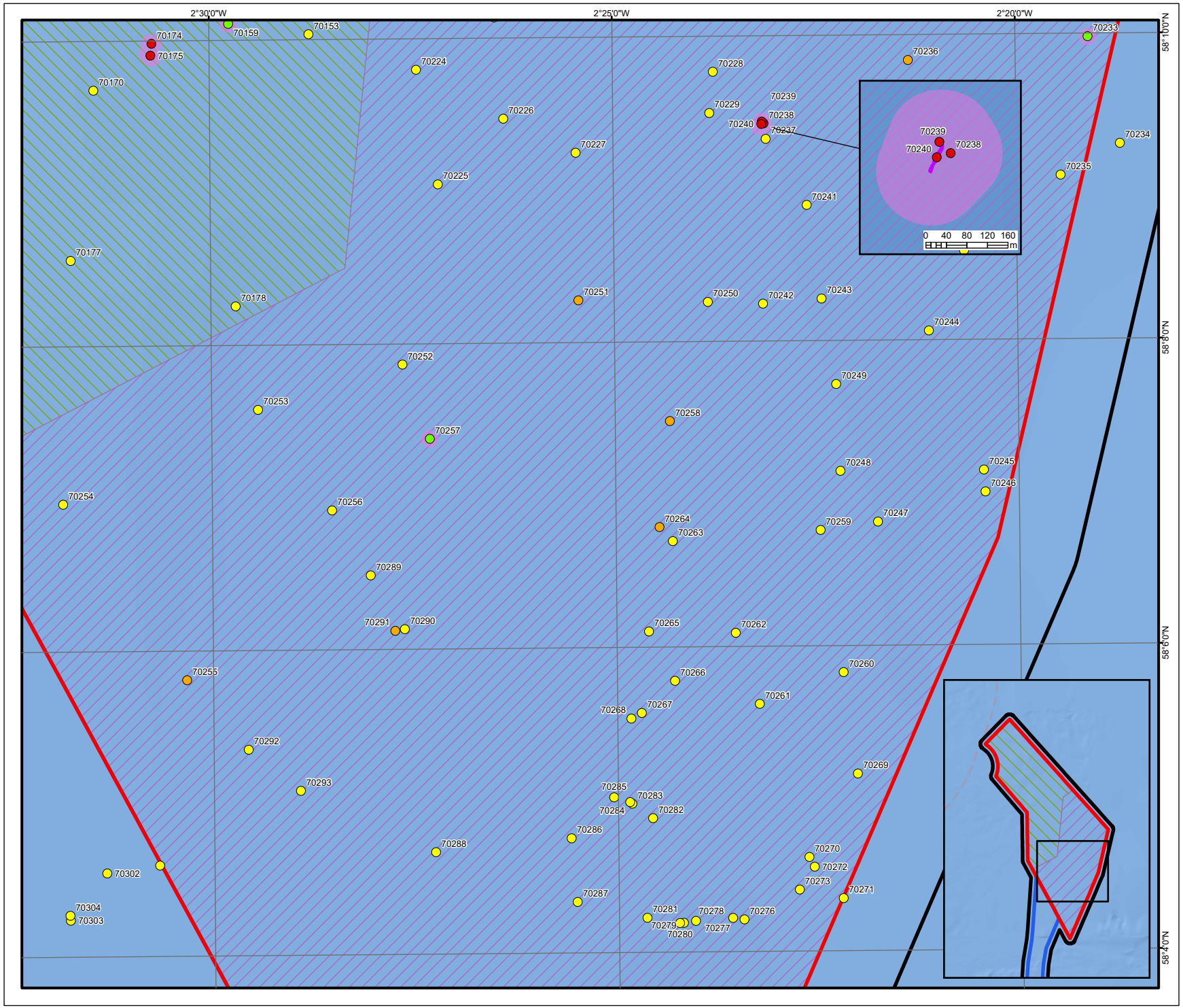

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CALEDONIA Offshore Wind Farm

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GEODETIC PARAMETERS: WGS 84 UTM 30 N	

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Figure 10-7: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia South Site

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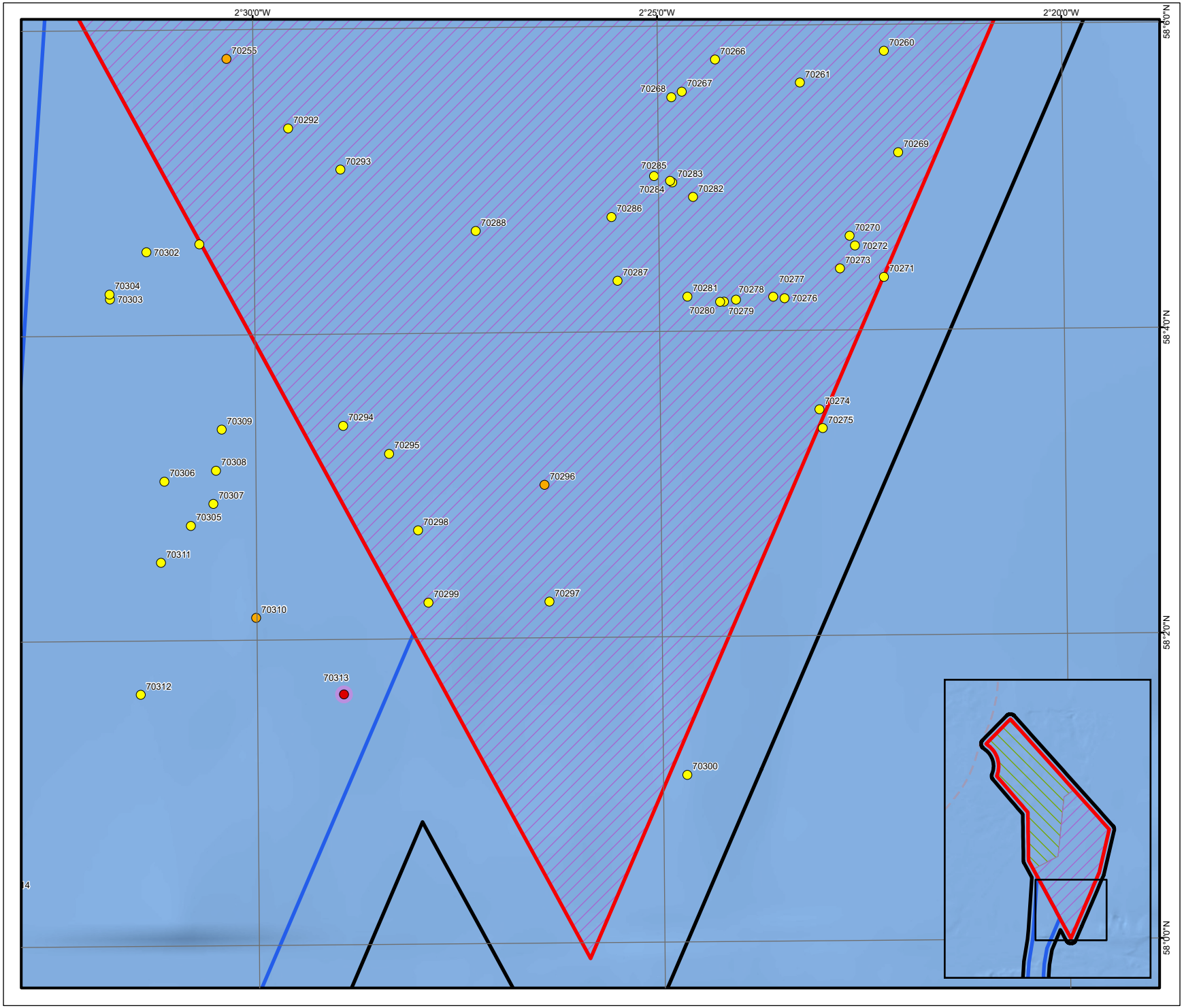
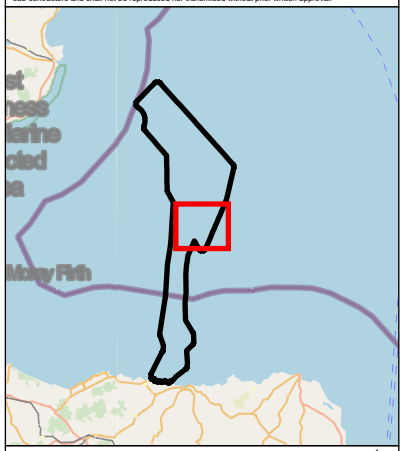


- Marine Study Area
- Caledonia OWF
- Caledonia OECC
- Caledonia North Site
- Caledonia South Site
- UK 12 nautical mile limit
- AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



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CALEDONIA Offshore Wind Farm

wessex archaeology

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GEODETIC PARAMETERS: WGS 84 UTM 30 N

DRAWING TITLE

Figure 10-8: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia South Site

STATUS	SCALE	
For Review	1:62,500	
DRAWING NUMBER	SHEET NO	REV
N/A	03 of 03	N/A

Caledonia OECC

10.4.3.24 The only identified designated site within the Caledonia OECC and OECC buffer is the reported location for aircraft crash site WA 70365 (UKHO 2190) discussed above in the Designated Sites section.

10.4.3.25 One item of isolated debris has been assigned an A1 archaeological discrimination (Figure 10-13). Anomaly 70549 has been interpreted as a distinct, oval dark reflector with a rounded shadow and has a very large associated Mag. anomaly of 977nT. This has been interpreted as ferrous debris.

10.4.3.26 Two magnetic anomalies with no associated visible seabed features were ascribed an A1 discrimination. Anomalies 70313 (Figure 10-9) and 70532 (Figure 10-13) were identified in the Mag. data only and have magnetic amplitudes of 740nT and 800nT respectively. These represent significant ferrous debris that are either buried or without surface expression.

10.4.3.27 Seven further features from documented sources were present in the MSA of the Caledonia OECC, including the wreck of the Norwegian sailing barque Ebenezer (WA 70657) wrecked off Whitehills in February 1900 with a cargo of coal for Grimsby and reports of a sailing vessel that ran aground at Banff in 1745 (WA 70566). The wreck of the *Ebenezer* is listed as having entirely broken up, with some wreckage possibly remaining within gulleys in the seabed (UKHO 2150). Four of the remaining A3s (WA 70380, WA 70379, WA 70367 and WA 70360) are listed as possible wrecks or foul ground which could be wreck material that were reported by a local fishing skipper, but have since not been identified on surveys. One of these (WA 70360) has been updated to 'dead' by the UKHO.

10.4.3.28 One recorded seabed obstruction (WA 2005) from the Aberdeenshire HER was grouped with anomaly WA 70367 as it was within 2.5m of the WA 2006 UKHO record position.

10.4.3.29 The above sites have been compiled from the UKHO, Canmore and HER datasets as above, and are shown in Figure 10-9. None of these were identified with anomalies within the geophysical datasets either because the survey extents did not cover their positions within the buffer around the Caledonia OECC or because no anomalous features were identified within the survey datasets from that location.

