

Morven Offshore Wind Farm

Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 2, Annex 9.1: Marine Archaeology Technical Report

MVCNS-J4029-MDS-00002
October 2026
B01

MSDS Marine

Document status

Version	Purpose of document	Authored by	Checker	Approved by	Date
B01	PEIR	MSDS Marine	LL	LS	October 2026

Prepared by:

MSDS Marine

Prepared for:

Morven Offshore Wind Limited

Table of contents

Executive Summary 1

1 Introduction 2

1.1 Overview 2
1.2 Technical guidance 2

2 Data gathering methodology 4

2.2 Study area 4
2.3 Desk study 6
2.4 Site-specific data 6
2.5 Chronology 10

3 Methodology: archaeological assessment of geophysical and hydrographic data 13

3.1 Overview 13
3.2 Data collection 13
3.3 Positioning 15
3.4 Data deliverables to MSDS Marine 16
3.5 Data quality and limitations 16
3.6 Archaeological assessment of data 20
3.7 Assessment of significance 22

4 Baseline characterisation 23

4.1 Summary of heritage assets 23
4.2 Baseline environment: submerged prehistory and palaeolandscapes 26
4.3 Baseline environment: results of geophysical anomalies 55
4.4 Baseline environment: magnetic anomalies 119
4.5 Baseline environment: coastal and maritime archaeology 123
4.6 Baseline environment: aviation archaeology 142

5 Assessment of significance 144

5.2 Submerged prehistory and palaeolandscapes 144
5.3 Coastal and maritime archaeology 144

6 Summary 147

7 References 149

List of tables

Table 2.1: Archaeological periods in England 10

Table 2.2: Quaternary chronology 12

Table 3.1: 2022 Geophysical and hydrographic sensor specifications 13

Table 3.2: 2023 Geophysical and hydrographic sensor specifications 14

Table 3.3: 2024 Geophysical and hydrographic sensor specifications 14
Table 3.4: 2022 Position sensor specifications 15
Table 3.5: 2023 Position sensor specifications 15
Table 3.6: 2024 Position sensor specifications 15
Table 3.7: Data deliverables to MSDS Marine 16
Table 3.8: Assessment criteria for archaeological potential 21
Table 4.1: Units identified within the SBP and geotechnical data within the MHPGC Project PEIR Red Line Boundary in English and Scottish waters (excluding the section that overlaps with Morven North and Morven South. 32
Table 4.2: Units identified within the SBP and geotechnical data within the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South 34
Table 4.3: Distribution of archaeological anomalies by potential 55
Table 4.4: Low potential anomaly categories 55
Table 4.5: Low potential anomaly descriptions 57
Table 4.6: Medium potential anomaly categories 59
Table 4.7: High potential anomaly categories 86
Table 4.8: Magnetic anomalies by amplitude (nT) 119
Table 4.9: Magnetic anomalies by ferrous mass (kg) 121
Table 4.10: Historic Seascape Characterisation broad character types within the Marine and Intertidal Archaeology Study Area 125
Table 4.11: Historic Seascape Characterisation previous character sub-types within the Marine and Intertidal Archaeology Study Area 126
Table 4.12: Vessel types indicated by wreck and documented loss records 137
Table 4.13: Coastal and maritime archaeological potential within the Marine and Intertidal Archaeology Study Area 141
Table 7.1: NMHR and HER unidentified obstruction records with the MHPGC Project PEIR Red Line Boundary 170

List of figures

Figure 2.1: Marine and Intertidal Archaeology Study Area 5
Figure 2.2: Multibeam Bathymetry coverage 8
Figure 2.3: Sidescan Sonar coverage 9
Figure 4.1: Designated heritage assets 24
Figure 4.2: Quaternary thickness 29
Figure 4.3: Distribution of seabed sediments 30

Figure 4.4: Seabed morphology 31
Figure 4.5: British Geological Survey formations 36
Figure 4.6: Distribution of Unit Fth 1 and geotechnical locations 40
Figure 4.7: Distribution of Unit Fth 2 and geotechnical locations 41
Figure 4.8: Units Fth 1 and Fth 2, exposed bedrock and BGS mapping 42
Figure 4.9: Geomorphological features 48
Figure 4.10: Sea level data 50
Figure 4.11: Distribution of archaeological anomalies 56
Figure 4.12: Distribution of low potential archaeological anomalies 58
Figure 4.13: Distribution of medium potential archaeological anomalies 61
Figure 4.14: Medium potential MOR23_083 62
Figure 4.15: Medium potential MOR23_085 63
Figure 4.16: Medium potential MOR23_058 64
Figure 4.17: Medium potential MOR23_093 65
Figure 4.18: Medium potential MOR23_021 66
Figure 4.19: Medium potential MOR23_101 67
Figure 4.20: Medium potential MOR23_044 68
Figure 4.21: Medium potential MOR23_104 70
Figure 4.22: Medium potential MOR23_135 71
Figure 4.23: Medium potential MOR23_077 72
Figure 4.24: Medium potential MOR23_067 73
Figure 4.25: Medium potential MOR23_014 74
Figure 4.26: Medium potential MEC23_003 76
Figure 4.27: Medium potential MEC23_010 77
Figure 4.28: Medium potential MEC23_011 78
Figure 4.29: Medium potential MEC23_008 80
Figure 4.30: Medium potential MEC23_012 81
Figure 4.31: Medium potential MEC23_130 82
Figure 4.32: Medium potential MEC23_118 83
Figure 4.33: Medium potential MEC23_114 84
Figure 4.34: Medium potential MEC23_141 85
Figure 4.35: Distribution of high potential archaeological anomalies 87
Figure 4.36: High potential MOR23_054 89
Figure 4.37: High potential MOR23_023 90

Figure 4.38: High potential MOR23_071 91
Figure 4.39: High potential MOR23_052 92
Figure 4.40: High potential MOR23_015 93
Figure 4.41: High potential MEC23_054 95
Figure 4.42: High potential MEC23_005 97
Figure 4.43: High potential MEC23_009 98
Figure 4.44: High potential MEC23_131 99
Figure 4.45: High potential MEC23_001 100
Figure 4.46: High potential MEC23_070 102
Figure 4.47: High potential MEC23_022 103
Figure 4.48: High potential MEC23_132 104
Figure 4.49: High potential MEC23_052 105
Figure 4.50: High potential MEC23_053 107
Figure 4.51: High potential MEC23_140 108
Figure 4.52: High potential MEC23_139 109
Figure 4.53: High potential MEC23_138 111
Figure 4.54: High potential MEC23_137 112
Figure 4.55: High potential MEC23_136 113
Figure 4.56: High potential MEC23_134 115
Figure 4.57: High potential MEC23_133 116
Figure 4.58: High potential MEC23_115 117
Figure 4.59: High potential MEC23_116 118
Figure 4.60: Distribution of magnetic anomalies by amplitude (nT) 120
Figure 4.61: Distribution of magnetic anomalies by mass (kg) 122
Figure 4.62: Distribution of Durham HER records 127
Figure 4.63: Existing infrastructure 134
Figure 4.64: Distribution of UKHO records 139
Figure 4.65: Distribution of NMHR and Canmore maritime records 140

Appendices

Appendix	Title
Appendix A	Gazetteer of archaeological anomalies
Appendix B	Gazetteer of wrecks, obstructions and documented losses
Appendix C	Gazetteer of heritage asset records

Appendix D	Gazetteer of sea-level index points

Glossary

Term	Meaning
Alternating Current (AC) connection cable corridor	The corridor within which the AC connection cables will be located, from the onshore land substation to the National Grid Hawthorn Pit Substation.
AC connection cables	Alternating Current (AC) cables that will connect the proposed onshore land substation to the National Grid Hawthorn Pit Substation.
the Applicant	The legal entity making the applications for consent; Morven Offshore Wind Limited (MvOWL).
Anomaly	An anomaly is a local variation of an otherwise uniform signal response. In the context of marine geophysics, the word anomaly is often used to indicate the feature causing the variation as well as the variation itself
Archaeological Interest	A heritage asset with value from the potential to hold evidence about the past that can be retrieved though specialist investigation.
Archaeological remains	The material remains of human activity from the earliest persons of human evolution to present. These may be buried traces of human activities, sites visible above ground, or moveable artifacts.
Commitments	Measures (embedded mitigation and secondary) to be adopted during the construction, operation and maintenance and decommissioning phases of the MHPGC Project.
Continuous working hours	Where continuous periods of working (up to 24 hours, 7 days per week) are required for construction activities e.g. for Trenchless Technique Installation
Core working hours	Working hours of 7am-7pm, Monday - Friday and 7am - 1pm on Saturday, no activity on Sundays or bank holidays.
Cumulative effect	The combined effect of the MHPGC Project in combined with the effects from other proposed developments, on the same receptor or resource.
Cumulative effects assessment	Assessment of the likely effects arising from the MHPGC Project alongside the likely effects arising from other proposed developments on the same receptor or resource.
Designated Heritage Asset	Heritage assets designated nationally under the relevant legislation. Planning Practice Guidance paragraph 022 identifies designated heritage assets as including scheduled monuments, listed buildings, registered parks and gardens, registered battlefields, world heritage sites, conservation areas and protected wreck sites.
Development Consent Order (DCO)	An order made under the Planning Act 2008, as amended, granting development consent.
Draft Development Consent Order and deemed Marine Licences	The draft order submitted by the Applicant to the Planning Inspectorate (PINS) as part of its application for development consent under the Planning Act 2008, including any deemed Marine Licence(s) in English Waters.
Embedded mitigation	Measures included as part of the project design. Includes both primary and tertiary mitigation.

Term	Meaning
Environmental Impact Assessment (EIA)	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Gazetteer	A directory providing information on historical assets relevant to a project.
Geoarchaeological potential	Some deep natural or semi-natural deposits have the capacity to preserve deeply buried archaeological or environmental material, including organic materials that are rarely preserved. Such deposits can be said to have high geoarchaeological potential.
Habitats Regulations Appraisal/Habitats Regulations Assessment (HRA)	The Habitats Regulations Appraisal (for Scotland)/Habitats Regulation Assessment (for England) is a process that determines whether development plans could adversely affect sites within the National Site Network and their qualifying features.
Historic England (HE)	HE is the Government's statutory adviser on England's historic environment and an executive non-departmental public body. In the DCO process, HE acts as a statutory consultee, providing expert advice on the potential effects of development on the historic environment. This includes designated heritage assets such as listed buildings, scheduled monuments, protected wreck sites, registered parks and gardens, conservation areas and World Heritage Sites. HE also advises on undesignated heritage assets, including archaeological remains, and on the setting and significance of heritage assets. In addition, HE provides specialist advice on coastal, intertidal and offshore marine archaeology, including submerged landscapes, shipwrecks and other marine heritage assets.
Landfall	The area in which the offshore export cables make landfall (come onshore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area between the trenchless technique exit pits and the transition joint bay inclusive of all construction works.
Lowest Astronomical Tide (LAT)	The lowest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.
Magnetic anomaly	A notable localised variation in the earth's magnetic field.
Magnetometer	An instrument which measures the strength of a magnetic field.
Maximum Design Scenario (MDS)	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the MHPGC Project.
MHPGC Project Environmental Statement (ES)	The document presenting the results of the Environmental Impact Assessment process.
MHPGC Project Evidence Plan Process (EPP)	A voluntary consultation process with specialist stakeholders to agree the approach to, and information to support, the EIA and Habitats Regulations Assessment processes for certain topics.

Term	Meaning
MHPGC Project Habitats Regulations Appraisal/ Habitats Regulations Assessment (HRA) Screening Report	A HRA Screening Report is Stage 1 of the HRA process and screens in sites within the National Site Network, and qualifying features, for consideration within Stage 2 of the HRA process. The HRA Screening Report for the MHPGC Project will be submitted to PINS and MD-LOT to obtain an opinion on which sites within the National Site Network, and qualifying features, should be screened in for consideration within the MHPGC Project Report to Inform the Appropriate Assessment (RIAA).
MHPGC Project PEIR Red Line Boundary	The area within which all components of the MHPGC Project will be located, including areas required on a temporary basis during construction and/or decommissioning (such as construction compounds).
MHPGC Project Preliminary Environmental Information Report (PEIR)	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
MHPGC Project Report to Inform Appropriate Assessment (RIAA)	A report prepared by the Applicant containing information that the Competent Authority needs to inform an Appropriate Assessment at Stage 2 of the HRA process. The MHPGC Project will consider whether the MHPGC Project could have adverse effects, either alone or in-combination with other plans or projects, on the integrity of the National Site Network for which the likely significant effects has been previously established.
MHPGC Project Scoping Boundary	The spatial extent of the area used to define the environmental baseline to inform impact assessments at the time the MHPGC Project Scoping Report was submitted.
MHPGC Project Scoping Opinions	Separate scoping opinions received from PINS (on behalf of the Secretary of State) and MD-LOT (on behalf of the Scottish Ministers) in response to the MHPGC Project Scoping Report. The MHPGC Project Scoping Opinions contain the range of issues that PINS, and MD-LOT in consultation with statutory stakeholders, have identified should be considered within the EIA process.
MHPGC Project Scoping Report	A Scoping Report for the MHPGC Project, scoping the likely significant effects of the project on the environment, was submitted and accepted by Planning Inspectorate (PINS) and submitted to the Scottish Ministers, via the Marine Directorate – Licencing Operations Team (MD-LOT) in February 2025.
Morven Hawthorn Pit Grid Connection Project	The MHPGC Project is comprised of the offshore export cables in Scottish and English waters from the Morven North or the Morven South offshore substation platform(s) (OSP), landfall, onshore export cables, the onshore land substation (LSS) and AC connection cables. Also referred to in this report as the MHPGC Project, for ease of reading.
Morven North Offshore Wind Array Project and Morven South Offshore Wind Array Project	Morven North and Morven South comprises the Morven North Offshore Wind Array Project and Morven South Offshore Wind Array Project, collectively.
Morven Programme	The Morven Programme comprises the MHPGC Project, Morven North, Morven South and MBAGC Project collectively.

Term	Meaning
Morven South Boundary	Boundary within which the wind turbines foundations, Offshore Substation Platforms and foundations, inter-array and interconnector cables and associated infrastructure for Morven South will be located.
Morven South Offshore Wind Array Project	The Morven South Offshore Wind Array Project, which includes the wind turbines and foundations, Offshore Substation Platforms and foundations, inter-array and interconnector cables and associated infrastructure located within the Morven South Boundary.
Multibeam Echo Sounder (MBES)	An instrument that uses sound to create a three-dimensional map of the seabed bathymetry.
National Grid Hawthorn Pit Substation	The National Grid substation at Hawthorn Pit, County Durham, which the AC connection cables will connect into from the Onshore Land Substation.
Nadir	The point on the seabed directly below the instrument.
Non-designated heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes assets identified by the local planning authority (including local listing).
Offshore export cable corridor	The proposed corridor in which the offshore export cables will be located, from either the Morven North or Morven South offshore substation platform to the transition joint bay (TJB) at landfall.
Offshore export cables	HVDC cables which bring electricity from either the Morven North or Morven South offshore substation platform to the TJB at landfall.
Offshore substation platform (OSP(s))	OSP(s) comprise the support structure, topside and electrical components used for collecting the electricity generated by the wind turbine generators, in Scottish waters, for the passage or transmission to landfall. These OSP(s) can be divided into two types: - HVAC collector substations; - HVDC converter substations.
Offshore Waters	Waters beyond 12nm from the coastline.
Onshore export cable corridor	The proposed corridor within which onshore export cables and associated infrastructure will be laid and located, from the TJB to the onshore land substation.
Onshore export cables	HVDC cables which bring electricity from the TJB to the onshore land substation.
Onshore Land Substation (LSS)	A purpose-built site comprising a compound containing the electrical components for converting the HVDC to HVAC power. The LSS site associated with the MHPGC Project adjusts the power quality and power factor to meet the requirements of power supply being fed to the National Grid Hawthorn Pit Substation.
Palaeoenvironmental	An environment of a past geological age.
Palaeochannel	A remnant of an inactive river or stream channel that has been filled or buried by younger sediment.
Palaeocoastline	A former coastline of a past geologic age.
Palaeoenvironment	The environment of the geologic past.

Term	Meaning
Palaeolandscape	Past terrestrial and coastal landscapes that formed during periods of lower sea level
Primary mitigation	Measures included as part of the location or design of the MHPGC Project made during the pre-application phase that are an inherent part of the MHPGC Project and do not require additional action to be taken. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the MHPGC Project, the parameters and associated commitments secured by the DCO and marine licence, or both.
Residual effects	Effects that continue to exist after mitigation has been applied.
Secondary mitigation	Actions that will require further activity to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES. These include measures required to reduce the significance of environmental effects and may be secured through an environmental management plan. For secondary mitigation measures, both pre-mitigation and residual effects are presented.
Sidescan Sonar	An instrument that used sound to create a two-dimensional representation of the seabed.
Sub-bottom Profiler	An instrument that uses sound to create a representation of the sub-seabed stratigraphy.
the Study Area	For each environmental topic, the baseline environment will be characterised, and the likely significant effect will be described within a topic-specific Study Area. Specific Study Areas are defined for each topic and are based on the maximum spatial extent across which likely significant effects of the MHPGC Project may be experienced by the relevant receptors (i.e. Zone of Influence (ZoI)). The Marine and Intertidal Archaeology Study Area is defined by industry best-practice and comprises a 2km buffer around the offshore extent of the MHPGC Project PEIR Red Line Boundary, extending to 200m above Mean High Water Springs (MHWS).
Tertiary mitigation	Actions that would occur with or without input from the EIA process feeding into the design. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
Transboundary effects	Assessment of likely significant effects resulting from MHPGC Project on the interests of another European Economic Area (EEA) state(s).
Transboundary impact	Potential impacts resulting from MHPGC Project and affecting another European Economic Area (EEA) state.

Term	Meaning
Transition Joint Bay (TJB)	An underground bay housing a joint which connects the offshore export cables to the onshore export cables. The TJB will be located in the vicinity of the onshore side of the landfall.
Unexploded Ordnance (UXO)	Unexploded ordnance are explosive weapons (bombs, shells, grenades, land mines, naval mines, etc.) that did not explode when they were employed and still pose a risk of detonation, potentially many decades after they were used or discarded.