10.4.3.30 Overall, 415 anomalies with archaeological potential were identified in the archaeological assessment of the geophysical survey data within the GSA around the Caledonia OECC. These were categorised as follows:

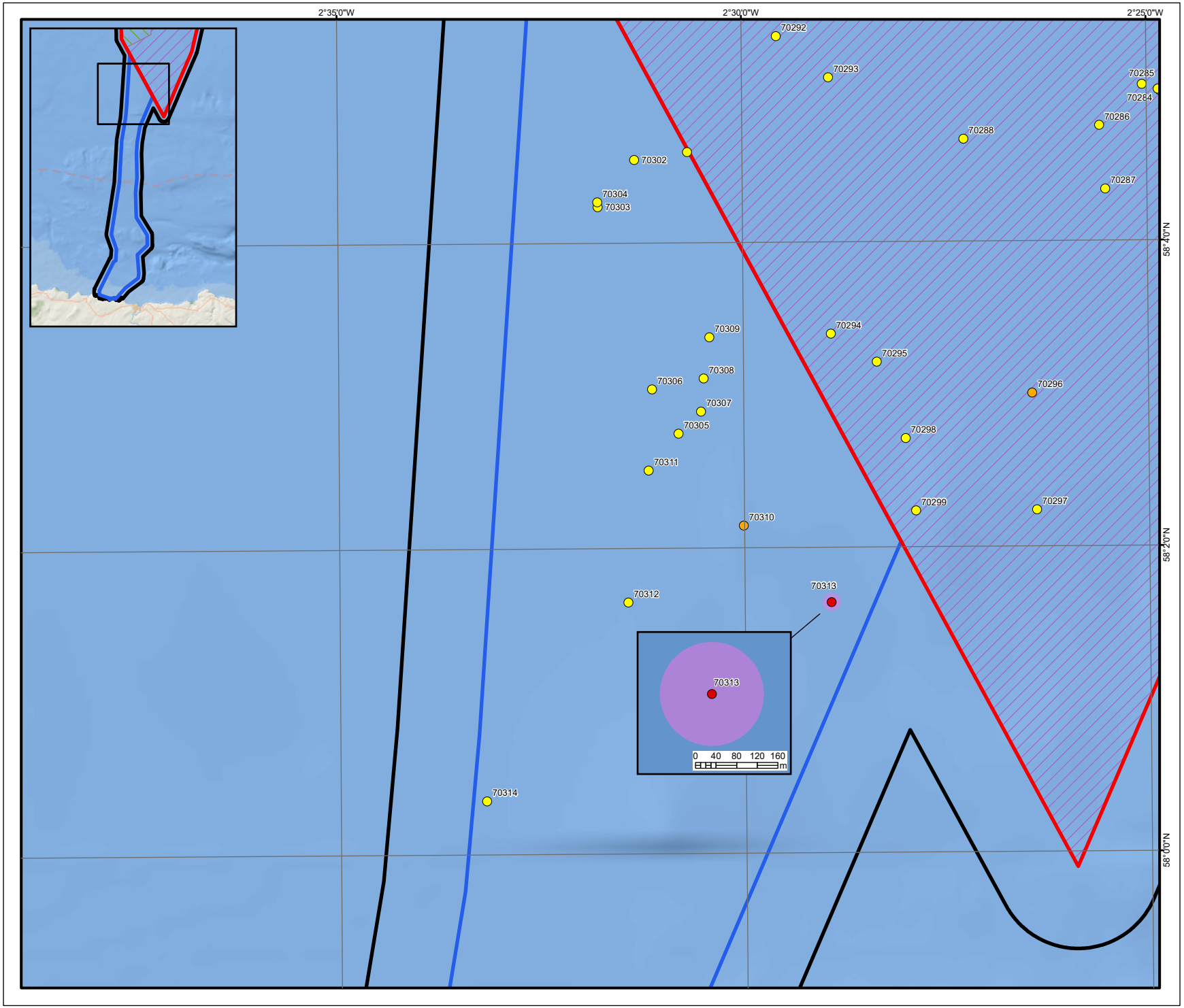
- Three A1 anomalies (defined as an anomaly of Anthropogenic origin of archaeological interest);
- 82 A2_h anomalies (anomaly of likely anthropogenic origin but of unknown date; may be of archaeological interest or a modern feature);
- 323 A2_l anomalies (anomaly of possible anthropogenic origin but interpretation is uncertain; may be anthropogenic or a natural feature); and
- Eight A3 (Historic record of possible archaeological interest with no corresponding geophysical anomaly).

10.4.3.31 The A2_h and A2_l categories are further classified by interpreted type, which further aids in assigning archaeological potential and importance, with differentiations done on professional experience and judgement. Further explanation of these classifications and information is presented within the Technical Report (see Volume 7B, Appendix 10-1: Marine Archaeology Technical Report). Table 10-6 shows the breakdown of these classifications.

10.4.3.32 Seabed features identified within the Caledonia OECC are presented in Figure 10-9.

Table 10-6: Classifications of A2_h and A2_l anomalies within the Caledonia OECC

Classification	Archaeological Category	**OECC**	OECC Buffer	Total
Dark reflector	A2_l	69	21	90
Debris	A2_h	3	1	4
Debris Field	A2_h	1		1
Linear Debris	A2_h	20	30	50
Linear Debris	A2_l	4	5	9
Magnetic	A2_h	13	14	27
Magnetic	A2_l	124	62	186
Mound	A2_l	6	3	9
Seabed disturbance	A2_l	25	4	29



- Marine Study Area
- Caledonia OWF
- Caledonia OECC
- Caledonia North Site
- Caledonia South Site
- UK 12 nautical mile limit
- AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain

0 0.5 1 1.5 2 km

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	28/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

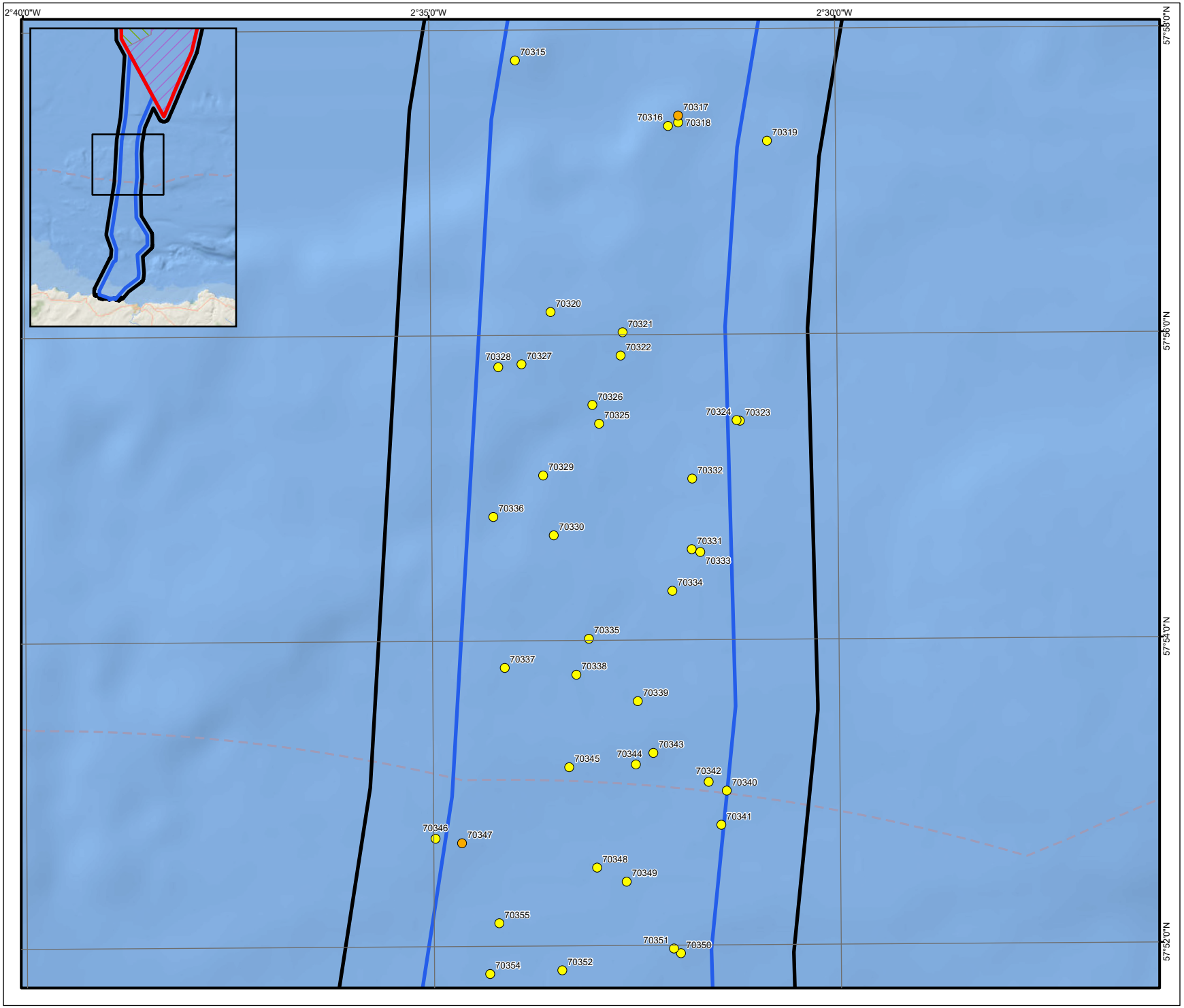
wessex archaeology

CONTRACTOR DRAWING NO: 257360_EIA_10-9	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-9: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia OECC

STATUS: For Review	SCALE: 1:62,500	
DRAWING NUMBER: N/A	SHEET NO: 01 of 05	REV: N/A



Marine Study Area

Caledonia OWF

Caledonia OECC

Caledonia North Site

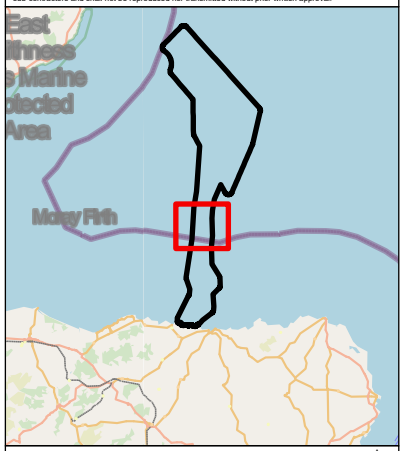
Caledonia South Site

UK 12 nautical mile limit

Anomalies of archaeological potential

A2_h – Anomaly of likely anthropogenic origin but of unknown date

A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain



0 0.5 1 1.5 2 km

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	28/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