Acronyms

Acronym	Meaning
AD	Anno Domini
ADS	Archaeology Data Service
AF	Acoustic Facies
AMAP	Areas of Maritime Archaeological Potential
ARS	Archaeological Research Services
BC	Before Christ
BGS	British Geological Survey
BP	Before Present
c.	Circa
CBM	Ceramic Brick Material
CIfA	Chartered Institute for Archaeologists
CITiZAN	Coastal and Intertidal Zone Archaeology Network
COWRIE	Collaborative Offshore Wind Research into the Environment
CPT	Cone Penetration Test
DBA	Desk-Based Assessment
Defra	Department for Environment, Food & Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DGPS	Differential Global Positioning System
ED50	European Datum 1989
EIA	Environmental Impact Assessment
EMODnet	European Marine Observation and Data Network
EPP	Evidence Plan Process
EWG	Expert Working Group
ES	Environmental Statement
GIA	Glacial Isostatic Adjustment

Acronym	Meaning
GIS	Geographical Information System
HEPS	Historic Environment Policy for Scotland
HER	Historic Environment Record
HES	Historic Environment Scotland
HF	High Frequency
HMPA	Historic Marine Protected Area
HSC	Historic Seascape Characterisation
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICOMOS	International Council on Monuments and Sites
ID	Identification
KP	Kilometre Point
LAT	Lowest Astronomical Tide
LF	Low Frequency
LSS	Land Substation
LUC	Land Use Consultants
MATR	Marine and Intertidal Archaeology Technical Report
MBES	Multibeam Echo Sounder
MD-LOT	Marine Directorate – Licensing Operations Team
MEDIN	Marine Environment Data and Information Network
MHPGC	Morven Hawthorn Pit Grid Connection
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MIS	Marine Isotope Stages
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPA	Marine Protected Area
MRU	Motion Reference Unit
MSGL	Mega-Scale Glacial Lineations
MvOWL	Morven Offshore Wind Limited
NERCZA	North East Coast Rapid Coastal Zone Assessment and Survey
NMHR	National Marine Heritage Record
NPS	National Policy Statement
NRHE	National Record of the Historic Environment
OD	Ordnance Datum
ORR	Offshore Regional Reports

Acronym	Meaning
OSP	Offshore Substation Platform
PAM	Passive Acoustic Monitoring
PAN	Planning Advice Note
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
pUXO	potential Unexploded Ordnance
RFA	Royal Fleet Auxiliary
RIAA	Report to Inform Appropriate Assessment
RLB	Red Line Boundary
ROV	Remotely Operated Vehicle
RSL	Relative Sea Level
SALMO	Salvage and Marine Operations
SBP	Sub-bottom Profiler
ScARF	Scottish Archaeological Research framework
SIS	Scottish Ice Sheet
SLIP	Sea Level Index Points
SoS	Secretary of State
SSS	Sidescan Sonar
UHRS	Ultra High-Resolution Seismic
UKHO	United Kingdom Hydrographic Office
USBL	Ultra Short Baseline
USV	Uncrewed Surface Vessel
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VORF	Vertical Offshore Reference Frames
WSI	Written Scheme of Investigation

Units

Unit	Meaning
cm	Centimetre
GW	Gigawatt
Hz	Hertz
J	Joules
kg	Kilogram

Unit	Meaning
kHz	Kilohertz
km	Kilometres
KP	kilometre point
m	Meters
m/s	Meters per second
MPa	Megapascal
nm	Nautical Miles
ppm	pixels per meter
qt	Corrected cone tip resistance
nT	Nanotesla
<	Less than
>	Greater than
°	Degree

Executive Summary

This Marine and Intertidal Archaeology Technical Report provides a comprehensive assessment of known and potential marine and intertidal archaeology relevant to the Morven Hawthorn Pit Grid Connection Project (referred to hereafter as 'the MHPGC Project'), which will connect the offshore substation platform(s) (OSP) of Morven North Offshore Wind Array Project or Morven South Offshore Wind Array Project (referred to hereafter as 'Morven North' or 'Morven South'), located approximately 61 kilometres (km) at its closest point from the Aberdeenshire coast in Scottish waters, to the National Grid Hawthorn Pit Substation, located in County Durham, England. The Technical Report informs the Preliminary Environmental Information Report (PEIR), defining the marine and intertidal archaeology baseline against which impacts associated with the MHPGC Project will be assessed.

This assessment has considered desk-based sources, geophysical and geotechnical data interpretation, and intertidal walkover survey results to provide a baseline of the known and potential marine archaeological remains within the Marine and Intertidal Archaeology Study Area. The assessment also includes a consideration of the potential significance of these remains.

There are 12 Quaternary geological units that have been provisionally identified by the site-specific survey conducted within the MHPGC Project PEIR Red Line Boundary. Of these, two units provisionally correlated with the Forth Formation within English waters, Fth 3 and Fth 2 (unit IDs assigned by the survey sub-contractors), have been identified as having moderate potential for *in situ* and *ex situ* archaeological remains and deposits of geoarchaeological interest up to 12nm in English waters (and low elsewhere). Units Hol 1, Hol 2 and Hol 3, interpreted as Holocene marine sediments, have been attributed a low potential for *ex situ* Mesolithic remains, with a marginally higher likelihood also within 12nm in English waters. These could be of up to moderate significance.

The assessment of geophysical and hydrographic data acquired from within the MHPGC Project PEIR Red Line Boundary identified 215 low potential anomalies, 23 medium potential anomalies and 24 high potential anomalies. Of these anomalies, 23 have been actually or potentially correlated with 21 UKHO wreck records. This assessment also identified 1,170 magnetic anomalies of between 5.0 and 1,056.0nT, with no definitive correlation with known or visible features or infrastructure.

The assessment of maritime, terrestrial and intertidal heritage asset records has determined that there is high potential for archaeological remains of modern date to be present within the Marine and Intertidal Archaeology Study Area, and a broad moderate to high potential for remains of post-medieval date to be present. There is, within 12nm in English waters, locally moderate potential for Mesolithic remains to be present (elsewhere low), a low potential for Neolithic and medieval remains, and very low potential for all other periods. There is low to moderate potential for aviation remains, based on documented losses and historic military aviation activity.

Any remains associated with wrecks could be of up to high significance, based on the extent and nature of the remains. Wrecks may become protected under the Protection of Wrecks Act 1973, Ancient Monuments and Archaeological Areas Act 1979, Marine Scotland Act 2010, or Protection of Military Remains Act 1986. Aviation remains would be automatically protected under the Protection of Military Remains Act 1986 if remains can be identified as of military origin (full details of legislation applicable to marine and intertidal archaeology are within **Volume 2, Chapter 9: Marine and Intertidal Archaeology, of the PEIR**).

Other remains are likely to consist of isolated, translocated finds which would be of low significance. However, the assessment of geological units Fth 3 and Fth 2 has suggested potential for Mesolithic remains to be found *in situ*, as well as *ex situ*. Such remains could be of up to moderate significance, depending on their extent and nature.

1 Introduction

1.1 Overview

1.1.1.1 This report presents the Marine and Intertidal Archaeology Technical Report (MATR) for the Morven Hawthorn Pit Grid Connection Project (referred to hereafter as 'the MHPGC Project'). It forms **Volume 2, Annex 9.1: Marine and Intertidal Archaeology Technical Report, of the Preliminary Environmental Information Report (PEIR)** prepared for the MHPGC Project and supports **Volume 2, Chapter 9: Marine and Intertidal Archaeology, of the PEIR**.

1.1.1.2 This MATR sets out the methods for the assessment of marine and intertidal archaeology and brings together the results of desk-based assessment of known and potential archaeological remains, geophysical survey and hydrographic data to inform the marine and intertidal archaeology baseline of the MHPGC Project.

1.1.1.3 This MATR also draws on information contained within the following appendices to this document:

- **Appendix A: Gazetteer of archaeological anomalies**;
- **Appendix B: Gazetteer of wreck, obstruction and documented loss records**;
- **Appendix C: Gazetteer of heritage records**;
- **Appendix D: Gazetteer of sea level index points**.

1.1.1.4 The MHPGC Project will connect the Offshore Substation Platforms (OSPs) of Morven North or Morven South (referred to hereafter as 'the area of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North or Morven South'), located approximately 61km at its closest point from the Aberdeenshire coast in Scottish waters, to the National Grid Hawthorn Pit Substation in County Durham, England.

1.1.1.5 The offshore elements of the MHPGC Project are sited within the Scottish and English marine environments. The most northerly part of the MHPGC Project PEIR Red Line Boundary is within Scottish waters (north of Kilometre Point KP208, a numbering system which marks sections of the offshore extent of the PEIR Red Line Boundary) and overlaps with Morven North and Morven South. The MHPGC Project PEIR Red Line Boundary passes through Scottish offshore waters (north of KP158.8), English offshore waters and English inshore waters up to Mean High Water Springs (MHWS). The elements located at MHWS at Blast Beach, County Durham, at landfall. Above MHWS onshore, the MHPGC Project Red Line Boundary continues to incorporate the onshore elements of the MHPGC Project. The MHPGC Project PEIR Red Line Boundary is illustrated by **Figure 2.1**.

1.2 Technical guidance

1.2.1.1 Relevant technical guidance, specific to marine and intertidal archaeology, that has informed this technical report is summarised below. As noted above, some guidance documents are relevant to both English and Scottish waters, such as any produced by the Chartered Institute for Archaeologists (CIfA). However, some others, produced by, for example, Historic England, may also serve as an industry standard, as set out below.

Guidance specific to Scottish waters

- Scottish Government Planning Advice Notes[1], in particular 2/2011: *Planning and Archaeology*; Planning Advice Note 1/2013: *Environmental Impact Assessment* (amended 2017; Scottish Government, 2013); Planning Circular 1/2017: *Environmental Impact Assessment Regulations* (Scottish Government, 2017);

[1] On 8 December 2025, the Scottish Government withdrew 27 Planning Advice Notes (PAN) and 19 other pieces of guidance from their current advice, including PAN 2/2011: Planning and Archaeology. The Scottish Government expects that the good practice set out in the PANs "should by now be established practice", therefore, adherence to this guidance note will continue until a suitable replacement is adopted or further notice.

- *Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland* (Historic Environment Scotland) and NatureScot, 2018);
- *Designation Policy and Selection Guidance* (HES, 2019c);
- Managing Change in the Historic Environment: Conserving Our Underwater Heritage (Historic Environment Scotland, 2025);
- Key Agencies Group National and Major Developments: An Agency Joint Statement on Pre-application Engagement (NatureScot, 2025).

Guidance specific to English waters

- Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage, 2008);
- *Managing Significance in Decision-Taking in the Historic Environment* (Historic England, 2015b);
- *Statements of Heritage Significance: Analysing Significance in Heritage Assets Historic England Advice Note 12* (Historic England, 2019);
- Historic Environment Circulars.

Guidance with potential relevance to English and Scottish waters

- *Military Aircraft Crash Sites* (English Heritage, 2002);
- *Code of Practice for Seabed Development* (Joint Nautical Archaeology Policy Committee, 2006);
- *Historic Environment Guidance for the Offshore Renewable Energy Sector* (Wessex Archaeology on behalf of the Collaborative Offshore Wind Research Into the Environment (COWRIE), 2007);
- *Aircraft Crash Sites at Sea* (Wessex Archaeology, 2008a);
- *Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy* (Oxford Archaeology on behalf of COWRIE, 2008);
- *Assessing Boats and Ships 1860–1950* (Wessex Archaeology, 2008b);
- *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (Gribble and Leather, 2011);
- *Guidance on Heritage Impact Assessments for Cultural World Heritage Properties* (International Council on Monuments and Sites (ICOMOS), 2011);
- *Protocol for Archaeological Discoveries: Offshore Renewables Projects* (Wessex Archaeology on behalf of the Crown Estate, 2014);
- *Geoarchaeology: Using earth sciences to understand the archaeological record* (Historic England, 2015a);
- *Standard and guidance for historic environment desk-based assessment* (Chartered Institute for Archaeologists, 2020);
- *Deposit Modelling and Archaeology: Guidance for Mapping Buried Deposits* (Historic England, 2020);
- *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (Wessex Archaeology on behalf of The Crown Estate, 2021);
- *Curating the Palaeolithic* (Historic England, 2023);
- *Marine Geophysics Data Acquisition, Processing and Interpretation, Guidance Notes* (2nd edition) (Historic England, 2025a);
- *Scientific Dating of Pleistocene Sites* (Historic England, 2025b);
- *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation* (3rd edition) (Historic England, 2025c).

2 Data gathering methodology

2.1.1.1 This section provides an overview of the methods used to inform the baseline assessment. The Marine and Intertidal Archaeology Study Area is described first, followed by data sources and detailed methods of the review.

2.1.1.2 The baseline assessment is primarily focused on known and potential remains relating to:

- Palaeolandscape and submerged prehistory;
- Maritime and coastal remains;
- Aviation.

2.1.1.3 Onshore heritage assets are included in the discussion where these fall within the Marine and Intertidal Archaeology Study Area (see below, **Paragraph 2.2.1.2**) or where consideration of a wider range of assets has been deemed necessary to better characterise the potential archaeological resource within the Marine and Intertidal Archaeology Study Area.

2.2 Study area

2.2.1.1 The Marine and Intertidal Archaeology Study Area for this assessment includes the MHPGC Project PEIR Red Line Boundary (seaward of MHWS) and a 2km buffer measured from the offshore extent of the PEIR Red Line boundary, within the marine zone.

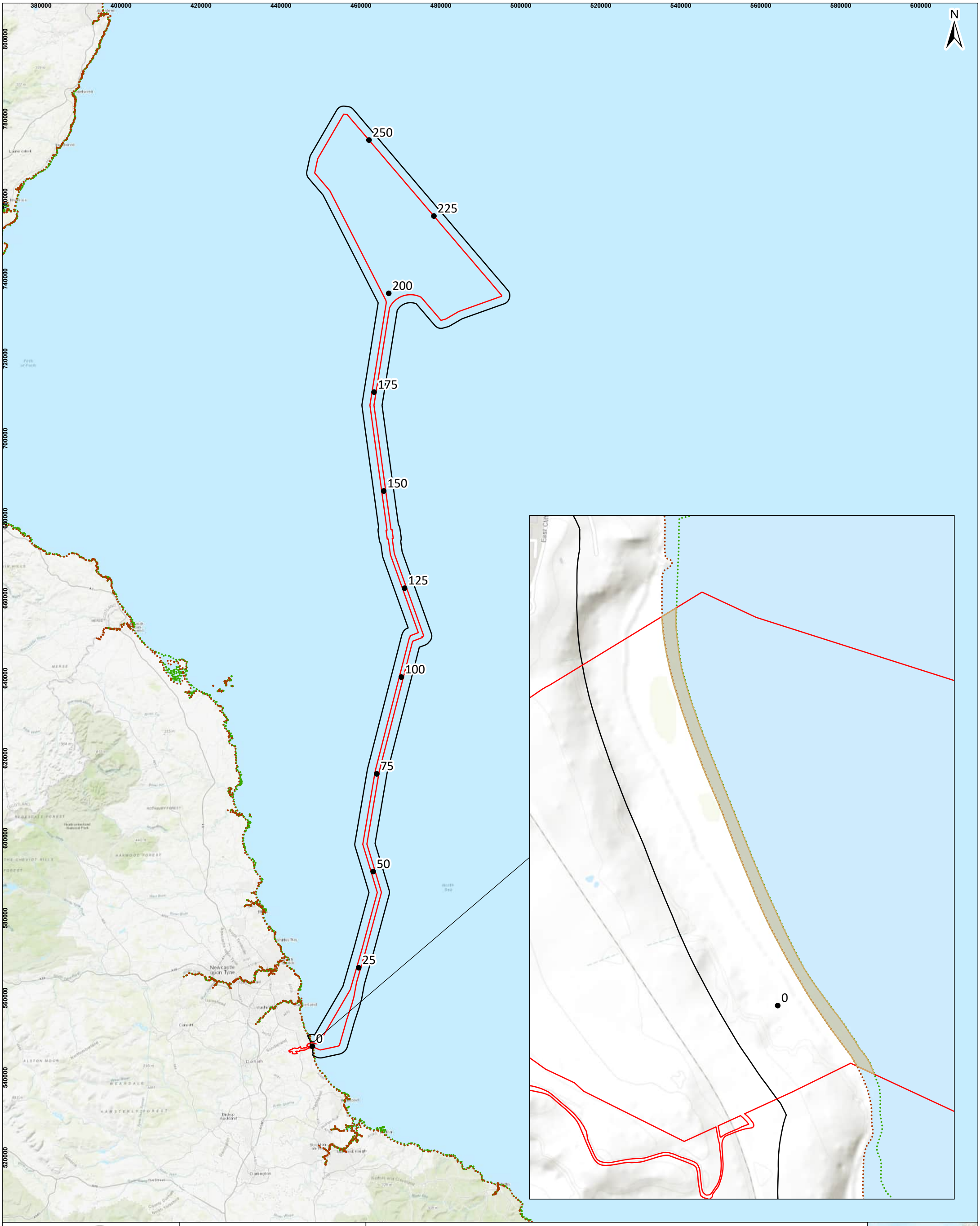
2.2.1.2 The Marine and Intertidal Archaeology Study Area extends to 200m above MHWS, capturing archaeological data from the nearby terrestrial landscape that may aid characterisation and interpretation of the marine archaeological resource and potential for remains to be present within the MHPGC PEIR Red Line Boundary.

2.2.1.3 The Marine and Intertidal Archaeology Study Area is defined to characterise the marine and intertidal archaeology resource within the MHPGC PEIR Red Line Boundary and establish a baseline of potential, adhering to best practice. The Marine and Intertidal Archaeology Study Area for the MHPGC Project has been agreed in consultation with Historic England, as part of the Evidence Plan Process. A record of stakeholder consultation pertaining to marine and intertidal archaeology is presented within **Volume 2, Chapter 9: Marine and Intertidal Archaeology, of the PEIR**.

2.2.1.4 The Marine and Intertidal Archaeology Study Area is not to be confused with the Zone of Influence (ZoI), which is introduced and implemented within **Volume 2, Chapter 9: Marine and Intertidal Archaeology, of the PEIR** and concerns the maximum distance identified for suspended sediment concentration (SSC) disturbed by works associated with the MHPGC Project and that form part of the assessments of adverse effect on marine and intertidal archaeology receptors.

2.2.1.5 The scope of a Marine and Intertidal Archaeology Study Area is not defined by policy nor legislation, rather it is determined on a project-by-project basis. Industry guidance recommends agreement in the scope between the party undertaking the assessment and the "…local authority's historic environment advisor…" prior to data collection (CIfA, 2020). Where appropriate for wider consideration of the historic environment and in line with stakeholder recommendations, the baseline occasionally examined and incorporated data and studies pertaining to the wider region. These additional data and source material contributed to an enhanced understanding of the marine archaeological potential in the wider region.

2.2.1.6 The Marine and Intertidal Archaeology Study Area is illustrated by **Figure 2.1**.



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0001				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey				
Drawing Title: FIGURE 2.1: MARINE AND INTERTIDAL ARCHAEOLOGY STUDY AREA	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA Topographic: Esri UK, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA Topographic: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA				
0 10 20 30 km Scale@A3:1:850,000	VER	DATE	DETAILS	BY	CHECK
	00	01/09/2026	Initial Issue	MJ	FLP
	01	01/09/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- Kilometer Points (KP)
- Intertidal Survey Area
- Mean Low Water
- Mean High Water



2.3 Desk study

2.3.1.1 The baseline assessment involved consultation of readily available archaeological and historical information from documentary and cartographic sources and repositories. These were agreed to by Historic England during the consultation process. Data sources accessed for the assessment were:

- United Kingdom Hydrographic Office (UKHO) Wrecks, Obstructions and Fouls data: comprising records relating to charted wrecks and other seabed obstructions that are considered navigational hazards (UKHO, 2026);
- NMHR data: comprising marine heritage records that lie between MHWS and the 200 nautical mile sea limit (formerly held by the NRHE) (Historic England, 2026a);
- Historic England's Intertidal and Coastal Peat Database which has identified submerged palaeolandscape peat deposits along England's coastline (Historic England, 2026b);
- National Historic Seascape Characterisation (HSC) Consolidation (Land Use Consultants (LUC), 2018 (on behalf of HE, 2018)). Data available from the Archaeology Data Service (ADS) (2018).
- Durham County Council HER (Durham County Council, 2026): archaeological and historic environment records for onshore heritage assets in Lincolnshire (including those formerly held by the NRHE);
- Trove data (formerly Canmore) (Historic Environment Scotland, 2026a): archaeological and HERs for onshore and offshore heritage assets;
- CITiZAN data (2026);
- HM Government's list of wrecks designated under the Protection of Military Remains Act 1986 (digitised and available online via the government Marine Map portal) (HM Government, 2026);
- British Geological Survey (BGS) GeoIndex Offshore (BGS 2026);
- BGS Offshore Regional Reports (ORRs);
- University of Sheffield (2026) BRITICE-CHRONO project data, which has information regarding the geomorphology (landforms) of the last British-Irish ice sheet;
- Marine Environmental Data and Information Network (MEDIN) (2026): data relating to marine geology, geotechnical data and publicly accessible shipwrecks;
- European Marine Observation and Data Network (EMODnet) (2026): data for sub-seabed palaeolandforms and palaeolandscapes;
- Other secondary sources consulted include relevant literature from journals, publications and unpublished archaeological reports.

2.3.1.2 All sources have been used to develop an understanding of the heritage baseline within the Marine and Intertidal Archaeology Study Area throughout the Quaternary period up to the present day. This data is assessed and presented chronologically within this MATR, beginning with the potential for submerged prehistoric landscapes. These sources were assessed and information compiled into gazetteers for the Marine and Intertidal Archaeology Study Area (see **Appendix A** to **Appendix D** of this document).

2.3.1.3 Historic England confirmed during consultation that the data sources are adequate for the assessment (relevant stakeholder engagement is detailed within **Volume 2, Chapter 9: Marine and Intertidal Archaeology, of the PEIR**).[2]

2.4 Site-specific data

2.4.1.1 Preliminary, project-specific geophysical and hydrographic data was acquired over three campaigns, illustrated in **Figure 2.2**.

[2] From 01 January 2025, Historic Environment Scotland no longer provide advice on undesignated underwater cultural heritage. The stakeholder will continue to provide information and advice to applicants and consenting/competent authorities on designated cultural heritage assets. Relevant guidelines for the assessment in Scottish waters was consulted, as detailed within **Section 1.2.** Full details of consultation for the MHPGC Project can be found within **Volume 2, Chapter 9: Marine and Intertidal Archaeology, of the PEIR.**

2.4.1.2 Data was collected in 2022 within the area of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South. MHPGC Project-specific survey data was collected in 2023 focussing on several offshore export cable route options (illustrated in **Figure 2.2**) and associated landfall options, and 2024-2025 (hereafter 2024) within the MHPGC Project PEIR Red Line Boundary, excluding the area of the MHPGC PEIR Red Line Boundary that overlaps with Morven North and Morven South, from KP208 to KP0. The 2024 data covered the full extents of the MHPGC Project PEIR Red Line Boundary between KP208 and KP0, except for some nearshore areas between KP21 and KP0. Supplementary MBES data from 2023 were purchased by Morven Offshore Wind Limited (MvOWL) (hereafter 'the Applicant') to provide complete coverage of the MHPGC Project PEIR Red Line Boundary between KP21 and KP0.

2.4.1.3 For the purposes of this archaeological assessment, the 2023 MHPGC export cable route option surface data was superseded by the 2024 data, both in terms of resolution and coverage of the MHPGC Project PEIR Red Line Boundary. Thus, whilst the results may be referenced in a wider context, they do not form part of the primary data source for the surface archaeological assessment within the MHPGC PEIR Red Line Boundary. However, the 2023 sub-surface data has informed the assessment of the palaeolandscape outside of the MHPGC Project PEIR Red Line Boundary. The extents of the 2023 sub-surface data are shown in **Figure 2.2.**

2.4.1.4 The 2022 Morven North and Morven South project data, the 2023 MHPGC export cable route option sub-surface data, the 2023 data purchased by the Applicant, and the 2024 MHPGC Project-specific survey data are collectively referred to within this MATR (along with data accumulated by a walk-over survey at landfall; see below, **Paragraph 2.4.1.8**) as the 'site-specific survey data'. The extents of the geophysical and hydrographic site-specific survey data are illustrated by **Figure 2.2**. This was subject to archaeological assessment in relation to surface anomalies, magnetic anomalies and the palaeolandscape.

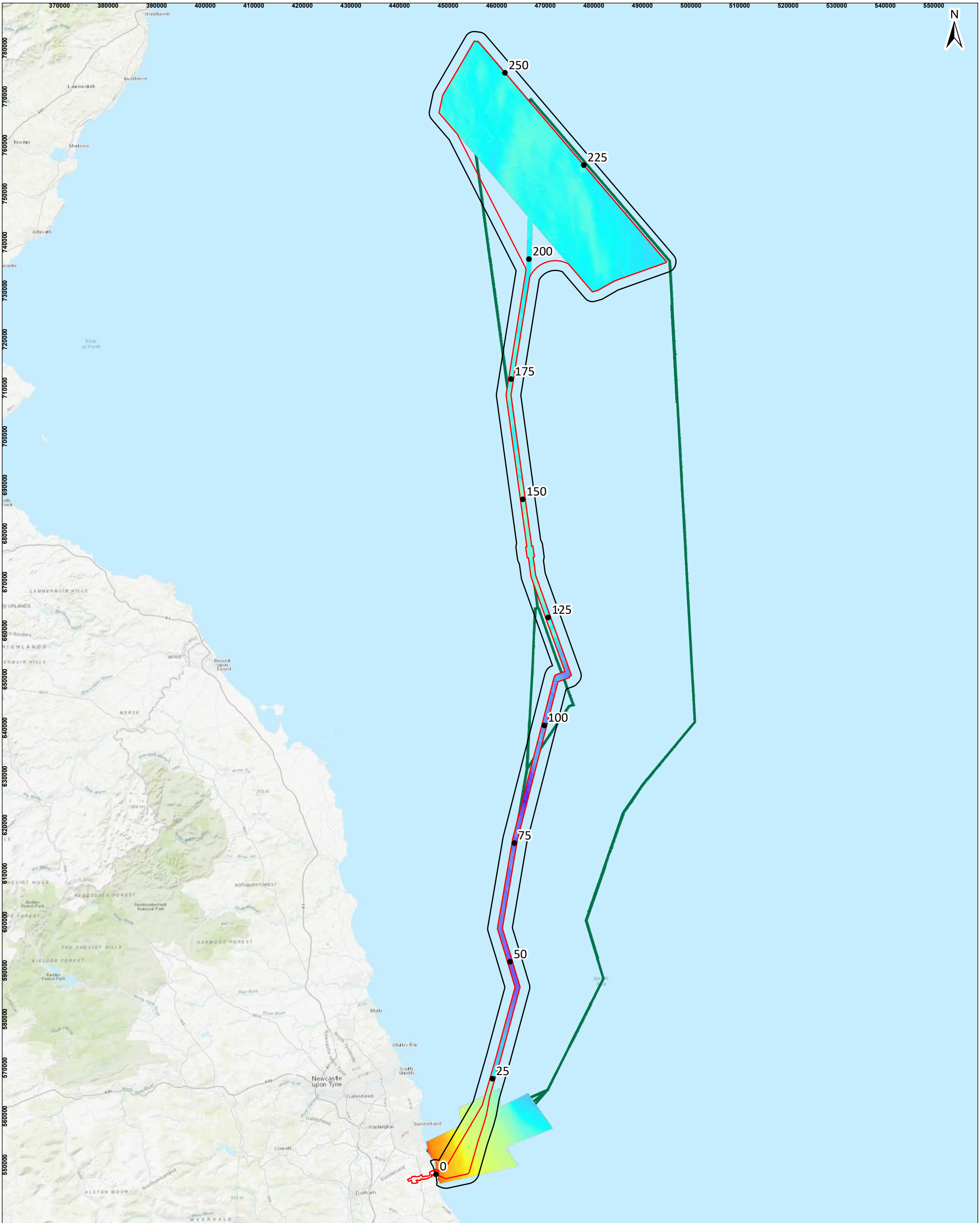
2.4.1.5 Within the MHPGC Project PEIR Red Line Boundary, to the southwest of Morven North and Morven South (KP197 to KP208), data collection is confined to a 500m corridor. Data was not collected to the east and the west of the corridor, as such these areas have not been subject to archaeological assessment outside of desk-based sources (see **Figure 2.2**). Should the final route deviate outside of the 500m corridor, but within the MHPGC Project PEIR Red Line Boundary, further data collection will be undertaken and subject to archaeological assessment.

2.4.1.6 Primary geotechnical investigation was undertaken by the Applicant within the area of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, comprising Cone Penetration Tests (CPTs) in 2022 and boreholes in 2023. Primary geotechnical investigation of the MHPGC Project PEIR Red Line Boundary, outside of the section that overlaps with Morven North and Morven South, was undertaken by XOCEAN in 2023, comprising CPTs only.

2.4.1.7 This baseline assessment has reviewed the interpretation and results reports of the aforementioned surveys, combining and refining the preliminary geophysical results. Reports reviewed for the assessment include:

- Gardline ltd, 2022. Project Morven Integrated Site Survey. Report for bp Alternative Energy Investments Limited. Ref: 11779;
- Hough, G. 2023. Technical File Note Preliminary Ground Model Morven Windfarm Development Central North Sea. JV EnBW/bp, Document No.: MV_5000080_01-00;
- Norwegian Geotechnical Institute (NGI) 2024, Morven Offshore Wind Farm: Evaluation of Export Cable Routes. DOC.NO. 20230203-17-R;
- XOCEAN ltd. 2025, 01139-BPX-SCO-WIND: Morven GC-1 Export Cable Route Geophysical Survey 2024-2025 Survey Results Report;
- XOCEAN ltd 2023, 00741-BPX-SCO-WIND Morven Cable Route Survey Results Report.

2.4.1.8 Further primary data was acquired through a walkover survey of the intertidal zone at the Landfall at Blast Beach, County Durham, on 16 July 2026. The purpose of the walkover was to ground truth any existing heritage records situated therein and identify any new sites, deposits or artefacts of archaeological interest. The results of this survey are presented in **Section 4.5.10**, and the survey area is shown on **Figure 2.1**.



Morven Offshore Wind Farm

MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0002

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Data Sources:
BP, Ordnance Survey,

Drawing Title:
FIGURE 9.1: MULTIBEAM BATHYMETRY COVERAGE

Service Layer Credits:
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA

0 10 20 30 km

Scale@A3:1:700,000

VER	DATE	DETAILS	BY	CHECK
00	01/09/2026	Initial Issue	MJ	FLP
01	01/09/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- Kilometer Points (KP)
- 2023 MHPGC export cable route option data extents

Multibeam Bathymetry
Depth (m) LAT
1.9
-80.0



250
225
200
175
150
125
100
75
50
25
0
N

Morven Offshore Wind Farm
MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0003

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Data Sources:
BP, Ordnance Survey,

Drawing Title:
FIGURE 2.3: SIDESCAN SONAR COVERAGE

Service Layer Credits:
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS

0 10 20 30 km
Scale@A3:1:700,000

VER	DATE	DETAILS	BY	CHECK
00	17/08/2026	Initial Issue	MJ	FLP
01	17/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Sidescan Sonar
Value
255
0

2.5 Chronology

2.5.1.1 Three chronological systems are used when discussing archaeological remains or periods. These are as follows:

- Absolute dates: These are fixed dates that correspond with calendar years and are suffixed with BC (Before Christ) or AD (Anno Domini). For example, a date of 641 BC occurred 2,667 years ago and a date of 1066 AD occurred 960 years ago (correct as of 2026);
- Calibrated radiocarbon dates: these can either be presented as calendar dates or as the number of years before 1st January 1950 (before practical radiocarbon dating technology was available and before large-scale nuclear testing altered the global ratio of 14C to 12C, making dating subsequent to this date unreliable). For example, a date of 11,700 Before Present (BP) occurred 11,776 years ago (correct as of 2026) and could also be presented as 9,750 BC, noting that there is no 'year zero', so 1 is subtracted from each date;
- Uncalibrated radiocarbon dates: these are dates that are based on the radiocarbon dating that do not take fluctuations in 14C levels into account. These dates can be calibrated using a calibration curve to convert them into calendar dates.

2.5.1.2 This assessment will use both BP and BC dates. For events or sites that pre-date the Mesolithic (10,000 BP/8,000 BC), dates are usually given in BP. From the Mesolithic onwards dates are generally given in BC. In some cases, dates after the Mesolithic are provided in BP where environmental features and events are discussed, such as the development of the current coastlines of the UK in approximately 6,000 BP.

2.5.2 Archaeological periods and Quaternary chronology

2.5.2.1 The main archaeological periods discussed in England and Scotland are listed in **Table 2.1** and are derived primarily from Historic England's interpretation of prehistoric and historic periods (2026c) and Historic Environment Scotland's Scottish Archaeological Periods & Ages (2026b).

2.5.2.2 The Quaternary chronology of the UK is outlined in **Table 2.2**, based on Historic England guidelines (2025b) and with dates from Lisecki and Raymo (2005). Marine Isotope Stages (MIS) are alternating warm and cold periods derived from oxygen isotope data taken from deep sea core samples.

Table 2.1: Archaeological periods in England

Broad period	Sub period	Dates (Scotland)	Dates (England)
Palaeolithic	Lower	790,000 BP to 300,000 BP	*Circa (c.)* 970,000 BP to 150,000 BP
	Middle	300,000 BP to 45,000 BP	150,000 BP to 40,000 BP
	Upper	45,000 BP to 12,000 BP	40,000 to 12,000 BP
Mesolithic	Early	10,000 BC to 7,000 BC[3]	10,000 BC to 7,000 BC
	Late	7,000 BC to 4,000 BC	7,000 BC to 4,000 BC
Neolithic	Early	4,300 BC to 3,500 BC	4,000 BC to 3,300 BC
	Middle	3,500 BC to 2,900 BC	3,300 BC to 2,900 BC
	Late	3,000 BC to 2,500 BC	2,900 BC to 2,200 BC
Chalcolithic		2,500 BC to 2,200 BC	-
Bronze Age	Early	2,200 BC to 1,500 BC	2,600 BC to 700 BC
	Middle	1,500 BC to 1,100 BC	
	Late	1,100 BC to 800 BC	

[3] From the Mesolithic, BC is the standard date format.

Broad period	Sub period	Dates (Scotland)	Dates (England)
Iron Age	Early	800 BC to 300 BC	800 BC to 43 AD
	Middle	300 BC to 300 AD	
	Late	300 AD to 500 AD	
	Long[4]	800 BC to 800 AD	
Roman		77 AD to 211 AD[5]	43 AD to 410 AD
Early Medieval		400 AD to 1093 AD	410 AD to 1066 AD
Medieval		1093 AD to 1603 AD	1066 AD to 1540 AD
Post Medieval		1603 AD to 1900 AD	1540 AD to 1901 AD
Modern		1901 AD to Present	1901 AD to Present

[4] Interpretations of the date range of Scotland's Iron Age vary by individual researchers, with some arguing this continued up to the arrival of the Norse in the late 8th Century AD (Scottish Archaeological Research Framework (ScARF), 2012a).

[5] There is no separate Roman period in Scotland as it was never completely conquered and military incursion/temporary settlement is generally discussed as part of the Iron Age. ScARF provide these dates as a guide to the principal period of Roman activity within Scotland (ScARF 2012b).

Table 2.2: Quaternary chronology

Stage		Age		Climate	Marine Isotope Stage		Epochs and Periods		
Main	Sub.	Start	End		Stages	Record			
Beestonian		970,000	936,000	Interglacial	25		Pleistocene	Early Pleisto.	Lower Palaeolithic
		936,000	917,000		24				
		917,000	900,000	Interglacial	23				
		900,000	866,000	Stadial	22				
		866,000	814,000	Sequence poorly understood but evidence for a series of small expansions of the British Ice Sheet marking at least 4 interstadials and 5 warm episodes.	21				
		814,000	790,000		20				
Bruhnes-Matuyama reversal (c. 780kBP)		790,000	761,000		19			Middle Pleistocene	
Cromerian Complex		761,000	712,000		18				
		712,000	676,000		17				
		676,000	621,000		16				
		621,000	563,000		15				
		563,000	524,000		14				
		524,000	478,000		13				
Anglian		478,000	424,000	Stadial	12				
Hoxnian		424,000	374,000	Interglacial	11				
Wolstonian/ Saalian complex	Unnamed	374,000	337,000	Stadial?	10				Middle Palaeolithic
	Purfleet	337,000	300,000	Interglacial	9				
	Early	300,000	243,000	Stadial?	8				
	Aveley	243,000	191,000	Interglacial	7				
	Late	191,000	123,000	Stadial	6				
Ipswichian		123,000	109,000	Interglacial	5e				
Devensian		109,000	96,000	Stadial	5d			Late Pleistocene	
	Early	Chelford	96,000	87,000	Interstadial	5c			
		87,000	82,000	Stadial	5b				
		Brimpton	82,000	71,000	Interstadial	5a			
		71,000	57,000	Stadial	4				
	Mid	Upton Warren	57,000	29,000	Interstadial	3			
	Late	Dimlington	29,000	14,700	Stadial	2			Upper Pal
		Windemere	14,700	12,900	Interstadial				
		Loch Lomond	12,900	11,700	Stadial				
Holocene		11,700	Present	Interglacial	1		Holocene		Meso.

3 Methodology: archaeological assessment of geophysical and hydrographic data

3.1 Overview

3.1.1.1 An overview of site-specific surveys and the acquisition timeline is presented in **Section 2.4**. This section presents the methodology for archaeological assessment of the data.

3.2 Data collection

3.2.1 2022 MHPGC Project PEIR Red Line Boundary survey for the part which overlaps with Morven North and Morven South

3.2.1.1 The survey was conducted by Gardline between April and August 2022 (Gardline, 2022). The survey consisted of Multibeam Echo Sounder (MBES), Sidescan Sonar (SSS), magnetometer, parametric Sub-bottom Profiler (SBP), and 2 Dimensional Ultra High-Resolution Seismic (2D UHRS). In addition, the survey campaign included the collection of environmental data, and Passive Acoustic Monitoring (PAM) (Gardline Ltd, 2022; Hough, 2023).

3.2.1.2 The SSS and magnetometer were towed behind the vessel, along with a towed sparker and hydrophone array (2D UHRS). The MBES and SBP were mounted to the vessel. Survey operations were conducted from MV *Geograph*, a dedicated survey vessel of 70m.

3.2.1.3 Survey operations were undertaken within a pre-defined boundary which was that of the Morven Array Project Scoping Boundary, which corresponds with the MHPGC Project PEIR Red Line Boundary where it overlaps with Morven North and Morven South (KP258.8 to KP208).

3.2.1.4 The survey was planned with a line spacing of 300m for the main lines (northwest-southeast) and 600m for the cross lines (northeast-southwest). The line spacing was suitable for the bathymetry data to achieve 100% coverage (including sufficient overlap) of the seabed. The line planning meant that approximately 75% seabed coverage of SSS data was achieved.

3.2.1.5 In addition, SBP, 2D UHRS and magnetometer data was collected along each of the survey lines.

3.2.1.6 Sensor specifications are presented in **Table 3.1**.

Table 3.1: 2022 Geophysical and hydrographic sensor specifications

Sensor	Manufacturer	Model	Frequency
SSS	EdgeTech	4200 FS	100/400 kilohertz (kHz)
MBES	Kongsberg	EM2040D	200 to 400kHz
Magnetometer	Geometrics	G-882	10 hertz (Hz) update rate
Parametric SBP	Innomar	SES-2000	5.7kHz
2D UHRS	Applied Acoustics	Dura Spark UHD	750 joules (j)

3.2.1.7 The data was collected to a specification appropriate to achieve the following interpretation requirements:

- SSS: ensonification of anomalies >0.5m;
- MBES: ensonification of anomalies >2.0m;
- Magnetometer: 5.0 nanotesla (nT) threshold for anomaly picking;
- Parametric SBP: variable penetration, layer resolution up to 20cm;
- 2D UHRS: penetration of +80m was achieved.

3.2.2 2023 MHPGC offshore export cable route options surveys

3.2.2.1 The surveys were conducted by XOCEAN Ltd. between January 2023 and June 2023 (XOCEAN, 2023), and Gardline Ltd. In June 2023. The survey consisted of SSS, MBES, magnetometer and

parametric SBP. As noted (**Section 2.4**) , the 2023 MHPGC export cable route option surface data was superseded by the 2024 MHPGC Project PEIR Red Line Boundary survey data, both in terms of resolution and coverage of the MHPGC Project PEIR Red Line Boundary. However, the 2023 sub-surface data collected by XOCEAN Ltd has informed the assessment of the palaeolandscape outside of the MHPGC Project PEIR Red Line Boundary and these specifications are presented below.

3.2.2.2 Data was collected using a fleet of Uncrewed Surface Vessels (USVs). The MBES and SBP were mounted to the vessels.

3.2.2.3 Survey operations were undertaken within a pre-defined boundary, which correspond with offshore export cable route options and landfall options illustrated in **Figure 2.2**.

3.2.2.4 The survey was planned with MBES data collected at 50m line spacing, one central line with four lines either side, and SBP data collected along the central line and two lines either side.

3.2.2.5 The line spacing ensured 100% coverage of MBES data of 500m corridors (with a minimum of 10% overlap) and SBP data at 100m line spacing within the surveyed areas.

3.2.2.6 Sensor specifications are presented in **Table 3.3**.

Table 3.2: 2023 Geophysical and hydrographic sensor specifications

Sensor	Manufacturer	Model	Frequency
MBES	Norbit	B51s	400kHz
Parametric SBP	Innomar	SES-2000 Medium 100	8kHz

3.2.2.7 The data was collected to a specification appropriate to achieve the following interpretation requirements:

- MBES: ensonification of anomalies >1.0m;
- Parametric SBP: variable penetration, layer resolution up to 20cm.

3.2.3 2024 MHPGC Project PEIR Red Line Boundary survey (outside of the part that overlaps with Morven North and Morven South)

3.2.3.1 The surveys were conducted by XOCEAN Ltd. between July 2024 and March 2025 (XOCEAN, 2025). The survey consisted of SSS, MBES, magnetometer and parametric SBP.