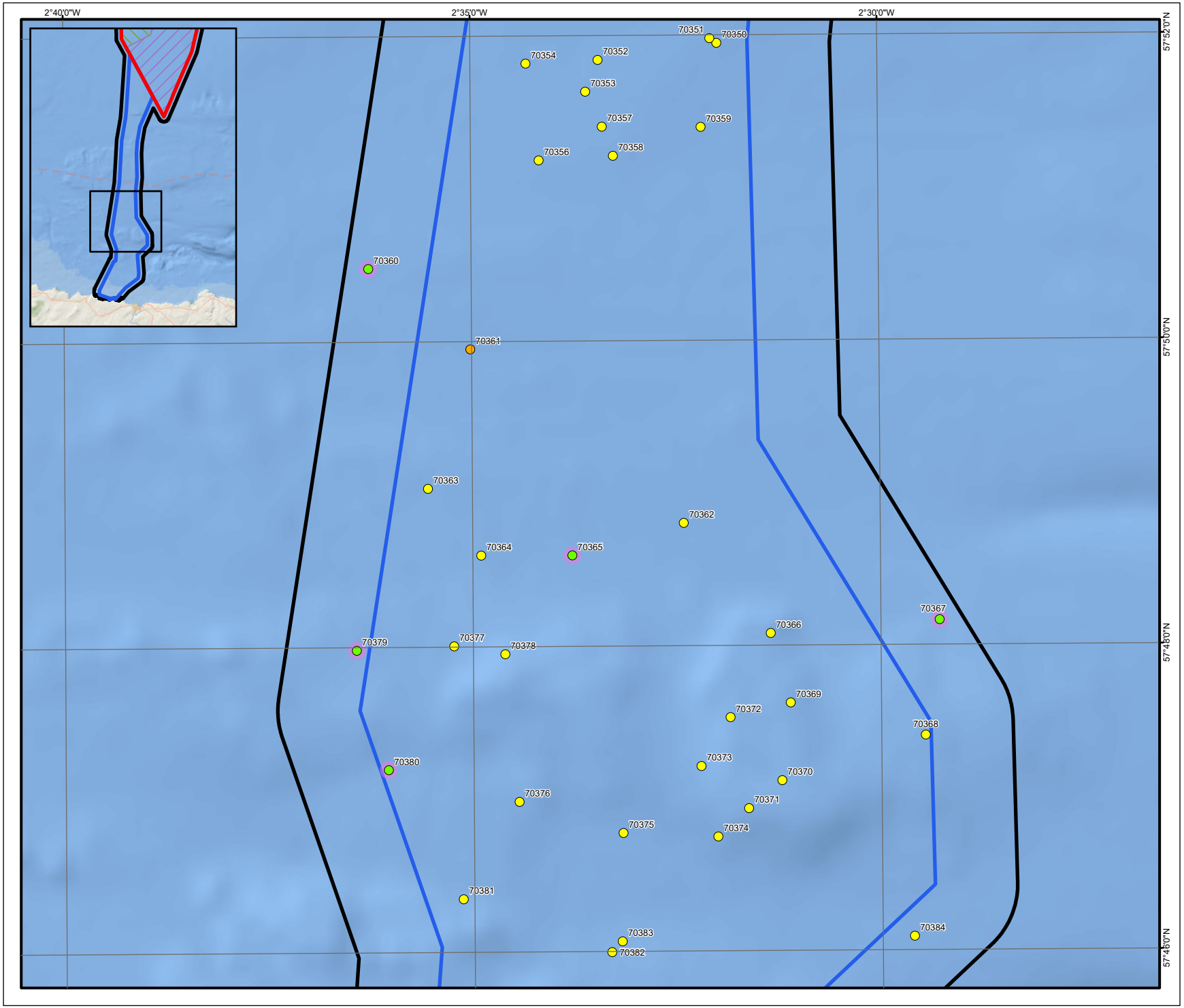
wessex archaeology

CONTRACTOR DRAWING NO: 257360_EIA_10-10	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-10: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia OECC

STATUS: Approved	SCALE: 1:62,500	
DRAWING NUMBER: N/A	SHEET NO: 02 of 05	REV: N/A



- Marine Study Area
- Caledonia OWF
- Caledonia OECC
- Caledonia North Site
- Caledonia South Site
- UK 12 nautical mile limit
- AEZ

Anomalies of archaeological potential

- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly

0 0.5 1 1.5 2 km

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	28/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

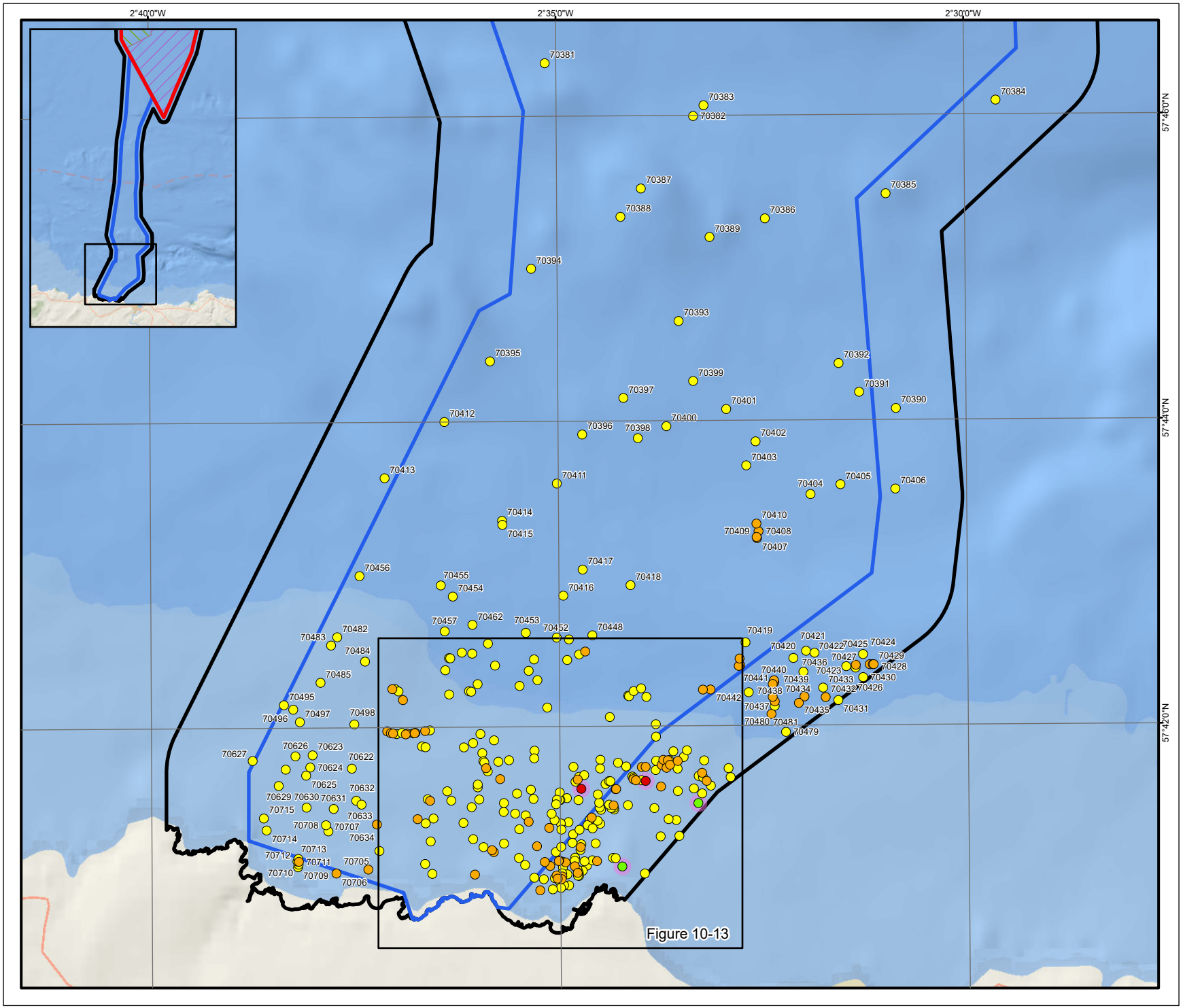
wessex archaeology

CONTRACTOR DRAWING NO: 257360_EIA_10-11	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-11: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia OECC

STATUS: For Review	SCALE: 1:62,500	
DRAWING NUMBER: N/A	SHEET NO: 03 of 05	REV: N/A



Marine Study Area
Caledonia OWF
Caledonia OECC
Caledonia North Site
Caledonia South Site
UK 12 nautical mile limit
AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly

0 0.5 1 1.5 2 km

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	28/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

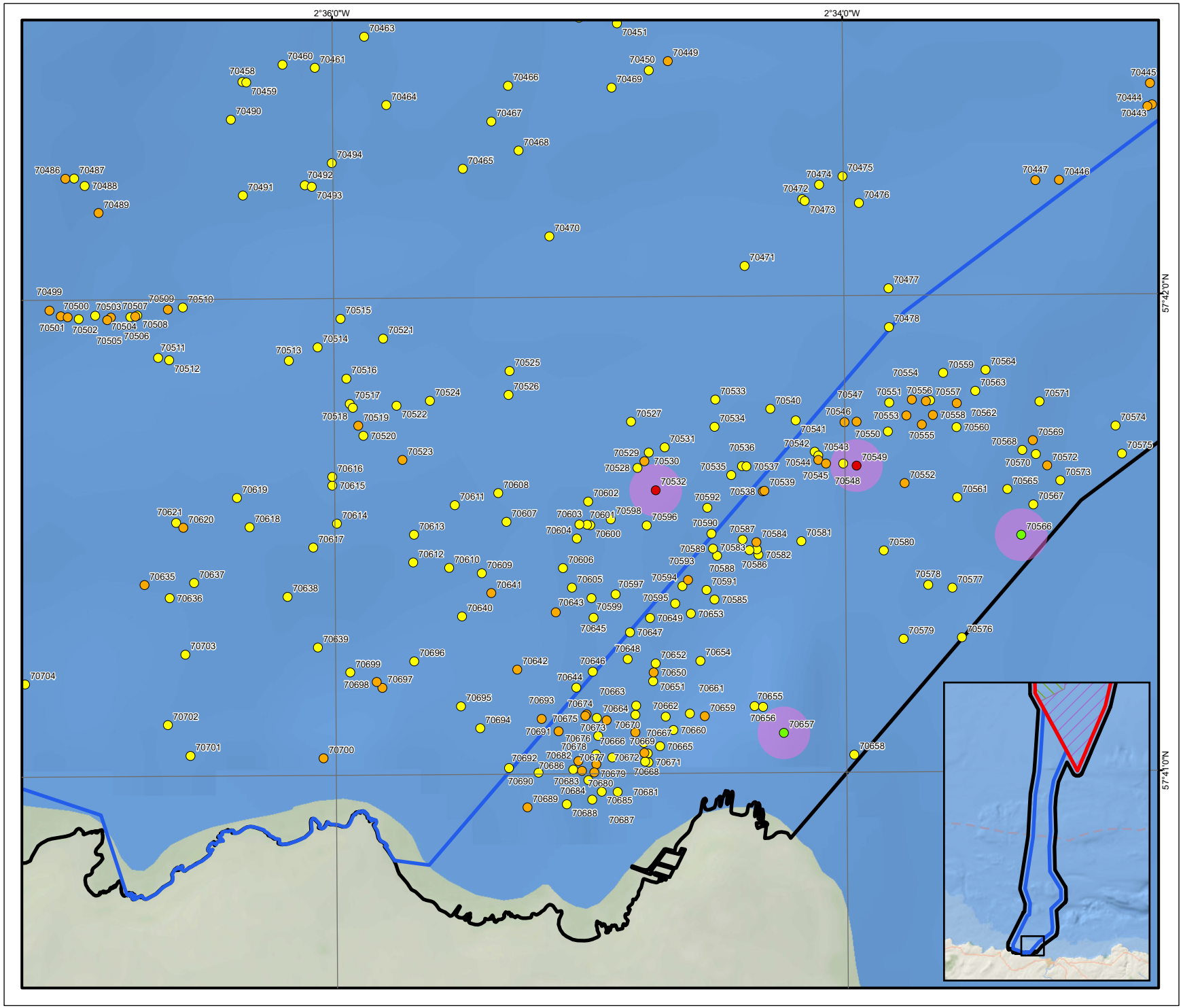
wessex archaeology

CONTRACTOR DRAWING NO: 257360_EIA_10-12	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-12: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia OECC

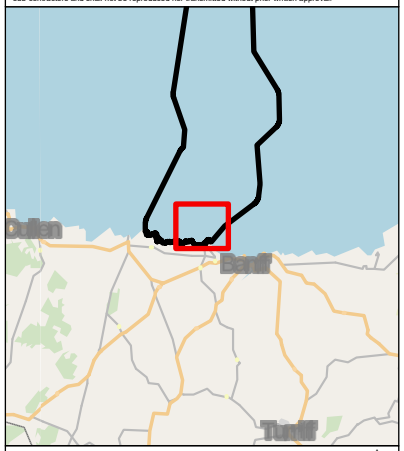
STATUS: For Review	SCALE: 1:62,500	
DRAWING NUMBER: N/A	SHEET NO: 04 of 05	REV: N/A



- Marine Study Area
- Caledonia OWF
- Caledonia OECC
- Caledonia North Site
- Caledonia South Site
- UK 12 nautical mile limit
- AEZ

Anomalies of archaeological potential

- A1 – Anthropogenic origin of archaeological interest
- A2_h – Anomaly of likely anthropogenic origin but of unknown date
- A2_l – Anomaly of possible anthropogenic origin but the interpretation is uncertain
- A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly



0 200 400 600 800 m

REV	DATE	DOC STATUS	ORIGIN	REVIEW	APP
01	28/08/2024	For Review	KF	BS	AB

CALEDONIA Offshore Wind Farm

wessex archaeology

CONTRACTOR DRAWING NO: 257360_EIA_10-13	CONTRACTOR REV: 01
GEODETIC PARAMETERS: WGS 84 UTM 30 N	

DRAWING TITLE

Figure 10-13: Anomalies of Archaeological Potential and recommended AEZs within the Caledonia OECC

STATUS: Approved	SCALE: 1:20,000	
DRAWING NUMBER: N/A	SHEET NO: 05 of 05	REV: N/A

Potential for Previously Unknown Seabed Features

10.4.3.33 In addition, there is potential for encountering the following:

- Unknown shipwreck material; and
- 20th century aircraft material, particularly from the Second World War.