3.2.3.2 Data was collected using a fleet of USVs. The SSS and magnetometer were towed behind the vessels, while the MBES and SBP were mounted to the vessels.

3.2.3.3 Survey operations were undertaken within a pre-defined boundary, which corresponds with the offshore extent of the MHPGC Project PEIR Red Line Boundary from KP208 to KP0 (excluding the part which overlaps with Morven North and Morven South).

3.2.3.4 The survey was planned in two phases, the first being MBES and SBP collected at 50m line spacing and the second being SSS and magnetometer collected at 150m line spacing. In two of the shallowest areas, the line spacing was reduced to 30m.

3.2.3.5 The line spacing ensured 100% coverage of MBES data (with a minimum of 10% overlap) and 100% coverage of SSS (excluding the nadir) of a 500m corridor within the surveyed area.

3.2.3.6 Sensor specifications are presented in **Table 3.3**.

Table 3.3: 2024 Geophysical and hydrographic sensor specifications

Sensor	Manufacturer	Model	Frequency
SSS	Klein	4K-SVY	300/600kHz
MBES	Norbit Norbit R2Sonic	B51s I77 2024	400kHz 400kHz 400kHz

Sensor	Manufacturer	Model	Frequency
Magnetometer	Marine Magnetics	Synapse	10Hz
Parametric SBP	Innomar	SES-2000 Medium 100	8kHz

3.2.3.7 The data was collected to a specification appropriate to achieve the following interpretation requirements:

- SSS: ensonification of anomalies >0.5m;
- MBES: ensonification of anomalies >1.0m;
- Magnetometer: 5.0nT threshold for anomaly picking;
- Parametric SBP: variable penetration, layer resolution up to 20cm.

3.3 Positioning

3.3.1.1 All data was collected with reference to the European Datum 1950 (ED50) datum and Universal Transverse Mercator (UTM) Zone 30 North projection (ED50 Z30N) (EPSG 23030). All vertical depths are relative to lowest astronomical tide (LAT) and were reduced to LAT using Vertical Offshore Reference Frames (VORF).

3.3.1.2 Towed sensors were positioned using an Ultra Short Baseline (USBL) positioning system to ensure positional accuracy throughout the survey. USBL ensures the actual position of the sensor is recorded, as opposed to when the position is estimated based upon the direction of the vessel and the amount of cable out (layback). Although the accuracy of the USBL system is dependent on the angle, and the distance of the beacon from the transceiver, tolerances of between 0.5m and 2.0m can be achieved. Positional accuracy is further increased through the correlation of the SSS dataset with the MBES dataset.

3.3.1.3 Surface and sub-sea position sensors specifications are detailed in **Table 3.4**, **Table 3.5** and **Table 3.6**.

Table 3.4: 2022 Position sensor specifications

Sensor	Manufacturer	Model	Accuracy
Surface positioning	Kongsberg	Seapath 380-5+ MRU5+	Roll/pitch 0.015° Heading 0.03° Position 0.02m
Sub-sea positioning	Kongsberg	HiPAP 501	1% slant range

Table 3.5: 2023 Position sensor specifications

Sensor	Manufacturer	Model	Accuracy
Surface positioning	Kongsberg	Seapath 380-5+ MRU5+	Roll/pitch 0.015° Heading 0.03° Position 0.02m

Table 3.6: 2024 Position sensor specifications

Sensor	Manufacturer	Model	Accuracy
Surface positioning	SBG	Navsight	Roll/pitch 0.01° Heading 0.1° Position 0.01m
Sub-sea positioning	Kongsberg	µPAP 201-3	0.46% slant range

3.4 Data deliverables to MSDS Marine

3.4.1.1 MSDS Marine were provided with the survey deliverables, including both raw and processed data, alongside interpretations and operations reports. The primary deliverables are detailed in **Table 3.7**.

Table 3.7: Data deliverables to MSDS Marine

Sensor	Manufacturer	Model
SSS (2022 and 2024)	Raw lines (low frequency (LF) and high frequency (HF))	.xtf
	Processed lines (HF)	.xtf
	Mosaic (HF) 0.1pixels per meter (ppm)	.tif
	Contacts	.shp
2D UHRS (2022) and SBP (2022, 2023 and 2024)	Raw lines (2022, 2023 and 2024 data)	.sgy
	Processed lines (2022, 2023 and 2024 data)	.sgy
	Isopach	.shp
	Horizons (2022, 2023 data)	.grd; .xyz; .dat
Magnetometer (2022 and 2024)	Raw lines	.csv
	Grids	.tif
	Contacts	.csv
MBES (2022, 2023 and 2024)	Raw lines	.xyz
	Grids (at 1.0m)	.xyz
	Mosaic (at 1.0m)	.tiff
Geographical Information System (GIS) (2022 and 2024)	Geodatabase	.gdb
Reports (2022 and 2024)	Interpretation report	.pdf
	Operations report	.pdf
	Mobilisation report	.pdf

3.5 Data quality and limitations

3.5.1 Sidescan Sonar

MHPGC Project PEIR Red Line Boundary where it overlaps with Morven North and Morven South

3.5.1.1 The SSS data covered the extents of the MHPGC Project PEIR Red Line Boundary where it overlaps with Morven North and Morven South (KP258.8 to KP208), providing coverage of approximately 75% (excluding the nadir). The data was generally of good quality, with minimal interference or data degradation caused by environmental factors or the simultaneous use of different sensors. Some data degradation due to motion was noted in places, likely a result of poor weather, however, this was not significant and does not affect the overall quality of the data and the suitability for archaeological interpretation. It should be noted that large shoals of fish were visible in some lines; with coverage only being 75%, there is the potential for these to mask features of potential archaeological interest. This is mitigated partly through the simultaneous review of MBES data.

3.5.1.2 Some small horizontal offsets were noted in places between the SSS and MBES data, although these were not significant and were within what would be considered normal tolerances. The positions of medium and high potential (and a number of low potential) anomalies were taken from the MBES data to ensure positional accuracy. The data quality overall was considered sufficient to undertake an archaeological assessment at this phase of the project.

MHPGC Project PEIR Red Line Boundary (excluding the part that overlaps with Morven North and Morven South)

3.5.1.3 With the exception of the area between KP21 and KP0, the SSS data covered the extents of the MHPGC Project PEIR Red Line Boundary where it does not overlap with Morven North and Morven South, providing coverage of approximately 100% (excluding the nadir).

3.5.1.4 Within the MHPGC Project PEIR Red Line Boundary, to the southwest of Morven North and Morven South (KP197 to KP208), data collection is confined to a 500m corridor. Data was not collected to the east and the west of the corridor, as such these areas have not been subject to archaeological assessment outside of desk-based sources (see **Figure 2.2**). This presents a limitation, however, should the final route deviate outside of the 500m corridor, but within the MHPGC Project PEIR Red Line Boundary, further data collection will be undertaken and subject to archaeological assessment.

3.5.1.5 The data was considered sufficient to undertake an archaeological assessment, with some interference or data degradation caused by environmental factors or the simultaneous use of different sensors. Distortion was visible in some areas and most notable with the imaging of large features, such as wrecks. The presence of fish and floating debris (potentially) obscured some areas of the seabed, however, the coverage of 100% SSS data and 100% MBES data largely mitigated this.

3.5.1.6 Some small horizontal offsets were noted in places between the SSS and MBES data, although these were not significant and were within normal tolerances. The positions of medium and high potential (and a large number of low potential) anomalies were taken from the MBES data to ensure positional accuracy.

3.5.2 Multibeam Bathymetry

3.5.2.1 The MBES data covered the extents of the MHPGC Project PEIR Red Line Boundary, with the exception of those parts to the southwest of Morven North and South as outlined above (**Paragraph 3.5.1.4**), providing coverage of 100%.

3.5.2.2 A review of the un-gridded point cloud data shows that the quality is good with no significant height or positioning errors that effect the overall dataset. The data, particularly within the purchased 2023 data (KP0 to KP21), is affected by uncorrected motion, which can impact the ability to identify small features and has resulted in small data gaps. The data density is generally good and the data can be gridded to 1.0m, increasing the ability to identify smaller features. Features identified within the MBES data generally correlate well with those identified in the SSS data.

3.5.2.3 MBES data is considered to provide the most accurate positioning due to the direct and fixed correlation between the sensor, the Differential Global Positioning System (DGPS) antennas and the Motion Reference Unit (MRU). The MBES dataset is the primary source of anomaly positioning. The data quality overall was considered sufficient to undertake an archaeological assessment at this phase of the project

3.5.3 Magnetometer

3.5.3.1 The magnetometer data covered the extents of the MHPGC Project PEIR Red Line Boundary, with the exception of those parts to the southwest of Morven North and South as outlined above (**Paragraph 3.5.1.4**), and was collected along the pre-defined survey line plan of up to 150m within the MHPGC Project Red Line Boundary, extending to within 300m within the MHPGC Project PEIR Red Line Boundary where it overlaps with Morven North and Morven South.

3.5.3.2 The data was sampled at 10Hz and were suitable to identify anomalies with a peak-to-peak amplitude of 5.0nT. It should be noted that 150m and 300m line spacing is too great for the accurate positioning of magnetic anomalies at distances away from the tracklines but can indicate areas of archaeological potential or can be correlated with visible feature on the seabed that lie on the same plane. Due to the line spacing, it is likely that buried ferrous material, particularly smaller objects, between the run lines will not have been identified within the data. However, the data was considered sufficient to undertake an archaeological assessment at this phase of the project.

3.5.4 Sub-bottom Profiler

MHPGC Project PEIR Red Line Boundary where it overlaps with Morven North and Morven South

3.5.4.1 2D UHRS and SBP data was collected within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South in 2022 (Gardline Ltd, 2022; Hough, 2023).

3.5.4.2 The 2D UHRS data aimed to achieve penetration down to 80m below seabed (BSB), extending to within the bedrock. This was sufficient to image the full Quaternary sequence across most of the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South boundaries, though interpretations within the bedrock were hampered by the seabed multiple which occurred at *c.* 70m BSB (Hough, 2023). The SBP data achieved much shallower penetration, to depths of 1.5m to 2.5m BSB, though increasing to *c.* 10m BSB where high amplitude features (e.g., channels) were present (Hough, 2023).

3.5.4.3 The SBP and 2D UHRS data was used together to interpret Quaternary sediments. Together, the data collected achieved sufficient penetration to identify sediments present within the area of impacts and with a sufficient buffer below these. The focus within the assessment set out within this MATR is on deposits within the upper 5m, owing to the expected depth range of cable related impacts. However, lower formations are also referred to.

3.5.4.4 Some data limitations exist, the sediment sound velocity has been assumed at 1600m/s and the interpreted surfaces have not yet been calibrated using available CPT data. Nevertheless, the data and wider geological sources are sufficient to characterise the baseline geological conditions within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South boundaries and associated archaeological and palaeolandscape potential. Where geological formations are expected, but not Boundary mapped in detail, they are included to provide a full indication of potential.

MHPGC Project PEIR Red Line Boundary (where it does not overlap with Morven North and Morven South)

3.5.4.5 SBP data was collected using an Innomar Medium SES2000, along the MHPGC Project PEIR Red Line Boundary where it does not overlap with Morven North and Morven South (2024) and along offshore export cable route options illustrated in Figure 2.2 (2023). The 2023 data cover three separate route options (formerly known as A, B and C; **Figure 2.2**), while the 2024 data largely cover the MHPGC Project PEIR Red Line Boundary. The central route within the 2023 survey is approximately equivalent to the MHPGC Project PEIR Red Line Boundary, except for a deviation in Scottish waters where the central route leads westward of the MHPGC Project PEIR Red Line Boundary. There is also a kink in the MHPGC Project PEIR Red Line Boundary, between KP136 and KP96 (which occurs *c.* 70km east of Berwick upon Tweed) for which there is no data. Additionally, there is currently no data within parts of the MHPGC Project PEIR Red Line Boundary to the southwest of Morven North and Morven South (KP197 to KP208) as outlined above (**Paragraph 3.5.1.4**).

3.5.4.6 The 2023 data was collected to investigate the top 5m of the seabed, with a vertical resolution of 0.2m. The data was provided to MSDS Marine as interpreted horizons (.grd, .dat and .xyz files) and processed .sgy files, showing both depth BSB and two-way time travel to the base of a series of seismic horizons interpreted within the data. The data was discussed by XOCEAN ltd. (2023) and the horizons were interpreted within the NGI (2024) geoscience report, which focused on an integrated geological, geophysical and geotechnical (CPT) characterisation of soil and rock units based on seismic and geotechnical data collected by XOCEAN ltd.

3.5.4.7 The 2023 data was of generally good quality, achieving penetration depths of greater than 5m, though constrained in places by geological conditions (i.e. in areas where hard substrate was present, such as moraine ridges, penetration was more limited). Some motion was noted in the data, relating to weather, and this was corrected in processing. Overall, the data from the survey was good, though the penetration depth is relatively limited, inhibiting the imaging of lower formations. For the

purposes of a cable route assessment, it is considered sufficient to characterise the palaeolandscape within the range of potential impacts.

3.5.4.8 The 2024 data was provided to MSDS Marine as processed but uninterpreted SEGY files. The 2024 SBP data was collected to optimise data in the top 5m of the seabed (XOCEAN Ltd., 2025: 14). Horizons were not interpreted within the data. The accompanying XOCEAN Ltd. report is focused primarily on surface sediments, seabed features, contacts, wrecks and other evidence of anthropogenic activity. The report noted that penetration had been an issue in some areas for the Innomar SBP system and, while most of the MHPGC Project PEIR Red Line Boundary had a penetration of *c.* 5m, in some areas (e.g. in areas of boulder fields) there was little to no penetration.

3.5.4.9 From an archaeological perspective, the data and interpretations present a sound source for understanding the potential for submerged palaeolandscape remains at this stage. Interpretations are related to BGS formations. These correlations primarily focus on the formations found within the northern part of the MHPGC Project PEIR Red Line Boundary (both in Scottish and English waters), presented in the central North Sea ORR (Gatliff *et al.*, 1994). A limitation is that the formations mapped by the BGS in the southernmost part of the MHPGC Project PEIR Red Line Boundary (within the scope of the southern North Sea ORR) are not discussed (Cameron *et al.*, 1992), however, the environments they represent are discussed and, as such, this is a minor limitation. The BGS formations from the northern and southern part of the MHPGC Project PEIR Red Line Boundary are discussed within this technical report.

3.5.5 Summary

3.5.5.1 Geophysical and hydrographic data was collected over three campaigns, the data from which have been subject to archaeological assessment during the production of this technical report. Data was collected in 2022 within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South. The data was collected to support Morven North and Morven South Array Project. The data was subject to archaeological assessment by MSDS Marine in 2023. This data has not been re-assessed; however, the results have been included within this technical report where they fall within the MHPGC Project PEIR Red Line Boundary.

3.5.5.2 MHPGC Project-specific survey data was collected in 2023 as part of offshore export cable route options surveys, of which only the SBP was subject to archaeological assessment due to the 2024 survey data superseding it in terms of coverage of the MHPGC Project PEIR Red Line Boundary and resolution. However, the SBP data collected outside of the MHPGC Project PEIR Red Line Boundary have been used to inform the palaeolandscape assessment.

3.5.5.3 Following route alignment, data was collected in 2024 within the MHPGC Project PEIR Red Line Boundary from KP208 to KP0 where it does not overlap with Morven North and Morven South. The 2024 data covered the full extents of a 500m corridor, with the exception of some nearshore areas between KP21 and KP0. Supplementary MBES data from 2023 were purchased by the MHPGC Project to provide complete coverage of the MHPGC Project PEIR Red Line Boundary between KP21 and KP0.

3.5.5.4 The 2022 Morven North Offshore Wind Array Project and Morven South Offshore Wind Array Project data, the 2023 MHPGC export cable route option sub-surface data, the 2023 data purchased by the Applicant, and the 2024 MHPGC Project-specific survey data are collectively referred to within this Report as the ‘site-specific survey data’.

3.5.5.5 Within the MHPGC Project PEIR Red Line Boundary, to the southwest of Morven North and Morven South (KP197 to KP208), data collection is confined to a 500m corridor. Data was not collected to the east and the west of the corridor, as such these areas have not been subject to archaeological assessment outside of desk-based sources (see **Figure 2.2**). Should the final route deviate outside of the 500m corridor, but within the MHPGC Project PEIR Red Line Boundary, further data collection will be undertaken and subject to archaeological assessment.

3.5.5.6 The site-specific survey data, and the 2023 SBP data, were subject to archaeological assessment in relation to surface anomalies, and the palaeolandscape. The assessment established the presence of material of potential archaeological significance, and recommended mitigation strategies appropriate to their archaeological potential.

3.6 Archaeological assessment of data

3.6.1.1 The archaeological assessment of data was undertaken by a qualified and experienced maritime archaeologist with a background in geophysical and hydrographic data acquisition, processing and interpretation.

3.6.1.2 Following delivery of the site-specific survey data, an initial review was undertaken to gain an understanding of the geological and topographic make-up of the survey area. Within the extent of MHPGC Project PEIR Red Line Boundary, the potential for variations in the seabed are high and can affect the interpretation of anomalies. The assessment considers the full extents of the site-specific surveys within the MHPGC Project PEIR Red Line Boundary (+50m, where data exists), noting that no geophysical or hydrographic data was collected within the approaches to Morven North and Morven South.

3.6.2 Sidescan Sonar

3.6.2.1 SSS is considered the best tool for the identification (ID) of anthropogenic anomalies on the seabed, due to the ability to ensonify small features, and forms the basis of any archaeological assessment of data. SSS data in .xtf format were imported into Moga Seaview 6.6 software, navigation and positioning were checked (corrected where required), and optimal gains were applied to ensure the consistent presentation of data.

3.6.2.2 Data was reviewed on a line-by-line basis and all anomalies of potential anthropogenic origin were identified and recorded. Records include, at a minimum: an image of the anomaly; dimensions; and a description. Whilst typically only images of medium and high potential anomalies are presented with this MATR, images of all anomalies are recorded, as interpretations can change as the data assessment progresses. A rating of archaeological potential was assigned to the anomaly following the criteria outlined in **Table 3.8**.

3.6.2.3 Following assessment of the individual lines, a mosaic was created and a Geotiff exported to allow for the checking of positional accuracy against the MBES data and to identify the extents of any anomalies that may have extended past the limits of individual lines.

3.6.3 Magnetometer

3.6.3.1 Magnetometer data indicates the presence of ferrous, and thus usually anthropogenic, material both on and under the seabed. Where line spacing allows, typically to a specification for the detection of potential unexploded ordnance (UXO), magnetometer data can provide accurate positions of buried ferrous anomalies. The survey line spacing is up to 150/300m, which is too great for the accurate positioning of magnetic anomalies at distances away from the tracklines, but can indicate areas of archaeological potential. Where possible, magnetic anomalies were correlated with anomalies visible on the seabed.

3.6.3.2 Magnetometry data was provided as .csv files and as a gazetteer detailing all anomalies greater than 5.0nT. An assessment was made by MSDS Marine as to the suitability of the gazetteer for archaeological interpretation. Where required, the .csv magnetometer data was imported into Moga Seaview 6.6 software, where the data was smoothed and a baseline identified and removed from the data, to highlight ferrous anomalies whilst considering geological variations in the data.

3.6.3.3 Magnetic anomalies identified within the data had the position, amplitude and dimensions recorded. A rating of archaeological potential was assigned to the anomaly following the criteria outlined in **Table 3.8**. The data was gridded to visually identify areas where the distribution of anomalies may represent a wider feature such a buried but dispersed wreck or modern features, such as buried cable or chain.

3.6.4 Multibeam bathymetry

3.6.4.1 Due to the minimum anomaly detection size of MBES data being larger than that of SSS data, the primary use during archaeological assessment, outside of seabed characterisation, is the corroboration of anomalies identified within other datasets and the visualisation of anomalies that may otherwise be obscured by shadow.