10.4.3.34 A total of 44 Recorded Losses for various types of ship, craft or aircraft were recorded within the overall study area, with all of these being recorded within the MSA of the Caledonia OECC, largely concentrated around the area immediately north of the fishing harbour of Whitehills. Three of them were aircraft Recorded Losses, all from the Second World War. Further details can be found in Volume 7B, Appendix 10-1: Marine Archaeology Technical Report.

10.4.4 Do Nothing Baseline

10.4.4.1 The EIAR requires a "description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort, on the basis of the availability of environmental information and scientific knowledge". This reflects how the baseline relevant to marine archaeology and cultural Heritage is expected to evolve without the Proposed Development (Offshore).

10.4.4.2 If undisturbed by the Proposed Development (Offshore), there would be no change to the baseline conditions discussed above beyond those caused by natural physical processes, natural deterioration, as well as those associated with potential changes to the coastline or sediment processes caused by climate change (as outlined in HES's Climate Action Plan; HES, 2019[9]).

10.4.4.3 Direct impact to the physical baseline resource may occur post-consent where mitigation measures are insufficient to protect the archaeological resource or are not established prior to interaction with the seabed occurring.

10.4.5 Data Gaps and Limitations

UKHO, Canmore and HER datasets

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

10.4.5.2 The records held by the UKHO, Canmore, HER, and the other sources used in this assessment 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 datasets 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.

10.4.5.3 The data supplied by the UKHO, Canmore and HER were obtained in February and March 2024 and are considered current for the purposes of this baseline assessment and EIA process.

Geophysical Datasets

10.4.5.4 For an archaeological assessment of the acquired geophysical data the high frequency SSS data is considered best for purpose. The majority of this assessment was undertaken using SSS mosaics, provided by the client. High frequency mosaics were unavailable, therefore low frequency were used, with the mitigation that the geophysical contact lists from the survey company were used alongside as well as ensuring anomalies of high potential were checked in the raw SSS data, for which high frequency data was available.

10.4.5.5 Some areas within the Proposed Development (Offshore) have not been covered by geophysical data - in the nearshore area at the southernmost point of the Caledonia OECC and in the western section of the North Site.

10.4.5.6 The presence of small ferrous material, more likely to be anthropogenic in origin, cannot be determined due to the relatively large line spacings of the Mag. survey acquired over the Proposed Development (Offshore). Therefore, only significant ferrous objects (e.g., steel hulled wrecks) will be identified between lines of surveys, and smaller individual pieces of ferrous debris will not be detected. This means that there is potential for any potential ferrous debris to be buried or have little surface expression across the Proposed Development (Offshore).

10.4.5.7 Overall geophysical data quality is summarised in Table 10-7. The MBES data for the Gardline 2022 Caledonia OWF survey were rated as 'Below Average' due to adverse weather affecting the quality of the data. The data coverage for the South Site was poor, with very large data gaps in the south-east, caused by adverse weather conditions leading to the survey being halted. However, this was later infilled by the Gardline 2023 survey. Further details on data quality including the criteria for data quality can be found in Volume 7B, Appendix 10-1: Marine Archaeology Technical Report.

Table 10-7: Data quality summary for Caledonia OWF datasets.

Survey Details			Data Quality			
Operator and Year	Area	Vessel	SBP	MBES	SSS	Mag.
Gardline 2022	Caledonia OWF – Caledonia North Site and Caledonia South Site	MV Ocean Endeavour	Good	Below Average	Average – Mosaic; Good - Raw	Average – single magnetometer
Gardline 2023	Caledonia OWF – Caledonia North Site and Caledonia South Site	MV Ocean Endeavour	Good	Average	Average – Mosaic; Good - Raw	Good – UXO, Average – single magnetometer
	Caledonia OECC	MV Ocean Endeavour	Good	Average	Average – Mosaic; Good - Raw	Average – single magnetometer
Titan 2023	OECC	MV Titan Discovery	Average	Good	Good – Mosaic; Good - Raw	Good – single magnetometer

10.5 EIA Approach and Methodology

10.5.1 Overview

10.5.1.1 This section outlines the methodology for assessing the likely significant effects on marine archaeology and cultural heritage from the construction, O&M and decommissioning of the Proposed Development (Offshore).

10.5.2 Impacts Scoped In to the Assessment

10.5.2.1 The Offshore Scoping Report (Volume 7, Appendix 2) was submitted to MD-LOT in September 2022. The Offshore Scoping Report set out the overall approach to assessment and allowed for the refinement of the Proposed Development (Offshore) over the course of the assessment. The proposed scope of the assessment is set out in Table 10-8.

Table 10-8: Marine archaeology and cultural heritage scope of assessment.

Potential Impact	Phase	Nature of Impact
Loss of or damage to known and unknown marine and intertidal historic environment assets and submerged prehistoric landscapes from direct impacts	All phases (construction, O&M and decommissioning)	Direct, physical damage from pre-installation/seabed preparation and installation activities
Indirect disturbance to assets caused by seabed preparation, foundations, cable burial methods and/or cable protection	All phases (construction, O&M and decommissioning)	Physical damage induced by indirect changes to sedimentation regimes leading to additional scour or removal of supporting sediments, for example

10.5.3 Impacts Scoped Out of the Assessment

10.5.3.1 No impacts were scoped out of the assessment during EIA scoping.

10.5.4 Assessment Methodology

10.5.4.1 The generic approach to assessment is set out in Volume 1, Chapter 7: EIA Methodology. The assessment methodology for marine archaeology and cultural heritage for the EIAR is consistent with that provided in the Offshore Scoping Report (Volume 7, Appendix 2).

10.5.4.2 In addition to the general approach and guidance outlined in Volume 1, Chapter 7: EIA Methodology, this marine archaeology and cultural heritage chapter of the EIAR also considers the following guidance documents:

- Designation Policy and Selection Guidance (HES, 2019b[26]); and
- Ships and Boats: Prehistory to Present - Designation Selection Guide (English Heritage (now Historic England), 2012[18]).

10.5.4.3 The significance of potential effects has been evaluated using a systematic approach, based upon identification of the importance/value of receptors and their sensitivity to the activities associated with the Proposed Development (Offshore), together with the predicted magnitude of the impact/change to the baseline conditions arising from the Proposed Development (Offshore).

Criteria for Assessment

10.5.4.4 The process for determining the significance of effects is a two-stage process that involves defining the magnitude of the potential impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.

10.5.4.5 The terms used to define impact magnitude and receptor sensitivity for marine archaeology and cultural heritage are based on those described in further detail in Volume 1, Chapter 7: EIA Methodology and the guidance documents listed above.

Magnitude

10.5.4.6 The magnitude criteria for marine archaeology and cultural heritage are provided in Table 10-9. Factors that have been considered to determine the magnitude of potential impact include the area of influence/spatial extent, duration, frequency, and reversibility of impact (a duration of hours or days would be considered for most receptors to be of short-term duration, which is likely to result in a low magnitude of impact).

Table 10-9: Impact magnitude criteria for marine archaeology and cultural heritage.

Magnitude of Impact Values	Description
Negligible	Impact is highly localised and short term with full rapid recovery expected to result in very slight or imperceptible changes to baseline conditions or the receptor. The impact is very unlikely to occur and if it does will occur at very low frequency or intensity.
Low	Impact is localised and temporary or short term, leading to detectable change in baseline conditions or noticeable effect on small proportion of the receptor. The impact is unlikely to occur or may occur but at low frequency or intensity.
Medium	Impact occurs over a local to medium extent, with short to medium term change to baseline conditions or affecting a moderate proportion of the receptor. The impact is likely to occur and/or will occur at a moderate frequency or intensity.
High	Impact occurs over a large spatial extent resulting in widespread, long term or permanent changes in baseline conditions or affecting a large proportion of the receptor. The impact is very likely to occur and/or will occur at a high frequency or intensity.

Sensitivity

10.5.4.7 Receptor sensitivity is determined by considering a combination of value, tolerance, adaptability and recoverability. Marine archaeology and cultural heritage receptors cannot typically adapt, tolerate, or recover from physical impacts resulting in material damage or loss caused by development activities. Consequently, the sensitivity of each receptor is predominantly quantified only by its value. Within this EIAR, value is weighed by

consideration of the potential for the receptor to demonstrate the following value criteria:

- Evidential value - deriving from the potential of a place to yield evidence about past human activity;
- Historical value - deriving from the ways in which past people, events and aspects of life can be connected through a place to the present. It tends to be illustrative or associative;
- Aesthetic value - deriving from the ways in which people draw sensory and intellectual stimulation from a place; and
- Communal value - deriving from the meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory. Communal values are closely bound up with historical (particularly associative) and aesthetic values but tend to have additional and specific aspects.

10.5.4.8 With regards to assessing the value of shipwrecks, the following criteria can also be used to assess a receptor in terms of its value (English Heritage (now Historic England), 2012[18]):

- Period;
- Rarity;
- Documentation;
- Group value;
- Survival/condition; and
- Potential.

10.5.4.9 The sensitivity criteria for marine archaeology and cultural heritage receptors are provided in Table 10-10.

10.5.4.10 For example, the wrecks related to the period of the two World Wars could be considered of increased sensitivity, based on individual histories, associations and particularly if either build or loss is attributable to military action. In particular the two designated wrecks HMS *Lynx* and HMS *Exmouth* have been designated due to their value being regarded as nationally significant. The wreck of U-309 has some international significance as it was one of the vessels that provided direct experience of U-boat patrols to the author of *Das Boot* (Thompson, 1993[43]).

Table 10-10: Receptor sensitivity criteria for marine archaeology and cultural heritage.

Sensitivity of Receptor Values	Description
Very Low	Poor example and/or little or no potential to contribute to knowledge and understanding and/or outreach. Assets with little or no surviving archaeological interest.
Low	Below average example and/or low potential to contribute to knowledge and understanding and/or outreach; 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.
Medium	Average example and/or moderate potential to contribute to knowledge and understanding and/or outreach; 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.
High	Best known, only example or above average example and or significant or high potential to contribute to knowledge and understanding and/or outreach. Receptors 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 Marine (Scotland) Act 2010[i], Protection of Wrecks Act 1973[2], Ancient Monuments and Archaeological Areas Act 1979[3], and Protection of Military Remains Act 1986[4] 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 palaeogeographic features with demonstrable potential to include artefactual and/or palaeoenvironmental material, possibly as part of a prehistoric site or landscape.