3.6.4.2 Navigation corrected, but unprocessed, MBES data was provided to MSDS Marine as .xyz files. The data was imported into QPS Fledermaus, where it was gridded and exported as a depth-embedded raster. The raster was imported into ArcGIS Pro 3.6 and a hill-shaded surface applied. Shading was adjusted to ensure the optimal presentation of data. The resulting 3-Dimensional image was viewed on a block-by-block basis and all anomalies of potential anthropogenic origin identified and recorded.

3.6.4.3 Records include, at a minimum: an image of the anomaly; dimensions; and a description. A rating of archaeological potential was assigned to the anomaly following the criteria outlined in **Table 3.8**. Where the interpretation of an anomaly was unclear, the data was imported into point cloud visualisation software such as Cloud Compare, to view the un-gridded data. The gridded surface image was exported as a Geotiff to allow further assessment alongside other datasets.

Calculation of mass (kg)

3.6.4.4 The presentation and categorisation of magnetic anomalies by amplitude (nT) provides an effective way to gain a broad understanding of the distribution of ferrous material on, or just below, the seabed. To understand the data more comprehensively, the ferrous mass needs to be calculated, which is based on the amplitude and the distance from the magnetometer. With a line spacing of up to 150/300m, this is not possible to undertake accurately for anomalies that are not visible on the surface or visible on two lines of data, due to the potential distance of an anomaly from the magnetometer ranging from the altitude to the slant range of 50% of the line spacing.

3.6.4.5 Therefore, all calculations of mass are made using the assumption the anomaly lies directly below the magnetometer, with the distance used for the calculation being equal to the recorded altitude of the magnetometer. Furthermore, calculations are made assuming an anomaly ratio of 1:1.

Table 3.8: Assessment criteria for archaeological potential

Potential	Criteria
Low	An anomaly potentially of anthropogenic origin but that is unlikely to be of archaeological significance – Examples may include discarded modern debris such as rope, cable, chain, or fishing gear; small, isolated anomalies with no wider context; or small boulder-like features with associated magnetometer readings.
Medium	An anomaly believed to be of anthropogenic origin but that would require further investigation to establish its archaeological significance – Examples may include larger unidentifiable debris or clusters of debris, unidentifiable structures, or significant magnetic anomalies.
High	An anomaly almost certainly of anthropogenic origin and with a high potential of being of archaeological significance – high potential anomalies tend to be the remains of wrecks, the suspected remains of wrecks, or known structures of archaeological significance.

3.6.5 Palaeolandscape and Sub-bottom Profiler interpretation

3.6.5.1 Whilst the interpretation of the palaeolandscape is based upon the archaeological review of geophysical and hydrographic data, the method of assessment, the assessment criteria and the best practise mitigation strategies differ from those presented in the preceding sections and thus is detailed separately, for clarity.

3.6.5.2 Sub-surface data acquired from seismic and geotechnical surveys is key to understanding the palaeolandscape potential of the MHPGC Project PEIR Red Line Boundary. The data has been collected for the MHPGC Project PEIR Red Line Boundary, reviewed and brought into an assessment which details geological conditions within the MHPGC Project PEIR Red Line Boundary. The interpretations of the data have fed into the ground model (Hough, 2023), which incorporates both geological modelling and engineering conditions, knowledge of which is necessary for development design. Sedimentary units have been identified within the ground model and tentatively correlated with known geological formations in the area based on the available data.

3.6.5.3 From an archaeological perspective, the ground model provides insight into the potential geological formations within the MHPGC Project PEIR Red Line Boundary and their likely depositional environment. This feeds into the assessment of the palaeolandscape through time and

corresponding archaeological potential. Information from the ground model and geological maps derived from the interpretation of sub-surface and current seabed data was assessed alongside existing studies which contribute to the understanding of the palaeolandscape and prehistoric archaeological potential within the MHPGC Project PEIR Red Line Boundary.

3.6.5.4 An archaeological review of the ground model included a review of geophysical survey data reports, select seismic profiles and ground model outputs. These sources were reviewed to establish the suitability of the data for archaeological interpretation and to gain an understanding of the geological make-up of the MHPGC Project PEIR Red Line Boundary, formations present and their palaeoenvironmental and archaeological potential. Information about the wider area has also been used to better contextualise the various environments experienced in the area during the Pleistocene and Holocene.

3.6.5.5 The assessment of submerged prehistoric remains aims to identify periods when the MHPGC Project PEIR Red Line Boundary was dry land and potentially habitable, as well as periods when it was covered by ice or water and thus uninhabitable. It examines the Quaternary sequence within the MHPGC Project PEIR Red Line Boundary, as different geological formations reflect varying environmental conditions and associated archaeological potential. The assessment also reconstructs past environmental conditions (e.g. marine, terrestrial, lacustrine, fluvial, marsh and riverine) across the MHPGC Project PEIR Red Line Boundary and wider North Sea environment during the Quaternary period, which is critical for understanding palaeolandscape development, palaeoenvironmental potential and possible patterns of human activity. Assessing the likelihood of preservation is also key and considers the present geological makeup alongside the impacts of erosion and geological processes linked to successive glaciations and marine transgressions.

3.7 Assessment of significance

3.7.1.1 The UK Marine Policy Statement (Department for Food, Environment and Rural Affairs, 2011) indicates that authorities should take account of the particular nature of the interest in the (heritage) assets and the value they hold for this and future generations.

3.7.1.2 In English waters, the North East Inshore and Offshore Marine Plans and North East Offshore Marine Plan (within which the MHPGC Project PEIR Red Line Boundary lies) conform with the UK Marine Policy Statement (Defra, 2021).

3.7.1.3 The Scottish National Marine Plan conforms with the UK Marine Policy Statement and sets out policies in relation to heritage, in particular GEN 6 Historic environment: “Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance” (Scottish Government, 2015).

3.7.1.4 Both designated and non-designated heritage assets can hold significance. Significance relates to several factors, including, for example, whether the receptor is rare, has protected status or has importance at a local, regional, national or international scale. Designated heritage assets, such as Protected Wreck Sites or Historic Marine Protected Areas (HMPAs), have high value.

3.7.1.5 Non-designated heritage assets comprise assets often of regional or local importance. Whilst they have the potential to contribute to understanding of the past, some have not been considered of the highest value to be formally designated under national policy. Others may remain undesignated due to their nature or location beyond 12nm but may demonstrate the attributes worthy of designation.

3.7.1.6 Non-designated assets are weighed against all available evidence when assessing their significance within the scope of a proposed development, in line with current UK Government policy and relevant industry guidance. Within England and English waters, significance is assessed on the basis of a combination of evidential, historical, aesthetic and communal values (Historic England, 2008), whereas in Scotland and Scottish waters, an asset is examined according to its intrinsic, contextual and associative characteristics (Historic Environment Scotland, 2019b).

4 Baseline characterisation

4.1 Summary of heritage assets

4.1.1.1 This section outlines the current baseline for marine and intertidal archaeology within the Marine and Intertidal Archaeology Study Area. The extent and rationale of the Marine and Intertidal Archaeology Study Area is presented in **Section 2.2**. The baseline assessment is informed by a range of desk-based sources (outlined in **Section 0**) and project-specific survey data (outlined in **Sections 2.4** and **3.2**).

4.1.1.2 A full list of heritage records is presented within **Appendix B** and **Appendix C**. Theses appendices consider duplicate records existing between the various datasets, with duplicate data merged and tabulated with a project-specific MSDS ID.

4.1.2 Designated heritage assets

4.1.2.1 Designated heritage assets comprise sites, structures and areas of significant cultural heritage importance to warrant protection and recognition under national policy. Designated assets comprise:

- Scheduled Monuments (England and Scotland);
- Remains designated under the Protection of Military Remains Act 1986 (England and Scotland);
- Protected Wrecks (England);
- HMPAs (Scotland)
- World Heritage Sites (England and Scotland);
- Registered Battlefields (England and Scotland);
- Listed Buildings (England and Scotland);
- Properties in Care (Scotland);
- Parks and Gardens (England);
- Gardens and Designed Landscapes (Scotland);
- Conservation Areas (England and Scotland).

4.1.2.2 There are seven designated heritage assets within the Marine and Intertidal Archaeology Study Area, comprising:

- Five Grade II Listed Buildings within the intertidal and terrestrial parts of the Marine and Intertidal Archaeology Study Area;
- One wreck designated under the Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2026 within the marine zone of the English waters part of the Marine and Intertidal Archaeology Study Area (the Royal Fleet Auxiliary (RFA) *Creosol*, MSDS ID: W_027);
- Part of the Seaham Conservation Area (extends below MHWS as it encompasses all of Seaham Docks).

4.1.2.3 Of these designated assets, only the wreck of the RFA *Creosol* is within the MHPGC Project PEIR Red Line Boundary. All designated heritage assets within the Marine and Intertidal Archaeology Study Area are illustrated by **Figure 4.1**.

443000 444000 445000 446000 447000 448000 449000 450000 451000 452000

556000 555000 554000 553000 552000 551000 550000 549000 548000 547000 546000 545000 544000 543000

N

North Sea

MEC25_137

OF_001

TI_003

TI_005

TI_001

TI_002

Seaham

Dawdon

Spectrum Business Park

Fox Cover Industrial Estate

Seaham Golf Course

0

TI_004

Hawthorn

Petwell Lane

Holehill Lane

Seaside Lane

Easington Colliery

Horden Burn

Memorial Avenue

Sunderland Road

A182

B1283

B1432

Morven Offshore Wind Farm

MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0004

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Data Sources:
BP, Ordnance Survey

Drawing Title:
FIGURE 4.1: DESIGNATED HERITAGE ASSETS

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS

0 0.5 1 km

Scale@A3:1:38,000

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

VER	DATE	DETAILS	BY	CHECK
00	07/08/2026	Initial Issue	MJ	FLP
01	07/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Designated Heritage Assets

- Conservation Areas
- Listed Buildings
- PMRA 1986



4.1.3 Non-designated heritage asset records

4.1.3.1 Non-designated heritage assets comprise assets often of regional or local importance. Whilst they have the potential to contribute to understanding of the past, they have not been considered of the highest value to be formally designated under national policy, due to one or more factors (see **Section 3.7** for further detail).

4.1.3.2 In total, and accounting for duplicated records, there are 502 non-designated assets within the Marine and Intertidal Archaeology Study Area.

4.1.3.3 There are 65 UKHO records within the Marine and Intertidal Archaeology Study Area for non-designated remains (this total excludes the record for the designated remains of the RFA *Creosol* discussed above):

- 12 in Scottish waters beyond 12nm;
- 41 in English waters within 12nm;
- 12 in English waters beyond 12nm.

4.1.3.4 There are 35 Trove records within the Marine and Intertidal Archaeology Study Area comprising

- 22 wreck records, of which 20 correlate with UKHO records;
  - 13 in Scottish waters beyond 12nm;
  - 9 in English waters beyond 12nm (none within 12nm);
- 13 documented loss records, of which four also correlate with UKHO wreck records[6].

4.1.3.5 There are 379 NMHR non-designated records within the Marine and Intertidal Archaeology Study Area (all within English waters):

- 39 wreck records, of which 38 correlate with UKHO records (total excludes the NMHR record for the designated remains of the RFA *Creosol*):
  - 37 within 12nm;
  - 2 beyond 12nm;
- 138 records of unknown obstructions:
  - 134 within 12nm;
  - 4 beyond 12nm;
- 186 documented loss records;
- 10 documented aircraft loss records;
- Six records for non-wreck/obstruction assets within the offshore and terrestrial zones:
  - A Mesolithic findspot comprising three lithic artefacts;
  - A colliery site;
  - Three sites relating to World War Two defences;
  - Seaham North Dock.

4.1.3.6 There are 168 non-designated Durham HER records within the Marine and Intertidal Archaeology Study Area (all within English waters):

- 10 wreck records, of which eight correlate with UKHO and NMHR records, and all of which are within 12nm (total excludes the HER record for the designated remains of the RFA *Creosol*);
- 34 records for unidentified obstructions, of which 31 correlate with NMHR records;
- 44 documented maritime loss records, of which 33 correlate with NMHR records;
- Two documented aircraft losses;
- 78 non-wreck or obstruction related offshore, intertidal and terrestrial assets ranging in date from the Mesolithic to the Modern periods (six that correspond with NMHR records and excluding three records that correlate with Historic England designated assets and the Seaham Conservation Area). Nine of these records are located below MLWS:
  - Six flint findspot records of Mesolithic date;

[6] Documented losses are records for which there is historical, documentary evidence for a maritime loss. The record has therefore been created from documentary evidence, rather than physical remains (recorded via diver sighting or sonar, for example).

  - Three associated with elements of Seaham Dock and anchorage, including the lighthouse.

4.1.3.7 Archaeological review of the project-specific geophysical and hydrographic data from within the MHPGC Project PEIR Red Line Boundary identified 262 surface anomalies of potential archaeological interest (illustrated by **Figure 4.11**), comprising:

- 215 low potential anomalies:
  - 159 in Scottish waters;
  - 56 in English waters;
- 23 medium potential anomalies:
  - 12 in Scottish waters;
  - 11 in English waters;
- 24 high potential anomalies:
  - Five in Scottish waters;
  - 19 in English waters.

4.1.3.8 Furthermore, a total of 1,170 magnetic anomalies of between 5.0nT and 1,056.0nT, with no definitive correlation with known or visible features or infrastructure (illustrated by **Figure 4.60** and **Figure 4.61**), have also been identified:

- 959 in Scottish waters;
- 211 in English waters.

4.2 Baseline environment: submerged prehistory and palaeolandscapes

4.2.1 Introduction

4.2.1.1 This section examines a wide range of geological and archaeological data to establish the baseline for the known early prehistoric (Palaeolithic and Mesolithic archaeological periods; *c.* 970,000 BP to 4,000 BC; **Table 2.1**: Archaeological periods in England).

4.2.1.2 The geology of the Marine and Intertidal Archaeology Study Area is discussed in two sub-divisions: pre-Quaternary bedrock and Quaternary deposits.

4.2.1.3 Primary data has been acquired for the offshore elements of the MHPGC Project, including geophysical and hydrographic data to inform sub-sea-bed geological interpretation. Reports accumulating and interpreting this information were reviewed for this assessment and are listed in **Section 2.4** of this report.

4.2.1.4 Where relevant, wider literature, comprising BGS geological mapping and published reports and other academic literature, has been introduced to the discussion, where this may allow further refinement of the interpretation of the geophysical and geotechnical data.

4.2.1.5 The principal sources reviewed and assessed in relation to the palaeolandscape review were:

- BGS ORRs whose scope is traversed by the Marine and Intertidal Archaeology Study Area:
  - The geology of the southern North Sea (Cameron *et al.*, 1992) (covering the majority of the MHPGC Project PEIR Red Line Boundary);
  - The geology of the central North Sea (Gatliff *et al.*, 1994) (covers the southernmost *c.* 30km of the MHPGC Project PEIR Red Line Boundary);
- BGS geological maps 1:250,000 series, in particular:
  - BGS, 1985. Marr Bank Sheet 56 N - 02 W Quaternary Geology. British Geological Survey: Southampton (covering the northern part of the MHPGC Project offshore export cable corridor);
  - BGS, 1988. Farne Sheet 55 N - 02 W Quaternary. British Geological Survey: Southampton (covering the central to south MHPGC Project PEIR Red Line Boundary);
  - BGS, 1986. Tyne-Tees Sheet 54 N - 02 W Sea Bed Sediments and Quaternary. British Geological Survey: Southampton (covering the southernmost part of the MHPGC Project PEIR Red Line Boundary to landfall).
- Other published sources, in particular:

– Roberts, D.H. *et al.* (2019). This study covers the wider area around the MHPGC Project PEIR Red Line Boundary, presenting seismic and geotechnical data which aids interpretation of the data laid out within this report.

4.2.2 Geology

Pre-Quaternary bedrock

4.2.2.1 BGS mapping of the bedrock within the Marine and Intertidal Archaeology Study Area can generally be categorised as:

- Chalk-dominated;
- Mudstone, sandstone and gypsum-stone;
- Complex.

4.2.2.2 The Marine and Intertidal Archaeology Study Area in both English and Scottish waters is dominated by broadly north to south aligned bands of Permian mudstone and gypsum-stone, complex Triassic and Cretaceous rocks and the Cretaceous chalk (Chalk Group), summarised below:

English waters only

- Permian rocks (mudstone and gypsum-stone).

English and Scottish waters

- Triassic rocks (siliciclastic or argillaceous rock and sandstone);
- Cromer Knoll Group (siliciclastic and argillaceous rock);
- Chalk Group.

Scottish waters only

- Palaeocene Rocks (mudstone, sandstone and lignite) (just intrudes into the southeastern corner of the Marine and Intertidal Archaeology Study Area around the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South).

4.2.2.3 Faulting is common within the surrounding bedrock, with several faults mapped crossing the Marine and Intertidal Archaeology Study Area.

4.2.2.4 Bedrock was encountered by the SBP within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, though interpretations within the bedrock were hampered by the seabed multiple which occurred at *c.* 70m below seabed level (Hough 2023). Channel bases infilled with Coal Pit Formation Quaternary deposits were observed to cut down into the bedrock within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South in some places, reaching depths of up to 130m.

4.2.2.5 Bedrock outcropping was commonly observed out to *c.* KP11 within the English nearshore, where the overlying Quaternary sequence deposits were less than 5m thick.

Quaternary deposits: overview

4.2.2.6 The Quaternary period of geological history began *c.* 2,588,000 years ago and continues into the present, thus encompassing the known period of hominin existence in the British Isles. Quaternary deposits therefore have the potential to contain evidence of hominin activity and other remains of archaeological interest.

4.2.2.7 The Quaternary geology of the North Sea is complex, having been influenced by a series of stadials, interglacials and interstadials over the past million years (**Table 2.2**). Archaeological potential for a deposit is therefore attained by correlating several factors, principally:

- Environmental conditions;
- Post-depositional processes;
- Hominin presence/activity.

4.2.2.8 Although several deposits are found to continue across the regional divide between the southern and central North Sea, the nomenclature of similar deposits (in both lithology and chronology) changes. This change in nomenclature has arisen from numerous factors, including ice-flow

separation, ice-sheet derivation and limits to interdigitating geological units (Stoker, 2011). Equivalency of geological units is described, where applicable, throughout the discussion of Quaternary deposits and in **Table 4.1** and **Table 4.2**.

Thickness of Quaternary sequence

4.2.2.9 The thickness of Quaternary sediment varies across the MHPGC Project PEIR Red Line Boundary, according to the BGS (Offshore GeoIndex; **Figure 4.**). Within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, the BGS Offshore GeoIndex (2026a) indicates that the Quaternary sequence is between 30m and 50m in thickness. However, assessment of project-specific seismic data within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South (Hough, 2023) has indicated channel systems extending to depths of at least 130m in thickness in some places, indicating localised areas where the Quaternary sequence exceeds that mapped by the BGS.

4.2.2.10 In the southernmost part of the MHPGC Project PEIR Red Line Boundary within English waters, between KP0 and *c.* KP10, the BGS indicate that Quaternary deposits are less than 5m in thickness and in many areas the bedrock outcrops on the seabed. The majority of the MHPGC Project PEIR Red Line Boundary is characterised by deposits of 5m to 50m in thickness, thickening to over 50m in the northeastern part of the MHPGC Project PEIR Red Line Boundary (north of KP221). NGI (2024) also mapped the thickness of the Quaternary sequence within the offshore export cable corridor in areas where bedrock was visible within the data, however, due to the generally shallow penetration depths of the SBP the bedrock was only observed in areas where it occurs at relatively shallow depths.

4.2.2.11 Their interpretation indicates that bedrock outcropping or subcropping the seafloor is common close to the landfall area (NGI, 2024) out to *c.* KP11 (**Figure 4.**). This coincides with BGS indications that bedrock outcrops on the seabed are in this area where Quaternary deposits are less than 5m in thickness. with the area in which the BGS map Quaternary sediments under 5m thick. NGI (2024) also notes that shallow or outcropping bedrock also occurs at other places along the MHPGC Project PEIR Red Line Boundary, in particular around KP113 to KP96 (**Figure 4.** and **Figure 4.8**). Roberts *et al.* (2019) also map major bedrock ridges in this area (**Figure 4.4**).

Quaternary sequence

4.2.2.12 The Quaternary sequence, based on interpretation of seismic and geotechnical data from within the MHPGC Project PEIR Red Line Boundary **Table 4.1** and **Table 4.2**. The layout of the tables differs according to the differences in source data (Hough, 2023; NGI, 2024; Roberts *et al.*, 2019).