10.5.4.11 By assigning and combining magnitude and sensitivity criteria, overall effect significance upon marine archaeology and cultural heritage receptors can be determined (Table 10-11). A level of effect of moderate or more will be considered a 'significant' effect for the purpose of the EIA. A level of effect of minor or less will be considered 'not significant'. Effects of moderate significance or above are therefore considered important in the decision-making process.

Table 10-11: Relationship Between Impact Magnitude and Receptor Sensitivity to Assign Significance of Effect.

Significance of Effect		Sensitivity of Receptor			
		Very Low	Low	Medium	High
Impact Magnitude	Negligible	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Minor	Minor	Minor
	Medium	Negligible	Minor	Moderate	Moderate
	High	Negligible	Minor	Moderate	Major

10.5.5 Approach to Cumulative Effects

10.5.5.1 The Cumulative Impacts Assessment (CIA) assesses the impact associated with the Proposed Development (Offshore) together with other relevant plans, projects and activities. Cumulative effects are therefore the combined effect of the Proposed Development (Offshore) in combination with the effects from a number of different projects, on the same receptor or resource.

10.5.5.2 The approach to the CIA for marine archaeology and cultural heritage follows the process outlined in Volume 1, Chapter 7: EIA Methodology.

10.5.5.3 The list of relevant developments for inclusion within the CIA is outlined in Volume 7A, Appendix 7-1: Cumulative Impact Assessment Methodology.

10.5.5.4 Developments which are located within 10km of the marine archaeology and cultural heritage study area have the potential to result in a cumulative effect. Developments which are either operational or in the decommissioning stage are considered to be part of the baseline and are not considered within the assessment.

10.5.6 Embedded Mitigation

10.5.6.1 Where possible, mitigation measures will be embedded into the design of the Proposed Development (Offshore) applications, specifically Caledonia North and Caledonia South.

10.5.6.2 Where embedded mitigation measures have been developed into the design of the Proposed Development (Offshore) with specific regard to marine archaeology and cultural heritage, these are described in Table 10-12. The impact assessment presented in Sections 10.7 to 10.10 take into account this embedded mitigation.

Table 10-12: Embedded mitigation.

Code	Mitigation Measure	Securing Mechanism
M-1	Development of and adherence to a Cable Plan (CaP). The CaP will confirm planned cable routing, burial and any additional protection and will set out methods for post-installation cable monitoring.	To be secured as a condition of the Generation and Transmission Asset Marine Licences for both Caledonia North and Caledonia South. The final layout will be presented within the CaP and conditions within the marine licence.
M-2	Development of and adherence to a Development Specification and Layout Plan (DSLP). The DSLP will confirm the layout and design parameters of the Proposed Development.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South.
M-4	Scour protection where there is the potential for scour to develop around infrastructure (foundations and cables).	To be secured as a condition of the Generation and Transmission Asset Marine Licences for both Caledonia North and Caledonia South. The CaP and Construction Method Statement (CMS). Archaeological assessment of geophysical data relating to scour surveys.
M-10	Development of and adherence to a Decommissioning Programme (DP). The outline DP will be submitted alongside the marine licence applications, and will detail the measures for the decommissioning of the Proposed Development.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South. The DP will outline measures for the decommissioning of the Proposed Development (Offshore).
M-32	Development of and adherence to a WSI. The Marine WSI will include the implementation of a Protocol for Archaeological Discoveries (PAD) in accordance with 'Protocol for Archaeological Discoveries: Offshore Renewables Projects'.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South. A WSI and PAD will be in place for any archaeological discoveries. This will include any recommended AEZs (for example in relation to seabed preparation, installation activities and installed infrastructure) and a PAD for reporting and investigating unexpected archaeological discoveries encountered during installation activities, with a Retained Archaeologist providing guidance and advising industry staff on the implementation of the PAD. The PAD provides a mechanism to comply with the Merchant Shipping Act 1995[5], including notification of the

Code	Mitigation Measure	Securing Mechanism
		Receiver of Wreck, and accords with the Code of Practice for Seabed Developers (JNAPC, 2006[12]). The PAD also makes provision for the implementation of temporary exclusion zones around areas of possible archaeological interest, for prompt archaeological advice, and, if necessary, for archaeological inspection of important features prior to further activities in the vicinity.
M-33	Seabed preparation, installation activities and installed infrastructure will avoid any identified seabed heritage assets and anthropogenic geophysical anomalies identified as AEZs and described in the WSI.	To be secured as a condition of the Generation Asset and Transmission Asset Marine Licences for both Caledonia North and Caledonia South. A WSI and PAD will be in place for any archaeological discoveries. This will include any recommended AEZs (for example in relation to seabed preparation, installation activities and installed infrastructure) and a PAD for reporting and investigating unexpected archaeological discoveries encountered during installation activities, with a Retained Archaeologist providing guidance and advising industry staff on the implementation of the PAD.

Archaeological Exclusion Zones

10.5.6.3 Thirty-eight (38) AEZs have been proposed as part of the assessment of the marine archaeology and cultural heritage baseline. These are outlined in Table 10-13 and are presented in Figure 10-3 to Figure 10-12.

Table 10-13: AEZs for the Proposed Development (Offshore).

ID	Name of Wreck	Archaeological Discrimination	Easting	Northing	AEZ Extent
70097	*Tekla* (part of)	A1	532691	6459600	100m around extents of site
70099	Debris field associated with 70100	A1	532694	6459429	100m around extents of site
70100	*Tekla* (part of)	A1	532677	6459411	100m around extents of site
70101	Debris field associated with 70100	A1	532658	6459397	100m around centre point
70136	*Makalla* (probably)	A1	534024	6458542	100m around extents of site
70137	Unknown wreck	A1	534192	6457832	100m around extents of site
70155	Debris associated with 70157	A1	529580	6447771	100m around centre point
70156	Debris field associated with 70157	A1	529574	6447797	100m around extents of site
70157	Unknown wreck	A1	529564	6447796	100m around extents of site
70158	Debris associated with 70157	A1	529546	6447828	100m around extents of site
70160	Unknown wreck	A1	529268	6448473	100m around extents of site
70161	Debris associated with 70160	A1	529258	6448488	100m around centre point
70174	Debris field associated with 70174	A1	528718	6447339	100m around extents of site

ID	Name of Wreck	Archaeological Discrimination	Easting	Northing	AEZ Extent
70175	HMS *Lynx*	A1	528705	6447195	100m around extents of site
70200	HMS *Jasper* (probably)	A1	533558	6452478	100m around extents of site
70238	Debris associated with 70240	A1	536164	6446372	100m around centre point
70239	Debris associated with 70240	A1	536142	6446394	100m around centre point
70240	U-309	A1	536137	6446364	100m around extents of site
70011	Unknown recorded obstruction	A3	518526	6467859	100m around centre point
70093	HMS *Exmouth*	A3	530335	6463094	750m around centre point
70102	Unknown recorded wreck	A3	533048	6458871	100m around centre point
70117	Unknown recorded obstruction	A3	524964	6453839	100m around centre point
70159	Unknown recorded wreck	A3	529651	6447581	100m around centre point
70173	Unknown recorded wreck (multiple of HMS *Lynx*?)	A3	528707	6447871	100m around centre point
70218	Unknown recorded obstruction	A3	541078	6448184	100m around centre point
70222	*Commander Boyle*	A3	531757	6449212	100m around centre point
70233	*Dalveen*	A3	540106	6447432	100m around centre point
70257	Unknown recorded obstruction	A3	532105	6442535	100m around centre point

ID	Name of Wreck	Archaeological Discrimination	Easting	Northing	AEZ Extent
70313	Magnetic Anomaly	A1	530581	6431876	100m around centre point
70532	Magnetic Anomaly	A1	525095	6394636	100m around centre point
70549	Ferrous debris	A1	525877	6394732	100m around centre point
70360	Unknown recorded wreck	A3	523488.2259	6411119.12	100m around centre point
70365	Recorded Aircraft Wreck	A3	525967.7978	6407640.252	100m around centre point
70367	Unknown recorded wreck	A3	530429.8965	6406865.304	100m around centre point
70379	Unknown recorded wreck	A3	523350.3915	6406480.013	100m around centre point
70380	Unknown recorded wreck	A3	523738.6931	6405028.966	100m around centre point
70566	Unknown recorded wreck	A3	526518	6394463	100m around centre point
70657	*Ebenezer*	A3	525594	6393692	100m around centre point

10.5.6.4 In addition to these AEZs a 100m exclusion zone around the assessed extents of the U2 wreck anomaly of the late 20th century fishing vessel *Trident* has been included (Figure 10-3; Table 10-14), due to the wreck potentially having the remains of crew onboard.

Table 10-14: U2 anomaly exclusion zones.

ID	Name of Wreck	Archaeological Discrimination	Easting	Northing	Exclusion Zone Extent
70024	*Trident*	U2	519458	6466323	100m around extents of site

10.6 Key Parameters for Assessment

10.6.1.1 Volume 1, Chapter 3: Proposed Development Description (Offshore) details the parameters of the Proposed Development (Offshore) using the Rochdale Envelope approach. This section identifies those parameters during construction, O&M and decommissioning relevant to potential impacts on marine archaeology and cultural heritage.

10.6.1.2 The worst-case scenario assumptions with regard to marine archaeology and cultural heritage are summarised in Table 10-15.

Table 10-15: Worst case assessment scenario considered for each impact as part of the assessment of likely significant effects.

Potential Impact	Assessment Parameter	Explanation
Construction		
Impact 1: Loss or damage to known and unknown marine and intertidal historic environment and submerged prehistoric landscapes from direct impacts	**Seabed Preparation:** ▪ Geophysical surveys; ▪ UXO clearance; ▪ Pre-lay grapnel run across the entire length of all cables; ▪ Boulder clearance; and ▪ Bedform clearance (e.g., sandwaves). **Construction/Installation of:** ▪ 140 jacket with suction caisson Wind Turbine Generators (WTGs) (bottom-fixed): o 12,100m2 associated scour protection/area of seabed preparation (jack-up vessel (JUV) leg footprint) per foundation, with total area of 1,694,100m2; ▪ Four Offshore Substation Platforms (OSPs) using jacket with suction caisson foundations (bottom-fixed): o 12,100m^2 associated scour protection/area of seabed preparation (JUV leg footprint) per foundation, with total area of 48,400m^2; ▪ 140 inter-array cables totalling 655km with a seabed impact width of 20m, giving a total area of 13,100,000m^2; ▪ Two interconnector cables totalling 60km with a seabed impact width of 20m, giving a total area of 1,200,000m^2; ▪ Four offshore export cables totalling 330km with a seabed impact width of 20m, giving a total area of 6,600,000m^2; ▪ Four Horizontal Directional Drilling (HDD) exit pits (one per export cable), excavated footprint of 90m^2, with total area of 360m^2; ▪ 20 crossings for the inter-array cables; ▪ Four crossings for the interconnector cables; and	Design scenario representing the maximum spatial area of impact associated with seabed activities. Any of the device designs, transmission cables and other infrastructure that impact the seabed have the potential to result in the damage/loss of known and unknown marine and intertidal historic environment and submerged prehistoric landscapes, which may lie undiscovered on or below the surface or the seabed, if any are present. Similar effects may be expected from vessel anchoring systems that impact the seabed. The worst case assessment parameters assume installation of jacket with suction caisson WTG foundations due to the comparatively increased seabed footprint compared to other foundation types, including floating WTG foundations (e.g., anchors and scour protection). However, it should be noted that the numbers do not include areas of anchor line sweep above the seabed within the water column (only applicable to floating WTGs), which have the potential to impact archaeological material standing

Potential Impact	Assessment Parameter	Explanation
	▪ 16 crossings for the offshore export cables.	proud of the seabed as these have not been modelled and so floating technology has not been considered as a WCS. These would only be included in the impact areas for semi-submersible foundations, not tension leg foundations. Effects are considered to be permanent. At landfall the application of HDD will result in a lower level of disturbance.
Impact 2: Indirect disturbance to marine historic environment assets caused by seabed preparation, foundations, cable burial methods and/or cable protection	Refer to Impact 1.	Maximum spatial area of impact associated with seabed activities including installation of inter-array cables, pre-installation and installation of export cables and any required cable and scour protection measures. Indirect impacts to known and potential maritime and aviation receptors could be caused by changes to the hydrodynamic and sedimentary regimes due to sediment redistribution during installation of cables and scour protection and application of protective measures resulting in changes to sediment transport regimes.
Operation and Maintenance		
Impact 3: Loss or damage to known and unknown marine historic environment and submerged	**Operation of:** ▪ 140 WTGs; ▪ Four OSPs; ▪ 140 inter-array cables;	Maximum spatial area of impact associated with O&M activities including existing mooring lines and anchoring points, repair/replacement of cable and/or reburial of cables. Any

Potential Impact	Assessment Parameter	Explanation
prehistoric landscapes from direct impacts	▪ Two interconnector cables; ▪ Four offshore export cables; ▪ 20 crossings for the inter-array cables; ▪ Four crossings for the interconnector cables; and ▪ 16 crossings for the offshore export cables. **Maintenance:** ▪ Routine, preventative and corrective maintenance; JUVs will not be used for this strategy. ▪ For unplanned major component replacement, one JUV campaign annually is the expected worst case scenario with up to three interventions (each 600m^2 of seabed impact; 4 legs x 150m^2) in each campaign, so 1800m^2 of seabed impact, which may or may not be within areas already impacted. ▪ Preventative cable maintenance every 1-5 years for offshore export cables, interconnector cables and inter-array cables.	of the device designs, transmission cables and other infrastructure on the seabed or in the water column above that result in localised scouring have the potential to result in the damage/ loss of known and unknown marine historic environment and submerged prehistoric landscapes lying on or below the seabed if such receptors are shown to be present. Maintenance vessel anchoring systems that impact the seabed, or the repeated removal and replacement of devices and other infrastructure in ways that disturb the seabed also have the potential to result in the damage/loss of any archaeological features and submerged prehistoric landscapes lying on the seabed. The numbers do not include areas of anchor line sweep above the seabed within the water column (only applicable to floating WTGs), which have the potential to impact archaeological material standing proud of the seabed as these have not been modelled. These would only be included in the impact areas for semi-submersible foundations, not tension leg foundations. Effects are considered to be permanent.

Potential Impact	Assessment Parameter	Explanation
Impact 4: Indirect disturbance to marine historic environment assets caused by maintenance activities	Refer to Impact 3.	Refer to Impact 3. Indirect impact to known and potential maritime and aviation receptors could also be caused by potential seabed level changes (such as scour) and plume effects resulting in increased protection to, or deterioration through erosion.
Decommissioning		
Impact 5: Loss or damage to known and unknown marine historic environment and submerged prehistoric landscapes from direct impacts	The worst-case scenario will be equal to (or less than) that of the construction phase. Refer to Impact 1.	As with the construction phase, decommissioning activities have the potential to affect archaeological features either directly or indirectly. If the Proposed Development (Offshore) structures are left *in-situ* any likely significant effects from decommissioning will be avoided. If the Proposed Development (Offshore) structures are to be removed at decommissioning this appraisal assumes that impacts from decommissioning activities are of similar nature to construction activities and would be of a similar or lesser scale, assuming the impact footprint is the same. In the absence of detailed information regarding decommissioning works, the worst case design scenario for decommissioning would be the same or less than during construction,

Potential Impact	Assessment Parameter	Explanation
		assuming the impact footprint is the same.
Impact 6: Indirect disturbance to marine historic environment assets caused by decommissioning activities	The worst-case scenario will be equal to (or less than) that of the construction phase. Refer to Impact 1.	Refer to Impact 5.

10.7 Potential Effects

10.7.1 Construction

Impact 1: Loss or Damage to Known and Unknown Marine and Intertidal Historic Environment and Submerged Prehistoric Landscapes from Direct Impacts

10.7.1.1 If direct impacts were to occur upon the marine archaeological receptors that have been identified in Section 10.4.3 of this EIAR chapter and any potential archaeology within the study area, these are most likely to occur during the construction phase of the Proposed Development (Offshore). Impacts resulting in adverse effects upon archaeological assets as part of the construction phase are those involving contact with the seabed and/or the removal of seabed sediments.

10.7.1.2 Marine archaeological receptors with height, such as shipwrecks, may be impacted by activities that occur within the water column, including pre-installation activities and mooring/anchor/cable installation activities. Installation activities that may lead to direct physical impacts include:

- Seabed preparation activities (pre-sweeping along export cable e.g. grapnel runs, save wave clearance);
- Installation of lidar buoy, wave rider buoy and wave radar;
- Installation of fixed WTG foundations into the seabed;
- Placement of moorings for floating WTG, including catenary, semi-taut, taut and tension leg, and their potential movement on the seabed;
- Anchor installation and presence;
- Placement of scour protection at anchors;
- Installation of OSPs;
- Installation of inter-array cables and cable protection;
- Installation of export cable;
- Preparation and installation of HDD route;
- Placement of export cable protection, such as rock placement, concrete mattresses, grout/rock bags, frond mattresses; and
- Vessel related impacts such as JUV legs impacting on the seabed, vessel anchoring and ship grounding.

10.7.1.3 Following the application of embedded mitigation, as outlined in Table 10-12 consisting of implementation of AEZs around high value anomalies and avoidance of identified heritage assets by infrastructure, direct impacts to known archaeological receptors would not occur.

10.7.1.4 Unavoidable direct impacts to potential archaeological receptors, not yet identified, may occur at any point where development and related activities disturb the seafloor.

Magnitude of Impact

10.7.1.5 All direct impacts to marine cultural heritage are permanent. Once archaeological deposits and material, and the relationships between deposits and material and their wider surroundings, have been damaged or disturbed it is not possible to reinstate or reverse those changes.

10.7.1.6 Impacts on potential palaeogeography receptors, such as potential *in situ* prehistoric sites and submerged landscape features, could result in major effects, as these are considered as high value assets. For the cable burial along the Caledonia OECC this is anticipated to be down to a maximum burial depth of 3m (see Volume 1, Chapter 3: Proposed Project Description (Offshore)), with HDD applied for landfall installation. Therefore, should potential palaeogeographic features be impacted the footprint will be limited to the trench width, and the magnitude of direct impacts on such resource is judged to be low.

10.7.1.7 The magnitude of direct impacts on known maritime and aviation receptors as part of construction activities, if they were to occur, would be high. This applies to all known sites identified in Section 10.4. However, with the application of embedded mitigation, including the implementation of AEZs and avoidance of identified seabed heritage assets, described in Table 10-12, the magnitude of impacts are judged to be negligible.

10.7.1.8 Similarly, the application of embedded mitigation (including the implementation of a PAD) would mean that the magnitude of direct impacts on potential maritime and aviation receptors, and potential seabed features as part of construction activities, if they were to occur, would be **low**.

Sensitivity of Receptor

10.7.1.9 All seabed assets have the potential to be damaged or destroyed if they are directly impacted during the construction phase of the Proposed Development (Offshore). Furthermore, all damage to archaeological sites or material is permanent and recovery is limited to stabilisation or re-burial so as to limit further impact. There is no potential for the recoverability of any seabed assets if they are affected following a direct impact. As such, all wrecks, aircraft, associated material and debris, and other maritime receptors should be regarded as having high sensitivity.

10.7.1.10 As the value of potential shipwrecks cannot be evaluated until they are discovered, potential wrecks of all periods should be expected to be of high value, in accordance with the precautionary approach. Aircraft are considered to have significance for remembrance and commemoration, but also have an implicit heritage value as historic artefacts, providing information on the aircraft itself and also the circumstances of its use and loss (English Heritage

(now Historic England), 2002, p. 2[11]). In addition, all UK aircraft that crash while in military service are protected under the Protection of Military Remains Act 1986, and therefore should be considered as designated sites until proven to be non-military. On this basis, all potential aircraft sites are of high value.

10.7.1.11 Derived artefacts and other isolated finds are likely to be of limited archaeological value as individual discoveries. However, the occurrence of a number of seemingly isolated objects within a particular area has the potential to indicate shipping routes or maritime battlegrounds, or possibly even indicate the presence of a hitherto unknown wreck site. Isolated maritime finds are, therefore, regarded as being of medium archaeological value. Isolated aircraft finds are considered as being of medium archaeological value as they may provide insight into patterns of historical aviation across the study area or indicate the presence of uncharted aircraft crash sites.

10.7.1.12 Based on the available assessed datasets, no features of palaeogeographic interest were identified (see Section 10.4.3) within the Proposed Development (Offshore). As highlighted the potential for seabed prehistory assets and their respective value varies from high to very low, depending on the asset type.

10.7.1.13 All A1 and A3 receptors and currently unknown archaeological sites are considered as high sensitivity receptors.

10.7.1.14 For all A2 anomalies, there is insufficient data to assess the value of each individual anomaly at this point. As such, all A2 anomalies must be considered to potentially have archaeological value, to a greater or lesser degree and, in accordance with the precautionary principle are considered as high value assets.

Significance of Effect

10.7.1.15 Significant impacts have been evaluated according to defined parameters expressed as a matrix in Table 10-11.

10.7.1.16 Taking the **High** sensitivity of known maritime and aviation receptors and the **Negligible** magnitude of impact, the effect of direct impacts through construction activities is considered to be **Negligible and Not Significant in EIA terms**.

10.7.1.17 The **High** sensitivity of potential maritime and aviation receptors and the **Low** magnitude of impact results in **Minor effects which is Not Significant in EIA terms**.

10.7.1.18 The **Very Low to High** sensitivity of potential palaeogeographic receptors and the **Low** magnitude of impact results in **Negligible to Minor effects which is Not Significant in EIA terms**.

Table 10-16: Significance of effect from direct impacts during construction.

Receptor	Sensitivity	Magnitude of Impact	Significance of Effect
Known maritime and aviation receptors (A1, A2 and A3 receptors)	High	Negligible	Negligible
Potential maritime and aviation receptors	High	Low	Minor
Potential palaeogeographic receptors	Very Low - High	Low	Negligible - Minor

Impact 2: Indirect Disturbance to Marine Historic Environment Assets Caused by Seabed Preparation, Foundations, Cable Burial Methods and/or Cable Protection

10.7.1.19 The indirect effects upon the known and potential marine archaeological assets considered here are those which occur as a result of changes to hydrodynamic and sediment transport regimes, where these changes have occurred as a consequence of activities and structures associated with the construction activities. These effects may occur subsequent to the clearance of areas of seabed during foundation and cable route preparation but may also occur through sediment dispersal/deposition or the placement of non-burial scour and/or cable protection on the seabed. Construction activities that could potentially create indirect physical impacts include:

- Changes to the sediment transport regime due to seabed preparation activities for WTG/OSP foundations, floating WTG mooring points and scour protection installation leading to changes in seabed sediment levels;
- Changes to the sediment transport regime due to seabed preparation for inter array cables, installation of inter array cables and associated cable protection leading to changes in seabed sediment levels;
- Changes to the sediment transport regime due to seabed preparation for export cables, installation of export cables and associated cable protection leading to changes in seabed sediment levels; and
- Dispersal of increased suspended sediment from arisings/plumes from construction activities potentially resulting in changes in seabed sediment levels.