370000 380000 390000 400000 410000 420000 430000 440000 450000 460000 470000 480000 490000 500000 510000 520000 530000 540000 550000

780000 770000 760000 750000 740000 730000 720000 710000 700000 690000 680000 670000 660000 650000 640000 630000 620000 610000 600000 590000 580000 570000 560000 550000

N

250
225
200
175
150
125
100
75
50
25
0

Laurencekirk
Brechin
Arbroath
LAMMERMUIR HILLS
MERSE
SCOTLAND
ENGLAND
THE CHEVIOT HILLS
KIELDER FOREST
ROTHBURY FOREST
REDESDALE FOREST
HARWOOD FOREST
ALSTON MOOR
Northumberland National Park
Kielder Forest Park
Newcastle upon Tyne
Gateshead
Washington
Consett
Sunderland
Durham

Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0004
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,
Drawing Title: FIGURE 4.2: QUATERNARY THICKNESS	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA
0 10 20 30 km Scale@A3:1:700,000	
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	

VER	DATE	DETAILS	BY	CHECK
00	07/08/2026	Initial Issue	MJ	FLP
01	07/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

LEGEND

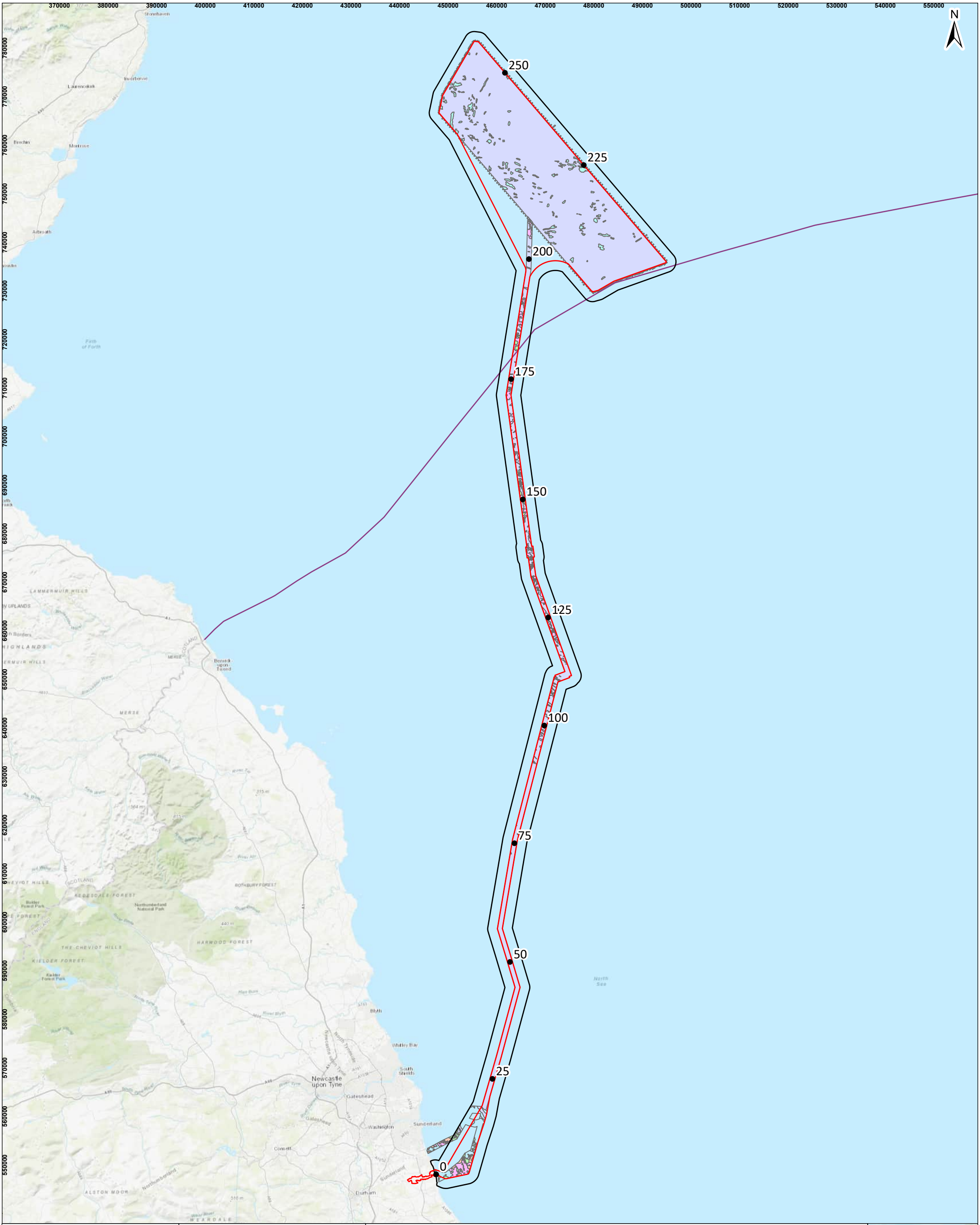
- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Bedrock outcrop
- Bedrock outcrop
- Shallow-bedrock
- Sand waves
- Megaripples

Quaternary Thickness (BGS Offshore GeoIndex)

Category
- < 5m
- 5m - 50m
- > 50m





Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0006				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.3: DISTRIBUTION OF SEABED SEDIMENTS	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA				
0 10 20 30 km Scale@A3:1:700,000	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

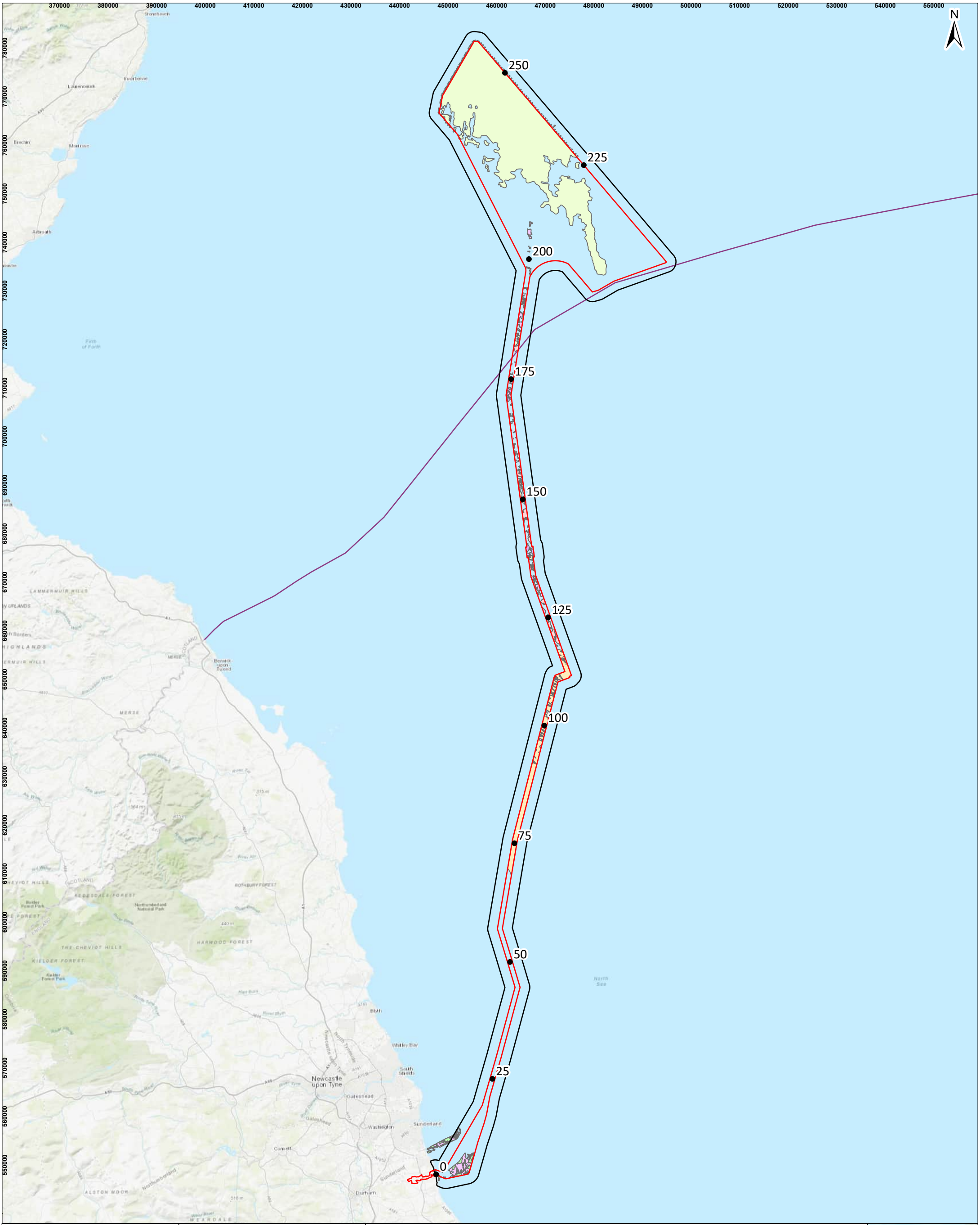
- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Seabed sediments

Sediment type

- Gravel
- Mixed sediment
- Mud to muddy sand
- Rocks and boulders
- Sand
- Shelly sand





Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0007				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.4: SEABED MORPHOLOGY	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA				
0 10 20 30 km Scale@A3:1:700,000	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Seabed morphology

Feature Name

- Boulder fields
- Outcrop
- Megaripples
- Mottled seafloor
- Sand ripples
- Seafloor furrows



Table 4.1: Units identified within the SBP and geotechnical data within the MHPGC Project PEIR Red Line Boundary in English and Scottish waters (excluding the section that overlaps with Morven North and Morven South.

Base horizon	Jurisdictional relevance	Seismic character	Lithology	CPT response (corrected cone tip resistance (qt))	Interpretation (NGI 2024)	Correlation with Roberts *et al.* 2019 facies	Age	MSDS interpretation	Archaeological Potential	Geoarchaeological Potential
Hol 3	England and Scotland	Moderate to low amplitude reflector, with chaotic continuity	Mainly loose to medium dense, gravelly sand with local clay.	Low (0 Megapascal (MPa) to 10MPa)	Marine: Mobile sand. Evidence of sand waves.	Acoustic Facies (AF) 5	Holocene	Marine sediments, potential for redeposited remains	Low	Low
Hol 2	England and Scotland	Low to moderate amplitude reflector, with transparent to semi-continuous character, draping over lower sediments and thicker in depressions.	Loose to medium dense sand, with local clay	Low (0MPa to 10MPa)	Marine: sheet deposits indicative of hemipelagic (offshore) sedimentation				Low	Low
Hol 1	England and Scotland	High to moderate basal reflector, continuous to semi continuous reflections, draping with variable thickness	Loose to medium dense sand, with local clay	Low (0MPa to 15MPa)	Marine: infill depression (high amp)				Low	Low
Fth 3	England and Scotland	Moderate to low amplitude basal reflector, with continuous to semi continuous and transparent reflections. Geometry indicates channel infill with overbank sedimentation	Dense to very dense fine to medium sand	Moderate (5MPa to 25MPa)	Forth Formation: Marine, glacio-marine, fluvio-marine, estuarine	AF4	Devensian potentially to Holocene	Archaeological potential focused in nearshore areas, English waters. Also, potential for redeposited remains.	Low to locally Moderate (within the English nearshore)	Low to locally Moderate (within the English nearshore)
Fth 2	England		Extremely low to low strength slightly sandy clay and clayey sand	Extremely low to low (≤2MPa)					Low to locally Moderate (within the English nearshore)	Low to locally Moderate (within the English nearshore)

Base horizon	Jurisdictional relevance	Seismic character	Lithology	CPT response (corrected cone tip resistance (qt))	Interpretation (NGI 2024)	Correlation with Roberts *et al.* 2019 facies	Age	MSDS interpretation	Archaeological Potential	Geoarchaeological Potential
Fth 1	England	Low to moderate basal reflector with transparent to semi continuous reflections. Geometry indicates channel infill	Dense to very dense sand, possible channel flank slump deposits	Moderate (5MPa to 20MPa)				Potential for redeposited remains.	Low	Low
MB	England	Moderate to low amplitude basal reflector, with semi continuous to transparent internal reflectors, and a prograding geometry	Dense to very dense fine to medium sand often with beds of medium to high strength clay with gravels, cobbles and boulders.	Moderate (5MPa to 25MPa)	Marr Bank: Marine to glaciomarine. Sheet-like outwash deposits	-	Devensian	Low archaeological potential	Low	Low
WB	England	Low amplitude basal reflector with transparent internal reflectors, with a varied geometry indicating sedimentation and local ridges.	Medium dense to very dense, gravelly clay and sand; very heterogenous in grain size; stiff, variably matrix-dominated polymictic till with some interbeds of sand, pebbly sand and silty clay	Moderate (5MPa to 25MPa)	Wee Bankie: Terminal and subglacial till	AF3/AF2		Low archaeological potential	Low	Low

Table 4.2: Units identified within the SBP and geotechnical data within the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South

Unit name	Character and lithology	Age	MSDS interpretation	Archaeological potential	Geoarchaeological potential
Surface Sediment	Surface sands, with thickness ranging from 0m to 10m (thickest in areas where sandwaves are present).	Holocene (Marine Isotope Stage (MIS) 1)	Marine.	Low	Low
Forth Formation	Channel fill deposits, between 10m to 60m deep, up to 3km wide. Irregular basal surface with a high amplitude reflector possibly indicating cobble basal lag deposit. CPT investigations refused at this depth also indicating a hard surface. Shallow braided channels are also present with a different seismic character.	Devensian/Holocene (MIS 1 to 2)	Glacial to marine.	Low	Low
Marr Bank Formation	Sheet like deposit, between 10m to 30m thick, though maximum of 65m and minimum of 0m. Acoustic character ranges from amorphous to parallel bedded indicating glacial outwash, with likely cross bedding of sand bars. The basal reflector is strong and bright indicating a cobble or boulder rich layer. Basal tills (deposited as an unstratified deposit) are present in some areas.	Devensian	Glacial to proglacial outwash plains.	Low	Low
Coal Pit Formation	The formation is present primarily as a channel and infill deposit, up to 130m deep, cutting down to bedrock in places. The channel bases have an irregular erosion surface and a chaotic/structureless fill. High amplitude reflectors in the base may represent shells or pebbles of the lower coal pit (tested in BGS BH 81/37)	MIS 6 to 3	Marine to glaciomarine, with potential for intertidal deposits in the Ipswichian.	Low	Low
Fisher Formation	Acoustic character of the Fisher Formation typically includes parallel sub-horizontal reflectors with small intraformational channels in seismic section. It is thought that this unit is present within the MHPGC Project Peir Red Line Boundary, but not yet fully mapped.	MIS 10 to 6	Sub-glacial to glaciomarine.	Low	Low
Ling Bank Formation	Acoustic character of the Ling Bank typically appears as a complex, stacked, concave-up, commonly irregular, curved seismic reflectors, with evidence of channels and infills that have an amorphous seismic signature. It is thought that this unit is present within the MHPGC Project PEIR Red Line Boundary, but not yet fully mapped.	MIS 12 to 10	Arctic glacial to marine interglacial conditions.	Low	Low
Aberdeen Ground Formation	Wedge shaped deposit. Upper parts of the formation are present within the MHPGC Project PEIR Red Line Boundary (proved at BGS BGH 81/27); however, the unit is not yet fully mapped.	Early to middle Pleistocene (MIS 100 to 13)	Varied (often glacial), but predating earliest evidence of human activity in Scotland.	Low	Low

Quaternary deposits: British Geological Survey offshore mapping

4.2.2.13 Along most of the MHPGC Project PEIR Red Line Boundary in English waters, the Devensian deposits directly overlie pre-Quaternary bedrock, and as such the sequence mapped within the SBP data is representative of the Quaternary sequence as a whole. However, in restricted areas, including within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, deposits pre-dating the Devensian are present. As the effects associated with cable burial and the SBP data collected for the project are focused primarily on the Devensian and later deposits, the early deposits are less of a focus. However, for completeness the earlier deposits are discussed briefly here and in **Section 4.2.5**.

4.2.2.14 In Scottish waters the earlier deposits within the MHPGC Project PEIR Red Line Boundary include the Aberdeen Ground Formation, Coal Pit, Ling Bank and Fisher Formations.

4.2.2.15 In English waters, the subcropping Aberdeen Ground Formation is mapped close to the offshore export cable corridor, though just beyond it (e.g. at 20km east of KP145). The Coal Pit Formation is generally present further offshore, but subcrops the MHPGC Project PEIR Red Line Boundary in English waters between KP140 to KP127. Further south the Devensian and later deposits directly overlie the bedrock (BGS, 1988).

4.2.2.16 In addition to the deposits identified within the project SBP data for MHPGC Project PEIR Red Line Boundary in English waters the Devensian and later deposits mapped by the BGS (Gatliff *et al.* 1994; Cameron *et al.* 1992) include (**Figure 4.5**):

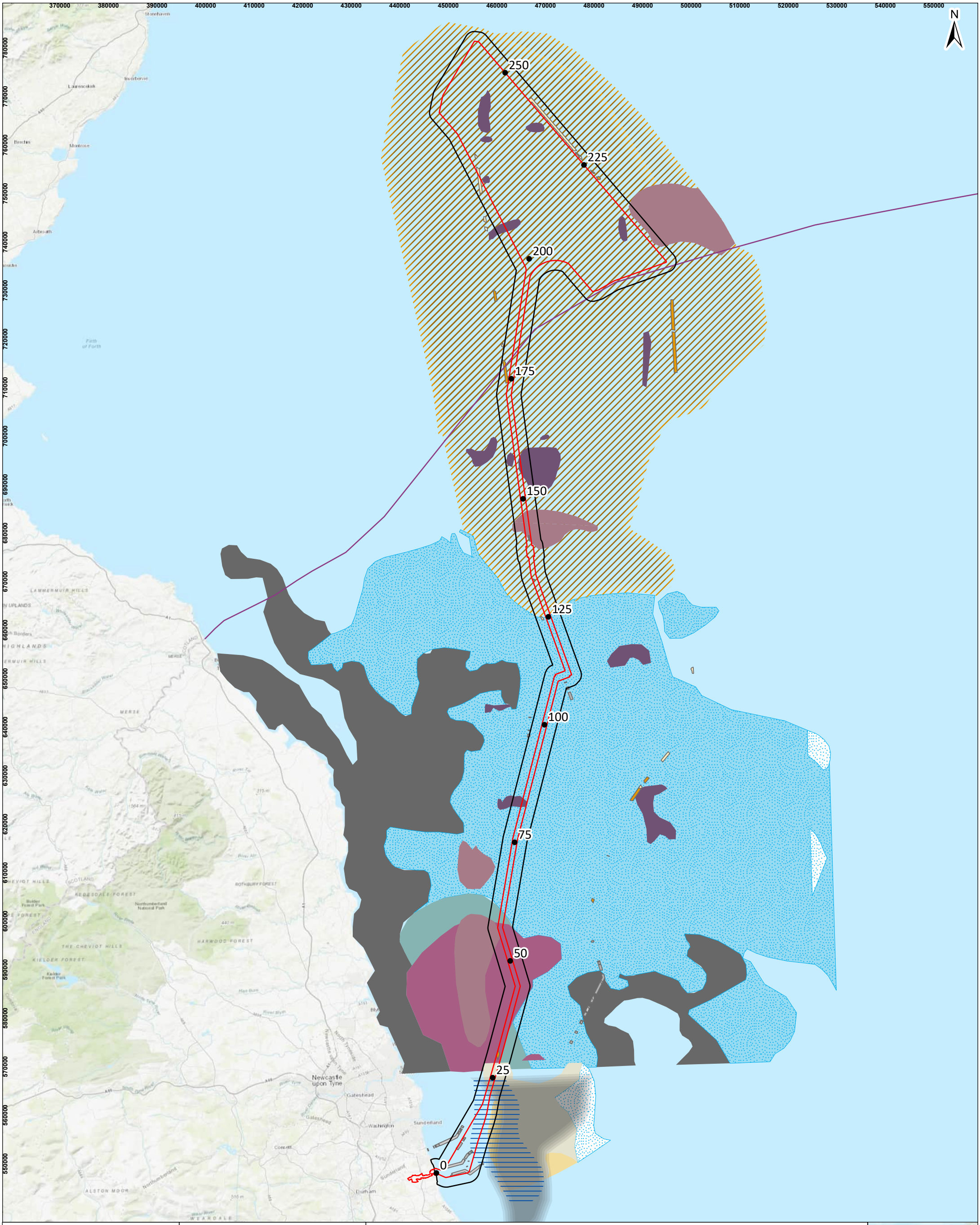
- Wee Bankie Formation;
- Marr Bank Formation;
- Botney Cut Formation;
- Sunderland Ground Formation;
- St Abbs Formation;
- Forth Formation (including and St Andrews Bay Member, Largo Bay Member and undivided deposits);
- Holocene (marine) sediments.

Aberdeen Ground, Ling Bank, Fisher and Coal Pit Formations

4.2.2.17 The depositional environments of each of these formations is summarised in **Table 4.2**. All are considered to have low archaeological potential, and the formations generally predate the earliest known human activity in Scotland, which currently dates to *c.* 14, 000BP (ScARF, 2026) where they have primarily been mapped). Geoarchaeological assessment of twelve boreholes, collected during the 2023 geotechnical campaign, from within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South sampled these formations. The assessment found evidence that most of the deposits related to glacial/proglacial and glacio-marine/marine environments. The assessment concluded that the boreholes and sediments held low geoarchaeological potential and low potential for scientific dating which may have assisted understanding of the chronology of the formations (MSDS Marine, 2025). As such these formations are considered to have low archaeological and geoarchaeological potential. They are not discussed further here.

Wee Bankie and Marr Bank Formations

4.2.2.18 The Devensian (122,000 BP to 10,000 BP, MIS 5-1) glaciation was the last glaciation to affect the UK. During this period the ice edge extended from the coast of Scotland out into the North Sea. The full extents of the ice sheet have been debated; however, many researchers now believe that the Scottish Ice Sheet (SIS) extended eastward into the North Sea and coalesced with Scandinavian ice sheets (Ballantyne and Small, 2019), indicating that the MHPGC Project PEIR Red Line Boundary is likely to have seen sub glacial conditions during the Devensian glacial maximum. Moraines are mapped by the BGS within the MHPGC Project PEIR Red Line Boundary and wider area off the east coast of Scotland to over 100km offshore, demonstrating glacial action in this area. Within the MHPGC Project PEIR Red Line Boundary, the Wee Bankie and Marr Bank Formations provide evidence of this glaciation.



Drawing Number: MHPGC-MSD-MA-0008					
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.5: BRITISH GEOLOGICAL SURVEY FORMATIONS	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA				
0 10 20 30 km Scale@A3:1:700,000	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Bedrock outcrop
- Bedrock outcrop
- Shallow-bedrock
- Sand waves
- Megaripples

BGS formations (Devensian and later)
- Prograded water-lain beds
- Proglacial beds
- Sunderland Ground Formation
- Forth Formation: St Andrews Bay Member
- Forth Formation: Largo Bay Member
- Forth Formation: Undivided
- St Abbs Formation
- Botney Cut
- Bolders Bank
- Marr Bank
- Wee Bankie
- Pre-Quaternary (exposed bedrock)



4.2.2.19 The Wee Bankie Formation consists of gravelly and sandy clay, with a sheet-like geometry that has been interpreted as subglacial till (Merritt *et al.*, 2003). The deposit is formed of a diamicton with some interbedded sand, pebbly sand, and silty clay. The formation is present off the east coast of Scotland (extending to c. 40km offshore) and is thought to represent the eastern extent of the late Devensian glaciation (MIS 2) (Merritt et al. 2003). In the study of Roberts et al. (2019) it was mapped as acoustic facies 3 (AF3) and correlated with many of the geomorphological features discussed in **Section 4.2.3**. Deglaciation in the area of the MHPGC Project PEIR Red Line Boundary is thought to have occurred around 19,900 BP to 19,500 BP around Seaham, with ice retreating northward and deglaciation off Eyemouth in Scottish waters occurring around 16,900 BP (Roberts *et al.* 2019). The distribution and description of the formation as mapped by the BGS and Roberts *et al.* (2019) correlates well with the WB unit mapped by NGI (2024) and with the Wee Bankie Unit mapped within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South (Hough 2023). The formation is subglacial and therefore has no potential to contain *in situ* prehistoric remains.

4.2.2.20 The Marr Bank and Wee Bankie Formations are all thought to represent the late Devensian glaciation including subglacial, supraglacial, glaciomarine, and outwash deposits. Glacial environments such as this are inhospitable, additionally, the UK is thought to have been completely uninhabited during the Dimlington Stadial (*c.* 22,000 BP to 13,000 BP), indicating low archaeological potential. Boreholes collected as part of the 2023 geotechnical campaign within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South were geoarchaeologically assessed (MSDS Marine, 2025). Core MRV-BH23-76A (**Figure 4.6**) included sediments interpreted as the Marr Bank Formation, and the silty sands with mixed lithology gravels encountered were interpreted as likely relating to a proglacial environment, possibly with deposition within a shallow glaciomarine environment. While shell material was present it was highly fragmented, indicating transportation, and was considered unsuitable for establishing the local depositional environment or dating (due to the likelihood of reworked material) (MSDS Marine, 2025). There remains some palaeoenvironmental potential associated with the formation, and should suitable dating material be found, it could indicate dates of exposure and ice edge retreat. However, geoarchaeological assessment for Morven North and Morven South (MSDS Marine, 2025) demonstrates that this potential is somewhat limited.

Forth, Sunderland Ground, St Abbs and Botney Cut Formations

4.2.2.21 NGI (2024) maps the presence of Fth 1, Fth 2 and Fth 3 and Hough (2023) mapped the Forth Formation, overlying the Wee Bankie and Marr Bank Formations. They interpret the units as the Forth Formation. In addition to the Forth Formation, the BGS also map the Sunderland Ground, and St Abbs Formations in the MHPGC Project PEIR Red Line Boundary (excluding that area that overlaps with Morven North and Morven South), with the Botney Cut Formation mapped nearby. These Formations together represent the late to post-glacial and pre-marine transgressional environments of the North Sea. They are all likely to be represented by the Fth 1, Fth 2 and Fth 3 units, though correlation between the distribution of the formations as mapped by the BGS and by the units mapped by NGI is generally weak. This is likely to be in part because the formation extents as mapped by the BGS are based on much sparser data than that collected for the project, and the latter is therefore likely to be a better indication of the distribution of the different units within the MHPGC Project PEIR Red Line Boundary. Nevertheless, the environments that the BGS formations and Fth units incorporate reflect the same kinds of deglaciating environment with glaciomarine, fluvio-marine, estuarine and glaciolacustrine deposits indicated.

4.2.2.22 Roberts *et al.* (2019) also identified their AF4 in the wider area where Fth 1, Fth 2 and Fth 3 are present, identifying AF4 in local depocentres and basins. Roberts *et al.* (2019) correlated AF4 with the Forth, St Abbs and Sunderland Ground Formations, demonstrating a likely correlation between AF4 and the Fth 1, Fth 2 and Fth 3 units. The seismic character of AF4 and position in local basins aligns with the distribution of the Fth units, which occur within depressions and in some cases meltwater channels. AF4 was sampled in all the cores collected by Roberts *et al.* (2019). VC 132 was the closest to the MHPGC Project PEIR Red Line Boundary, collected 6km east of KP85. The vibrocores collected by Roberts *et al.* (2019), provide important data on the Fth units. Fine grained interlaminated sediments, with fluctuations in grain size were found throughout, indicating meltwater plume inputs. Palaeoenvironmental analysis indicated that cold water foraminifera

dominated the assemblages in each of the cores, indicating glaciomarine origins concurring with the interpretation of AF4 as corelated with the Forth/St Abbs/Sunderland Ground Formations (all of which are potentially glaciomarine). There is potential evidence for ice readvance and subsequent retreat within some of the cores collected by Roberts *et al*. (2019) (e.g. VC 132 and 136; **Figure 4.6**) with diamict overlying the laminated sediments. AF4 is thought to represent a deglaciating environment, showing the transition from proximal to distal glacial conditions through time.

4.2.2.23 The Forth Formation originated in the Late glacial and Holocene periods and can be divided into two members spanning this period: the Largo Bay Member and the St Andrew's Bay Member (BGS, 1986). The Largo Bay Member of the Forth Formation is thought to have been deposited during the late glacial interstadial (Merritt *et al.* 2003). Although sea levels were likely regressing on the east coast of Scotland during this period following the high stand during the late glacial period (Stoker *et al*. 2008) deposits within the inner estuaries in eastern Scotland provide evidence of raised marine deposits in the Windemere Interstadial (Holloway *et al*. 2002; Peacock 1999) (*c.* 15,000 to 13,000 BP) demonstrating the likelihood that the northern parts of the offshore export cable experienced marine to glaciomarine conditions during this period. This correlates with the marine and glaciomarine characteristics of the Fth 1, Fth 2 and Fth 3 units.

4.2.2.24 During the Loch Lomond Stadial (*c.* 13,000 to 12,000 BP) colder conditions were re-established, and there was a short-lived period of ice sheet expansion between *c*. 13,000 BP to 12,000 BP during which sea levels fell (Stoker *et al.* 2008). Around the east coast of Scotland, evidence of this now-submerged shoreline, termed the Main Late Glacial Shoreline, has been encountered. Deposition of the St. Andrews Bay Member of the Forth Formation is thought to have begun during this cold period and continued throughout the Holocene (Merritt *et al.* 2003; Stoker *et al.* 2008). Evidence of the St Andrew's Member has been identified in the RLB by the BGS (**Figure 4.5**). The deposit represents shallow marine or estuarine environments (Gatliff *et al.* 1994). The channelling noted within the Fth 1, Fth 2 and Fth 3 units could represent these estuarine environments, and the distribution of Fth 1 ties in with the recorded locations of the St. Andrews Bay Member by the BGS. The estuarine elements of the deposit indicates broad archaeological and palaeoenvironmental potential associated with the Forth Formation, spanning the Late Upper Palaeolithic and Mesolithic. This can be further refined by considering changes in relative sea level (RSL) (see **Section 4.2.4**).

4.2.2.25 The St Abbs Formation is characterised as glaciomarine deposit thought to date to the late Devensian, laid down in the period following the last glacial maximum (Stoker *et al.* 1985). While NGI do not interpret this deposit within the MHPGC Project PEIR Red Line Boundary, the general character of the deposit correlates with the seismic character and some of the environments indicated for the Fth 1, Fth 2 and Fth 3 units. Additionally, the distribution of the St Abbs Formation as mapped by the BGS generally coincides with Fth 2 as interpreted by NGI (2024) (though the latter is more expansive and also covers the Largo Bay Member and Sunderland Ground Member and areas of the Wee Bankie Formation). Nevertheless, the St Abbs Formation may too be represented by the Fth units.

4.2.2.26 The Sunderland Ground Formation is present within the southern part of the MHPGC Project PEIR Red Line Boundary in English waters according to the BGS (Cameron *et al*., 1992) (KP30 to KP24). The formation is relatively localised, present in a 75km long trough, 15km wide and 80m deep at its maximum extents, to the east of Sunderland. The Sunderland Ground Formation partially infills this trough, accounting for up to 25m of soft, reddish-brown water-lain muds (Cameron *et al*., 1992: 114). VC 134, collected by Roberts *et al.* (2019); Figure 4.3) *c.* 12km to the east of KP28, held evidence of a brown/red soft clay deposit in the area where the BGS map the Sunderland Ground Formation (mapped by Roberts *et al.* 2019 as part of AF4). The location of VC 134 also coincides with an area in which Fth 1 and Fth 2 are mapped, and it therefore provides direct evidence of these units. The palaeoenvironmental analysis of VC 134 yielded evidence of a deglacial glaciomarine environment (Roberts *et al.* 2019), though the deposit has also been suggested to be of glaciolacustrine origin, connected with the glacial lake Wear (Catt, 2007). The upper parts of AF4 in VC 134 showed evidence of erosion correlated with the marine transgression, and this was overlain by marine sediments. This is also evident within the seismic data collected by the project, which shows clear evidence of erosion at the top of unit Fth 2 in particular. The Sunderland Ground Formation overlies the Botney Cut Formation in this area.

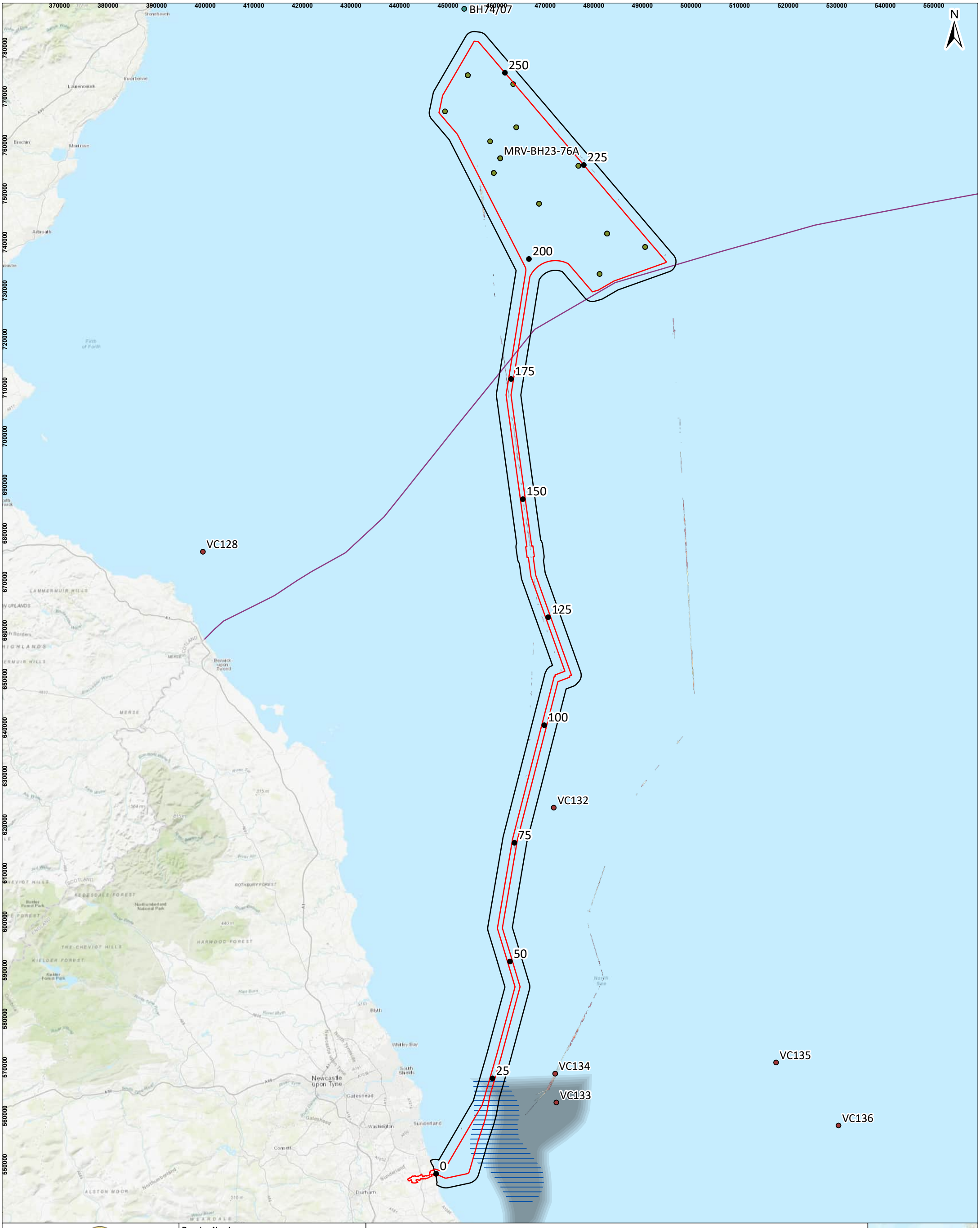
4.2.2.27 This area is a complex one and the BGS also map the Forth Formation (Largo Bay and St Andrews members) and St Abbs Formation, the latter directly continuing from the Sunderland Ground

Formation. While Cameron *et al.* (1992) and Gatliff *et al.* (1994) provide broad maps of the deposits in this area, the BGS Quaternary sheet for the Tyne area shows more detail, indicating a slightly larger area of proglacial muds (likely equivalent to the Sunderland Ground Formation) and prograded water-lain beds, predominantly formed of silt and clay, all overlain by Holocene marine sediments (**Figure 4.6**, **Figure 4.7** and **Figure 4.8**). The distribution of all these formations correlate generally with an area in which Fth 2, and small areas of Fth 1, is mapped (**Figure 4.6**, **Figure 4.7** and **Figure 4.8**). NGI (2024) indicates a lithology of low strength clays in this area, and the seismics show Fth 2 in particular filling a large depression, with continuous, laminated and draped reflectors, supporting the interpretation of water-lain beds. The Forth Formation, St Abbs Formation and Sunderland Ground Formation all have potential glaciomarine origins (correlating with the general seismic character of Fth 2 and the coring undertaken at VC 134), though they may also represent glacio-lacustrine, estuarine or marine environments.

4.2.2.28 The Botney Cut Formation has been identified in the Southern North Sea including in close proximity to the southern part of the MHPGC Project PEIR Red Line Boundary in English waters (the BGS map the deposit extending to within *c.* 1km of the MHPGC Project PEIR Red Line Boundary, and given the scale of the mapping it is possible that this deposit extends to within the MHPGC Project PEIR Red Line Boundary). The formation infills large channels up to 200m deep and can be divided into two members. The lower member comprises reddish brown diamicton with interbedded sands and is equivalent to the Wee Bankie Formation described above and was deposited in a glacial setting. The upper member is firm, grey or greyish brown sandy pebbly mud. The upper member is partly glaciomarine in origin, with other evidence of glaciolacustrine or lacustrine origins. However, evidence indicates that at least some of the Botney Cut channels remained opened and active in pre-transgressional Holocene environments in some areas and therefore contain a range of sediment types. This part of the formation is roughly contemporary with the St Abbs and much of the Forth Formations, though post-glacial environments differed off the east coasts of Scotland and England. In the southern North Sea area expanses of terrestrial landscapes with fluvial networks including Botney Cut channels were exposed (areas surrounding 'Doggerland') while in the northern North Sea levels fluctuated, influencing potential (see discussion on sea levels in **Section 4.2.4** and **Figure 4.5**). While NGI (2024) does not interpret this deposit within the MHPGC Project PEIR Red Line Boundary, the general character of the deposit correlates with some of the environments indicated for the Fth 1, Fth 2 and Fth 3 units, in particular related to channelling, and as such this formation may too be represented.

4.2.2.29 Therefore, in summary the Fth 1, Fth 2 and Fth 3 units appear to correlate with a series of formations mapped by the BGS (Forth, Sunderland Ground, St Abbs and potentially Botney Cut), and more recent work by Roberts *et al.* (2019) has correlated these with a single unit AF4. The formations mapped by the BGS, and analysis of AF4, indicates formation under principally glaciomarine conditions with evidence of a gradually retreating ice edge, though glacio-lacustrine, estuarine or marine environments may also be represented. Cores sampling AF4 show that the upper parts of the deposit have been eroded in places potentially representing the marine transgression, and the site specific survey data support this. However, if uneroded sections survive then the deposit has the potential to contain evidence of the transition from late glacial to early Holocene environments.

4.2.2.30 The archaeological and palaeoenvironmental potential of the units can be further understood through assessment of RSLs (**Section 4.2.4**).