Magnitude of Impact

10.7.1.20 The magnitude of indirect impacts to offshore archaeological assets during installation is expected to be low, as all the magnitude of impacts identified related to the sediment transport regimes within Volume 2, Chapter 2: Marine

and Coastal Processes are low (with the significance of effect of these being either minor or negligible). Consequently, the magnitude of impact on marine archaeological assets would be low as seabed disturbance will be temporary and localised.

Sensitivity of Receptor

10.7.1.21 Indirect impacts may affect marine archaeological baseline conditions where they result in the increased exposure or burial of marine archaeological assets. The increased exposure of marine archaeological assets has the potential to cause erosion and deterioration to the assets. Conversely, should assets be subject to increased sedimentation and burial, they may, in turn, benefit from conditions which afford higher levels of preservation.

10.7.1.22 Changes to Suspended Sediment Concentration (SSC) which would in turn lead to changes to seabed level are noted to be associated with the construction activities. Jet trenching has the potential to increase sediment levels by up to 10mm within a 1 x 5km area around the activity, and a further 1 – 5mm within a 4 x 6km area around the activity, while foundation installation through drilling may increase seabed levels by up to 2mm within 1km of the foundation location. Seabed preparation is largely expected to be related to seabed levelling, rather than sandwave clearance, utilising a trailing suction head dredger (TSHD). The impact of this technique is largely either within the area of direct impact from the preparation discussed above, or within the local of disposal.

10.7.1.23 Changes to seabed level due to HDD are limited to the vicinity of the exit pits, with an increase of 1mm within several hundred metres of the pit location, becoming negligible 700m from it. Each of these are noted to be a temporary increase related directly to the construction activities around jet trenching, seabed preparation and foundation installation. As discussed above increases in seabed sediment and thereby increased burial have positive effects on seabed features as they afford higher levels of preservation. The chapter does not identify any significant effect which would lead to the lowering of seabed sediment levels, which would be the pathway for any negative indirect impacts.

10.7.1.24 Therefore, the sensitivity of the receptors to continued sediment deposition is very low, as it is in effect protecting receptors as presently or to a greater extent.

Significance of Effect

10.7.1.25 Significant impacts have been evaluated according to defined parameters expressed as a matrix in Table 10-11.

10.7.1.26 Taking the **Very Low** sensitivity of marine archaeological assets to continued sediment deposition and the **Low** magnitude of impact, the effect of indirect impacts through construction activities is considered to be **Negligible and Not Significant in EIA terms**.

Table 10-17: Significance of effect from indirect impacts during construction.

Receptor	Sensitivity	Magnitude of Impact	Significance of Effect
Known maritime and aviation receptors (A1, A2 and A3 receptors)	Very Low	Low	Negligible
Potential maritime and aviation receptors	Very Low	Low	Negligible
Potential palaeogeographic receptors	Very Low	Low	Negligible

10.7.2 Operation and Maintenance

Impact 3: Loss or Damage to Known and Unknown Marine Historic Environment and Submerged Prehistoric Landscapes from Direct Impacts

10.7.2.1 Activities undertaken as part of the O&M phase have the potential to impact marine archaeology directly and indirectly, located on or under the seabed, resulting in their loss or the disruption of relationships between receptors and their wider surroundings.

10.7.2.2 Operational effects will be limited to those arising from cable repair/replacement, cable protection repair/replacement, maintenance or any monitoring that may be required. Potential direct impacts on marine archaeology during operation of the Proposed Development (Offshore) may arise from:

- Re-burial of cables;
- Repair/replacement of cables;
- Placement of additional cable protection; and
- Vessel related impacts such as JUV legs impacting on the seabed, vessel anchoring and ship grounding during any maintenance activities.

Magnitude of Impact

10.7.2.3 As a result of the embedded mitigation, which remain applicable during both the construction and O&M phases (see Table 10-12), direct impacts to known archaeological receptors would not occur and so the magnitude of impact is negligible.

10.7.2.4 The magnitude of direct impacts on potential maritime and aviation receptors, and potential seabed features as part of operation activities, if they were to occur, would be high. Any impact upon marine archaeology, including any

unknown archaeology would be permanent and irreversible. However, with the implementation of embedded mitigation and implementation of measures within the WSI including archaeological input in any future geoarchaeological surveys and a PAD, the magnitude of impacts is judged to be low.

Sensitivity of Receptor

10.7.2.5 Although the operation of the Proposed Development (Offshore), and associated maintenance works, is anticipated to occur within areas already disturbed during the construction phase, seabed assets have the potential to be damaged or destroyed if they are directly impacted during the O&M phase of the Proposed Development (Offshore). Furthermore, all damage to archaeological sites or material is permanent and recovery is limited to stabilisation or re-burial so as to limit further impact. There is no potential for the recoverability of any seabed assets if they are affected following a direct impact. As such, all wrecks, aircraft, and associated material and debris should be regarded as having high sensitivity.

10.7.2.6 Derived artefacts and other isolated finds are likely to be of limited archaeological value as individual discoveries. However, the occurrence of a number of seemingly isolated objects within a particular area has the potential to indicate shipping routes or maritime battlegrounds, or possibly even indicate the presence of a hitherto unknown wreck site. Isolated maritime finds are, therefore, regarded as being of medium archaeological value. Isolated aircraft finds are considered as being of medium archaeological value as they may provide insight into patterns of historical aviation across the study area or indicate the presence of uncharted aircraft crash sites.

10.7.2.7 Based on the available assessed datasets, no features of palaeogeographic interest were identified (see Section 10.4.3) within the Proposed Development (Offshore). As highlighted the potential for seabed prehistory assets and their respective value varies from high to very low, depending on the asset type.

Significance of Effect

10.7.2.8 Significant impacts have been evaluated according to defined parameters expressed as a matrix in Table 10-11.

10.7.2.9 In areas where the impact has already occurred during the construction phase, there is unlikely to be further effect.

10.7.2.10 In areas that have not yet been impacted, the magnitude of impact on marine archaeology are anticipated to be low, on the basis that embedded commitments and WSI measures are implemented.

10.7.2.11 Taking the **High** sensitivity of marine archaeological assets and the **Low** magnitude of impact, the effect of direct impacts through O&M activities is considered to be **Minor and Not Significant in EIA terms**.

Table 10-18: Significance of effect from direct impacts during operation and maintenance.

Receptor	Sensitivity	Magnitude of Impact	Significance of Effect
Known maritime and aviation receptors (A1, A2 and A3 receptors)	High	Negligible	Negligible
Potential maritime and aviation receptors	High	Low	Minor
Potential palaeogeographic receptors	Very Low - High	Low	Negligible - Minor

Impact 4: Indirect Disturbance to Marine Historic Environment Assets Caused by Maintenance Activities

10.7.2.12 The effects upon known and potential offshore archaeological assets considered here are those which occur as a result of changes to hydrodynamic and sediment transport regimes leading to changes in seabed sediment levels (such as localised scour), where these changes have occurred as a result of the presence of the WTG foundations, inter-array cables and export cables, and the associated protection measures. Such impacts cause effects which afford increased protection to, or deterioration of, archaeological receptors. These include:

- Changes to the sediment transport regime due to the presence of structures on the seabed (WTG and OSP foundations) leading to changes in seabed sediment levels; and
- Changes to the sediment transport regime associated with inter array/export cable reburial, repair/replacement and additional cable protection leading to changes in seabed sediment levels.

Magnitude of Impact

10.7.2.13 The magnitude of indirect impacts to offshore archaeological assets during installation is expected to be low, as all the magnitudes of impacts identified related to the sediment transport regimes within Volume 2, Chapter 2: Marine and Coastal Processes are low (with the significance of effect of these being either minor or negligible). Consequently, the magnitude of impact on marine archaeological assets has been assessed as low as seabed disturbance will be temporary and localised.

Sensitivity of Receptor

10.7.2.14 Indirect impacts may affect marine archaeological baseline conditions where they result in the increased exposure or burial of marine archaeological assets. The increased exposure of marine archaeological assets has the potential to cause erosion and deterioration to the assets. Conversely, should

assets be subject to increased sedimentation and burial, they may benefit from conditions which afford higher levels of preservation.

10.7.2.15 Volume 2, Chapter 2: Marine and Coastal Processes identifies impacts on seabed morphology by structures on or close to the seabed as having the potential for sediment accumulation around areas of cable protection (limited to a short period of time after their installation after which the accumulation will stop) and scour around seabed infrastructure. The use of scour protection material is likely to mitigate the magnitude of scour and so the magnitude of impact for both these impacts is judged to be low. Therefore, the sensitivity of the receptors to continued sediment deposition is very low, as it is in effect protecting receptors as presently or afford protection to a greater extent.

Significance of Effect

10.7.2.16 Significant impacts have been evaluated according to defined parameters expressed as a matrix in Table 10-11.

10.7.2.17 Taking the **Very Low** sensitivity of marine archaeological assets to continued sediment deposition and the **Low** magnitude of impact, the effect of indirect impacts through O&M activities is considered to be **Negligible and Not Significant in EIA terms**.

Table 10-19: Significance of effect from indirect impacts during operation and maintenance.

Receptor	Sensitivity	Magnitude of Impact	Significance of Effect
Known maritime and aviation receptors (A1, A2 and A3 receptors)	Very Low	Low	Negligible
Potential maritime and aviation receptors	Very Low	Low	Negligible
Potential palaeogeographic receptors	Very Low	Low	Negligible

10.7.3 Decommissioning

Impact 5: Loss or Damage to Known and Unknown Marine Historic Environment and Submerged Prehistoric Landscapes from Direct Impacts

10.7.3.1 As with the construction phase (see Section 10.7.1), decommissioning activities have the potential to affect archaeological assets either directly or indirectly. The operational lifetime of the Proposed Development (Offshore) is expected to be 35 years. All infrastructure above the seabed within the maritime area is proposed to be removed in line with the Outline Offshore

Decommissioning Plans for the Proposed Development (Offshore) (Volume 7, Appendix 15: Caledonia North Outline Offshore Decommissioning Plan and Volume 7, Appendix 16: Caledonia South Outline Offshore Decommissioning Plan). The methodology for doing so will be based upon best regulations/practices and available technology, as described in Volume 1, Chapter 3: Proposed Project Description (Offshore).

10.7.3.2 If any of the Proposed Development (Offshore) structures are left *in-situ* any likely significant effects from decommissioning them will be avoided. If the Proposed Development (Offshore) structures are to be removed at decommissioning this appraisal assumes that impacts from decommissioning activities are of similar nature to construction activities and would be of a similar or lesser scale, and therefore **likely to be Not Significant**.

Impact 6: Indirect Disturbance to Marine Historic Environment Assets Caused by Decommissioning Activities

10.7.3.3 Similar to those impacts assessed during the construction phase (see Section 10.7.1), during decommissioning impacts may occur as a result of changes to hydrodynamic and sediment transport regimes, where these changes have occurred as a consequence of activities and removal of structures associated with decommissioning activities.

10.7.3.4 This appraisal assumes that impacts from decommissioning activities are of similar nature to construction activities and would be of a similar or lesser scale, and therefore **likely to be Not Significant**.

10.8 Cumulative Effects

10.8.1 Overview

10.8.1.1 The list of developments identified for assessing cumulative effects is presented in Volume 7A, Appendix 7-1: Cumulative Impact Assessment Methodology.

10.8.1.2 The marine archaeology and cultural heritage Zone of Influence (ZoI) has been defined by a 10km buffer around the Proposed Development (Offshore). The ZoI is substantially larger than the study area extent to capture any potential buffer of impacts from other surrounding developments.

10.8.1.3 The specific projects scoped into the cumulative effects assessment for this chapter, are outlined in Table 10-20, and an assessment of the cumulative effects presented where appropriate.

Table 10-20: Marine archaeology and cultural heritage cumulative effects.

Development	Potential for Significant Cumulative Effects	Comment
Moray West OWF OECC[ii]	Yes	Boundary of development is within 10km of the Proposed Development (Offshore). Potential for cumulative indirect impacts.
Stromar OWF Scoping OECC	Yes	Boundary of development is within 10km of the Proposed Development (Offshore). Potential for cumulative indirect impacts.

10.8.1.4 Given the highly localised nature of direct impacts on marine archaeology and cultural heritage, the ZoI for cumulative effects is considered to be the spatial extent of the Proposed Development (Offshore). There are no relevant projects located within the ZoI.

10.8.1.5 The two projects listed in Table 10-20 have the potential to interact with the Proposed Development (Offshore) via indirect impacts relating to burial of marine archaeology and cultural heritage. The identified indirect impacts relate to the potential for cumulative impact on seabed sedimentation patterns, which generally are either positive (additional sediment is deposited over a known or unknown archaeological site, providing further protection to it) or negative (covering or supporting sediment is removed from a known or unknown archaeological site, causing damage through either exposure or lack of supporting sediment). Volume 2, Chapter 2: Marine and Coastal Processes has been consulted to identify what changes to sedimentation are predicted to be caused by the Proposed Development (Offshore).

10.8.2 Construction

Impact 1: Loss or Damage to Known and Unknown Marine and Intertidal Historic Environment and Submerged Prehistoric Landscapes from Direct Impacts

10.8.2.1 As all projects and developments located within the Proposed Development (Offshore) are in operation, they therefore form part of the current baseline environment. There is no potential for these to give rise to cumulative effects with the construction of the Proposed Development (Offshore) and have therefore not been taken forward for consideration in the CIA.

[ii] Moray West Export Cable was commissioned after the CIA was undertaken, and therefore has been included as part of the longlist.

Impact 2: Indirect Disturbance to Marine Historic Environment Assets Caused by Seabed Preparation, Foundations, Cable Burial Methods and/or Cable Protection

10.8.2.2 There are two projects for consideration, both relating to Wind Farm export cables - one under construction (Moray West OWF) and one in the concept/early planning stage (Stromar OWF). Such projects either have undergone EIA or are in the process of doing so, and hence it is assumed that any known seabed features would have been avoided during the route development process, as these will constitute engineering hazards, and any potential impacts likely mitigated against.

Magnitude of Impact

10.8.2.3 Any known seabed features should have been avoided during construction, as these would constitute engineering hazards. Impacts to buried material in general is likely to be relatively minimal, as the impact to the seabed is relatively minimal, although over a long distance. As cables are likely to be buried or covered by low-lying material, they are unlikely to cause noticeable changes to hydrodynamic, sedimentation or erosion regimes. Therefore, any cumulative impacts of indirect impacts of cables would be of negligible magnitude.

10.8.2.4 Early concept, concept/early planning or pre-planning OWF interconnectors will undergo EIA prior to consent, therefore suitable measures are likely to be implemented. Therefore, any cumulative impacts from other offshore projects (OWF export cables and marine interconnectors) would be of negligible magnitude. However, should impact occur, it could range from low to high, depending on the value of the receptor being impacts.

10.8.2.5 Discrete archaeological sites and unknown sites encountered by chance during the construction of the Proposed Development (Offshore) or the other developments, will be too small to be subject to impact interactions arising from combined effects of the Proposed Development (Offshore) with other developments and activities in the area. Additionally, the Proposed Development (Offshore) has committed to include a PAD to mitigate against any unknown sites discovered during construction.

10.8.2.6 Volume 2, Chapter 2: Marine and Coastal Processes notes that any changes in sediment patterns would be on a local scale of up to 6km and may lead to increased sedimentation due to construction methodologies and so there is the potential for increased burial of marine archaeology and cultural heritage. The magnitude of this impact on Marine and Coastal Processes was assessed as low, and so the overall magnitude of this impact has been assessed as **low** on the marine archaeology and cultural heritage receptors.

Sensitivity of Receptor

10.8.2.7 Based on the available assessed datasets, no features of palaeogeographic interest were identified (see Section 10.4) within the study area. As highlighted in Table 10-10 the potential for seabed prehistory assets and their respective value varies from high to very low, depending on the asset type.

10.8.2.8 All A1 and A3 receptors and currently unknown archaeological sites are considered as high sensitivity receptors.

10.8.2.9 For all A2 anomalies, there is insufficient data to assess the value of each individual anomaly at this point. As such, all A2 anomalies must be considered to potentially have archaeological value, to a greater or lesser degree and, in accordance with the precautionary principle are considered as high value assets.

Significance of Effect

10.8.2.10 Taking the **High** sensitivity of marine archaeology and cultural heritage receptors and the **Low** magnitude of impact, the cumulative effect of indirect impacts through changes in sedimentation and scour patterns during construction is considered to be **Minor and Not Significant in EIA terms**.

10.8.3 Operation and Maintenance

Impact 3: Loss or Damage to Known and Unknown Marine Historic Environment and Submerged Prehistoric Landscapes from Direct Impacts

10.8.3.1 As the direct impacts to marine archaeology and cultural heritage will only be within the Proposed Development (Offshore), there is no potential for cumulative effects related to these, as existing operational OWF and cables form part of the current baseline environment.

Impact 4: Indirect Disturbance to Marine Historic Environment Assets Caused by Maintenance Activities

10.8.3.2 There are the same two projects for consideration as under Impact 2. Such projects are either already in commission or have undergone EIA/are in the process of doing so, and hence it is assumed that any known seabed features would have been avoided during the route development process, as these will constitute engineering hazards, and any potential impacts likely mitigated against.

Magnitude of Impact

10.8.3.3 Volume 2, Chapter 2: Marine and Coastal Processes notes that any changes in sediment patterns from scour around installed seabed infrastructure would be on a local scale of up to 1km and would be minimal due to the presence of scour protection around foundations, anchor points and cables/cable

protection. There is therefore minimal potential for increased burial or exposure of marine archaeology and cultural heritage. The overall magnitude of this impact has been assessed as negligible on the marine archaeology and cultural heritage receptors.

Sensitivity of Receptor

10.8.3.4 Based on the available assessed datasets, no features of palaeogeographic interest were identified (see Section 10.4) within the study area. As highlighted in Table 10-10 the potential for seabed prehistory assets and their respective value varies from high to very low, depending on the asset type.

10.8.3.5 All A1 and A3 receptors and currently unknown archaeological sites are considered as high sensitivity receptors.

10.8.3.6 For all A2 anomalies, there is insufficient data to assess the value of each individual anomaly at this point. As such, all A2 anomalies must be considered to potentially have archaeological value, to a greater or lesser degree and, in accordance with the precautionary principle are considered as high value assets.

Significance of Effect

10.8.3.7 Taking the **High** sensitivity of marine archaeology and cultural heritage receptors and the **Negligible** magnitude of impact, the cumulative effect of indirect impacts through changes in sedimentation and scour patterns during operation is considered to be **Negligible and Not Significant in EIA terms**.

10.8.4 Decommissioning

10.8.4.1 The magnitude of cumulative impacts and sensitivity ratings of the cumulative impacts at decommissioning is currently unknown. The impacts are likely to be the same as the construction phase.

10.9 In-combination Effects

10.9.1.1 In-combination impacts may occur through the inter-relationship with another EIAR topic that may lead to different or greater environmental effects than in isolation. There is also the potential for in-combination impacts resulting from onshore and offshore works.

10.9.1.2 There are no potential in-combination effects for marine archaeology and cultural heritage receptors resulting from effects between Proposed Development (Offshore) works.

10.10 Transboundary Effects

10.10.1.1 There is no direct impact on marine archaeology and cultural heritage receptors beyond the footprint of the Proposed Development (Offshore), which is entirely within UK waters. The indirect impacts identified above have

all been evaluated as having negligible effects which is not significant in EIA terms. Therefore, there are no transboundary impacts with regard to marine archaeology and cultural heritage and this is not considered further.

10.11 Mitigation Measures and Monitoring

10.11.1 Construction

10.11.1.1 No additional mitigation measures beyond those outlined in Table 10-12 are proposed for the construction phase.

10.11.2 Operation

10.11.2.1 No additional mitigation measures beyond those outlined in Table 10-12 are proposed for the O&M phase.

10.11.3 Decommissioning

10.11.3.1 No additional mitigation measures beyond those outlined in Table 10-12 are proposed for the decommissioning phase.

10.12 Residual Effects

10.12.1 Construction Effects

10.12.1.1 As noted above both identified construction effects were already not significant in EIA terms following the implementation of embedded mitigation. The residual effects during construction are therefore also considered to be **Not Significant in EIA terms**.

10.12.2 Operation Effects

10.12.2.1 As noted above both identified operation effects were already not significant in EIA terms following the implementation of embedded mitigation. The residual effects during operation are therefore also considered to be **Not Significant in EIA terms**.

10.12.3 Decommissioning Effects

10.12.3.1 No further effects were identified for the decommissioning phase beyond those already assessed within the construction and operation phases.

10.13 Summary of Effects

10.13.1.1 Table 10-21 presents a summary of the significant effects assessed within this EIAR, any mitigation required, and the residual effects are provided.

Table 10-21: Summary of effects for marine archaeology and cultural heritage.

Potential Impact	Magnitude	Sensitivity of Receptor	Significance	Mitigation Measure	Residual Effect
Construction					
Impact 1: Loss or damage to known and unknown marine historic environment and submerged prehistoric landscapes from direct impacts	Negligible to Low	Very Low to High	Negligible to Minor	No mitigation required above and beyond embedded mitigation measures outlined in Table 10-12	Negligible to Minor
Impact 2: Indirect disturbance to marine historic environment assets caused by seabed preparation, foundations, cable burial methods and/or cable protection	Low	Very Low	Negligible	No mitigation required above and beyond embedded mitigation measures outlined in Table 10-12	Negligible
Operation and Maintenance					
Impact 3: Loss or damage to known and unknown marine historic environment and submerged prehistoric landscapes from direct impacts	Negligible to Low	Very Low to High	Negligible to Minor	No mitigation required above and beyond embedded mitigation measures outlined in Table 10-12	Negligible to Minor
Impact 4: Indirect disturbance to marine	Low	Very Low	Negligible	No mitigation required above and beyond	Negligible

Potential Impact	Magnitude	Sensitivity of Receptor	Significance	Mitigation Measure	Residual Effect
historic environment assets caused by maintenance activities				embedded mitigation measures outlined in Table 10-12	
Decommissioning					
Impact 5: Loss or damage to known and unknown marine historic environment and submerged prehistoric landscapes from direct impacts	Potential effect of decommissioning would be the same as Construction Phase if the Proposed Development (Offshore) was to be removed. Refer to Impact 1.				
Impact 6: Indirect disturbance to marine historic environment assets caused by decommissioning activities	Potential effect of decommissioning would be the same as Construction Phase if the Proposed Development (Offshore) was to be removed. Refer to Impact 2.				

10.14 References

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