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0009				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.6: DISTRIBUTION OF UNIT FTH 1 AND GEOTECHNICAL LOCATIONS	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS				
0 10 20 30 km Scale@A3:1:700,000	VER	DATE	DETAILS	BY	CHECK
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Unit Fth 1

Depth to base (m)

62.83

0.11

Vibrocores (Roberts et al. 2019)

- Vibrocore locations

BGS cores

- Borehole locations

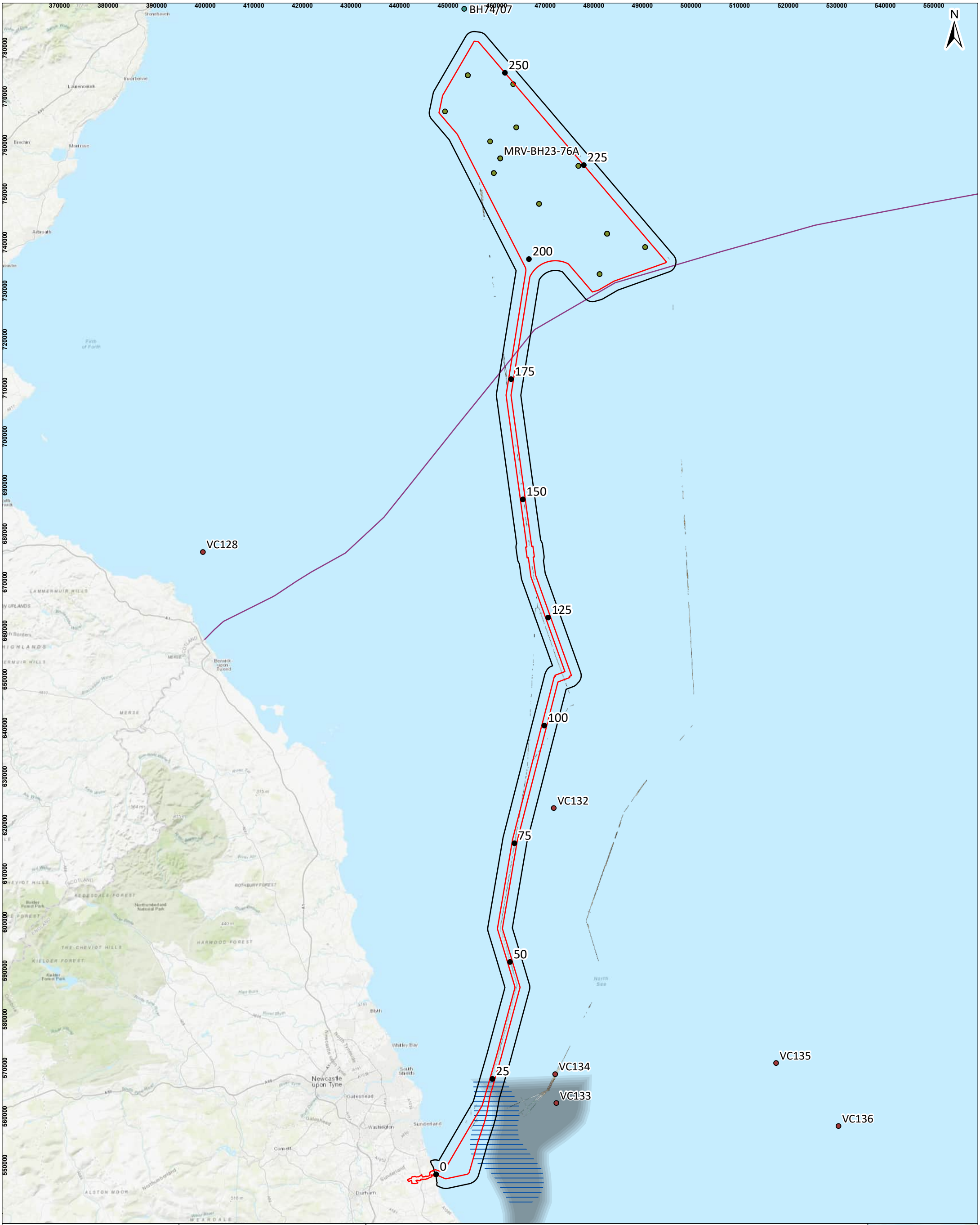
Borehole locations (Morven Array; MSDS Marine 2025)

- Borehole locations

BGS formations (Devensian and later)

- Prograded water-lain beds
- Proglacial beds





Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0010				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.7: DISTRIBUTION OF UNIT FTH 2 AND GEOTECHNICAL LOCATIONS	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS				
0 10 20 30 km Scale@A3:1:700,000	VER	DATE	DETAILS	BY	CHECK
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Vibrocores (Roberts et al. 2019)

- Vibrocore locations

BGS cores

- Borehole locations

Borehole locations (Morven Array; MSDS Marine 2025)

- Borehole locations

Unit Fth 2

Depth to base (m)

27.061

0.219

BGS formations (Devensian and later)

- Prograded water-lain beds
- Proglacial beds

435000 440000 445000 450000 455000 460000 465000 470000 475000 480000

580000 575000 570000 565000 560000 555000 550000 545000 540000 535000 530000 525000

N

25

0

VC134

VC133

Seaton Sluice
Whitley Bay
Monkseaton
Cullercoats
North Shields
Chirton
South Shields
River Tyne
Port of Tyne Maritime House
West Park
Middlefields Industrial Estate
Temple Memorial Park
King George's Field
Boldon Colliery
Cleadon
Whitburn
East Boldon
Boldon Golf Club
Fellgate
Sunderland
Hendon
Barnes Park
Leechmere Industrial Estate
Farringdon
Harrington Country Park
Ryhope
Houghton le Spring
Seaham
Dalton le Dale
Dawdon
Hetton le Hole
Hetton Lyons Country Park
Murton
Elemore Golf Course
Easington Lane
Easington Colliery
Easington
Ludworth
Shotton Colliery
North West Industrial Estate
South West Industrial Estate
Peterlee
Horden
Wheatley Hill
Blackhall Colliery
Blackhall Rocks
Wingate
Station Town
Hutton Henry
Kelloe
Trimdon
Trimdon Station
Port of Hartlepool Victoria Harbour
The Headland
Hartlepool
Elwick
Longhill Industrial Estate
Seaton Carew
Sedgefield
Greatham
Wynyard Woodland Park
Wynyard
Wynyard park
Wolviston
Mordon
Billingham
Cowpen Lane Industrial Estate
Seal Sands Industrial Estate
Tees Mouth
Queen Elizabeth II Jetty/Teesport
Cleveland Golf Links
Redcar
Dormanstown
Marske by

Morven Offshore Wind Farm
MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.8: UNITS FTH 1 AND FTH 2, EXPOSED BEDROCK AND BGS MAPPING

0 5 km
Scale@A3:1:167,772

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Drawing Number:
MHPGC-MSD-MA-0011

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, USGS, NGA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS

VER	DATE	DETAILS	BY	CHECK
00	07/08/2026	Initial Issue	MJ	FLP
01	07/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Vibrocores (Roberts et al. 2019)

- Vibrocore locations

NGI 2023 features

- Bedrock outcrop
- Shallow-bedrock
- Sand waves
- Megaripples

Unit Fth 1
Depth to base (m)
62.83
0.11

Unit Fth 2
Depth to base (m)
41.667
0.141

North Sea
SCOTLAND
Glasgow
Edinburgh
UNITED KINGDOM
Belfast
Manchester
Leeds
Birmingham
The Hague
WALES
Cardiff
London
ENGLAND
English Channel

Quaternary deposits: discussion

Units Surface Sediment and Hol 1, Hol 2 and Hol 3

4.2.2.31 The units mapped within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South as Surface Sediment (Hough, 2023) and within the offshore export cable corridor as Hol 1, Hol 2 and Hol 3 (NGI, 2024) have varied seismic facies. The surface sediments unit mapped within Morven North and Morven South vary in thickness, with evidence of sandwaves in places. Chaotic internal reflections are mapped within Hol 3; transparent to semi-continuous in Hol 2; and continuous to semi-continuous in Hol 1. The geometry of the AF also differs, with Hol 3 characterised by sandwave geometry and Hol 2 and Hol 3 displaying draped geometry with variable thickness. All had low cone penetration resistance and the anticipated lithology is sand. The upper sands (Hol 3) were interpreted as mobile and Hol 2 was interpreted as loose sands.

4.2.2.32 Hol 3 was sparse within the MHPGC Project PEIR Red Line Boundary, identified within Scottish and English waters in the northern part of the MHPGC Project PEIR Red Line Boundary with very restricted occurrences further south.

4.2.2.33 Hol 2 was much more widely distributed, present along almost the entire MHPGC Project PEIR Red Line Boundary. Hol 1 was also widely distributed, though with localised areas of absence, for example, toward the southern end of the MHPGC Project PEIR Red Line Boundary.

4.2.2.34 BGS seabed sediment classifications along the MHPGC Project PEIR Red Line Boundary confirm the presence of sands at the seabed, along with large areas of muddy sand, particularly in the southern part of the MHPGC Project PEIR Red Line Boundary, and with a gravelly component in the nearshore area (though muds and sands still dominate).

4.2.2.35 Hol 1, Hol 2 and Hol 3 deposits of the offshore export cable corridor represent modern marine sediments, laid down following the Holocene marine transgression of the area. The Surface Sediment unit within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South and Hol 3 within the remainder of the MHPGC Project PEIR Red Line Boundary represent sandwave bedforms.

Units Forth Formation and Fth 1, Fth 2 and Fth 3

4.2.2.36 The Forth Formation unit mapped within the that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South (Hough, 2023) and the Fth 1, Fth 2 and Fth 3 units mapped by NGI (2024) within the remainder of the MHPGC Project PEIR Red Line Boundary have varied seismic facies, CPT resistance values and predicted lithologies.

4.2.2.37 Within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, the Forth Formation is characterised as channel infill deposits, between 10 to 60m deep and up to 3km wide. They have an irregular basal surface with a high amplitude reflector, possibly indicating a basal lag deposit comprising cobbles. CPT investigations refused at this horizon, also indicating a hard surface. Shallow braided channels are also present, with a different seismic character.

4.2.2.38 Within the MHPGC Project PEIR Red Line Boundary beyond part that overlaps with Morven North and Morven South, the lowest of the Fth units is Fth 1. Fth 1 has a low to moderate amplitude basal reflector, with transparent to semi-continuous reflection continuity, and a channel infill geometry (**Figure 4.6**). It is discontinuous and generally present in the northern part of MHPGC Project PEIR Red Line Boundary (from *c.* KP113 to KP96 and further north), in both Scottish and English waters, though smaller areas are also present in the southernmost parts of the MHPGC Project PEIR Red Line Boundary (e.g. around KP28). While it is mapped in Scottish waters, its distribution lies beyond the MHPGC Project PEIR Red Line Boundary. It has a moderate CPT resistance (5 to 20MPa) and is expected to comprise of dense to very dense sands.

4.2.2.39 Fth 2 has a moderate to low amplitude basal reflector and varied reflection continuity. Some areas are characterised by continuous reflectors, whereas others are by semi-continuous and transparent reflectors. The geometry of the deposit has been interpreted as channel infill, with overbank sedimentation (NGI, 2024). It is present along much of the MHPGC Project PEIR Red Line Boundary (from *c.* KP16 northward), though it is discontinuous and becomes more patchy further north, particularly within Scottish waters. While it is mapped in Scottish waters, its distribution lies beyond

the MHPGC Project PEIR Red Line Boundary. The unit has an extremely low to low CPT resistance (≤2MPa) and sandy clays/clayey sands are the expected lithology.

4.2.2.40 A large area of Fth 2 in the south forms a continuous unit and it is in this area that the unit achieves its greatest thickness. This is generally mapped beyond the MHPGC Project PEIR Red Line Boundary, from *c.* 5km east of KP35 to KP20, though the unit is also identified within the MHPPGC Project PEIR Red Line Boundary in this area from KP80 southward to *c.* KP26, where the data deviates from the MHPGC Project PEIR Red Line Boundary. The seismic character of Fth 2 from *c.* 5km east of KP35 to KP20 shows continuous and draped reflectors, with evidence of a strong erosion event at the top.

4.2.2.41 Roberts *et al.* (2019) cored through this part of Fth 2 with VC 134 (**Figure 4.7**). This was collected *c.* 12km to the east of KP28 and thus is beyond the MHPGC Project PEIR Red Line Boundary but provides important information on the units which are present within the MHPGC Project PEIR Red Line Boundary. VC 134 extended to a depth of 4.5m and showed a massive brown matrix supported diamict, overlain by a brown/red, soft, massive clay with occasional large clasts. The latter is thought to represent Fth 2. The unit was reportedly colour-banded, with occasional silt laminations. Roberts *et al*. (2019) equated this unit with their AF4. Roberts *et al.* (2019) undertook palaeoenvironmental analysis of this and other samples and interpreted the results as representative of a glaciomarine environment, with evidence for meltwater pulses and an increasingly distal location to the (retreating) ice sheet, concurrent with a Late Devensian environment.

4.2.2.42 Fth 3 has a moderate to low amplitude basal reflector and varied reflection continuity. Some areas are characterised by continuous reflectors and others by semi-continuous and transparent reflectors. The geometry of the unit has been interpreted as channel infill with overbank sedimentation (NGI, 2024). The distribution is discontinuous and is largely absent in Scottish waters (with just a single small occurrence noted within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, although it is also identified in data just beyond the MHPGC Project PEIR Red Line Boundary from KP237 to KP226). The seismic facies description is therefore the same as Fth 2, though the distribution is different and the large area of Fth 2 in the south (where the continuous draped facies are present) are not represented by Fth 3. Additionally, the CPT response is different, indicating a moderate CPT resistance (5 to 25MPa) and Fth 3 is expected to comprise of dense to very dense, fine/medium sands.

4.2.2.43 Overall, the Forth Formation and Fth 1, Fth 2 and Fth 3 are interpreted as representing marine, glacio-marine, fluvio-marine and estuarine depositional environments, equivalent with the Forth Formation as mapped by the BGS (Hough, 2023; NGI, 2024). Where these units infill meltwater channels and other depressions, the infilling may have occurred in glaciomarine or other deglaciating conditions.

Units Marr Bank Formation and MB

4.2.2.44 The Marr Bank Formation (within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South) and MB unit (within the remainder of the MHPGC Project PEIR Red Line Boundary) is varied. Within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, it is a sheet-like deposit, generally between 10m to 30m thick, though with a maximum thickness of 65m and minimum of 0m. The acoustic character ranges from amorphous to parallel bedded, indicating glacial outwash, with likely cross bedding of sand bars. The basal reflector is strong and bright, indicating a cobble- or boulder-rich layer. Basal tills (deposited as an unstratified deposit) are present in some areas.

4.2.2.45 The MB unit within the MHPGC Project PEIR Red Line Boundary outside of that part that overlaps with Morven North and Morven South has a moderate to low amplitude basal reflector, with semi-continuous to transparent internal reflectors and a prograding geometry. The unit has a moderate CPT resistance (5MPa to 25MPa) and the expected lithology is dense to very dense fine/medium sands, with beds of medium to high strength clay and gravels, cobbles and boulders. The unit has been interpreted as the glaciomarine/marine deposited Marr Bank Formation, mapped in English waters. The absence of mapping this unit in Scottish waters may be due to an inability to identify the basal reflector in the offshore export cable corridor situated within Scottish waters, arising from the limited penetration depths. The deeper data from the 2D UHRS within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South demonstrates its presence in this area.

Unit WB

4.2.2.46 The WB unit is recorded within the MHPGC Project PEIR Red Line Boundary outside of that part that overlaps with Morven North and Morven South, with no equivalent identified within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South data. It has a low amplitude basal reflector, with a transparent internal character. The geometry is interpreted as heterogenous sedimentation with local ridges. The unit has a moderate CPT resistance (5MPa to 25MPa) and the expected lithology is medium to very dense gravelly clay and sand, dominated by polymictic till with interbeds of sand, pebbly sand and silty clay.

4.2.2.47 The unit has been interpreted as terminal to subglacial till, representing the Wee Bankie Formation, and has been identified in English waters only. The absence of mapping this unit in Scottish waters may be due to an inability to identify the basal reflector in this area, arising from the limited penetration depths.

Unit Coal Pit Formation

4.2.2.48 The Coal Pit Formation is present primarily as a channel and infill deposit, up to 130m deep, cutting down to bedrock in places. The channel bases have an irregular erosion surface and a chaotic/structureless fill. High amplitude reflectors in the base may represent shells or pebbles of the lower facies (tested in BGS BH 81/37).

4.2.2.49 This unit is reported within the data from that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South only, likely owing to the greater depths of penetration achieved by the 2D UHRS within this area (Hough, 2023).

Earlier Formations

4.2.2.50 The following deposits are reported within the data from that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South only, likely owing to the greater depths of penetration achieved by the 2D UHRS within this area (Hough, 2023).

4.2.2.51 Lower formations thought to be present within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South boundaries, but which are not yet fully mapped comprise:

- Fisher Formation: The acoustic character of the Fisher Formation typically includes parallel, sub-horizontal reflectors, with small, intraformational channels in seismic section. It is thought that this unit is present within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South but not yet fully mapped within the project-specific geophysical survey data.
- Ling Bank Formation: The acoustic character of the Ling Bank Formation typically appears as a series of complex, stacked, concave-up, commonly irregular, curved seismic reflectors, with evidence of channels and infills that have an amorphous seismic signature. It is thought that this unit is present within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South but is not yet fully mapped within the project-specific geophysical survey data.
- Aberdeen Ground Formation: This is a wedge-shaped deposit mapped by the BGS within the central North Sea. The upper parts of the formation are present within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South Morven North and Morven South (proved at BGS BH 81/27, *c.* 7km east of the RLB), however, the unit is not yet fully mapped within the project-specific geophysical survey data.

Scotland: summary of Quaternary sequence

4.2.2.52 Quaternary sediment thickness in the Scottish parts of the MHPGC Project PEIR Red Line Boundary is generally between 5m and 50m. The Quaternary sequence within Scottish waters as mapped by Hough (2023) NGI (2024) comprising (in descending order from the seabed):

- Surface Sediment/Hol 3
- Hol 2;
- Hol 1;
- Forth Formation/Fth 3;

- Marr Bank Formation;
- Coal Pit Formation;
- Fisher Formation;
- Ling Bank Formation;
- Aberdeen Ground Formation.

4.2.2.53 Note that although these formations appear within the area of site-specific survey data coverage, some of these areas now lie beyond the MHPGC Project PEIR Red Line Boundary, and within the MHPGC Project PEIR Red Line Boundary, to the southwest of Morven North and Morven South (KP197 to KP208), data collection is confined to a 500m corridor. Data was not collected to the east and the west of the corridor, as such these areas have not been subject to archaeological assessment outside of desk-based sources (see **Figure 2.2**). Should the final route deviate outside of the 500m corridor, but within the MHPGC Project PEIR Red Line Boundary, further data collection will be undertaken and subject to archaeological assessment where required.

4.2.2.54 Additionally, absence of the lower units MB and WB, as identified within MHPGC Project PEIR Red Line Boundary outside of that part that overlaps with Morven North and Morven South, may be due to an inability to identify the respective basal reflectors in Scottish waters (see **Section 3.5.4**). The former (Marr Bank Formation) has been mapped within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South based on the 2D UHRS data.

England: summary of Quaternary sequence

4.2.2.55 Quaternary sediment thickness in the English parts of the MHPGC Project PEIR Red Line Boundary is varied, with thin sediment cover and exposed bedrock common near the coast (between KP0 and *c.* KP10), gradually thickening offshore to between 5m and 50m. The Quaternary sequence within English waters, as mapped by NGI (2024), comprises (in descending order from the seabed):

- Hol 3;
- Hol 2;
- Hol 1;
- Fth 3;
- Fth 2;
- Fth 1;
- MB;
- WB.

4.2.3 Geomorphology

4.2.3.1 The MHPGC Project PEIR Red Line Boundary has been subject to varied conditions during the Quaternary Period, with key erosive and depositional events that have affected the underlying geomorphology and that of the surrounding central North Sea palaeolandscape. These largely were the result of glaciation and attendant glacial processes.

Glaciations

4.2.3.2 The known history of hominin occupation of Britain is marked by three main stages of glaciation: the Anglian (478,000 to 424,000 BP; MIS 12), the Wolstonian complex (374,000 to 123,000 BP; MIS 10 to 6) and the Devensian (109,000 to 11,700 BP; MIS 5d to 2). The latter two each include several interstadials, of which less information is available for the Wolstonian. The pre-Anglian Cromerian complex and Beestonian stage also express evidence of a series of stadials and interstadials, however, these sequences are poorly understood at present (Lamb, 2017; Lauer, 2018), and the latter generally precedes known hominin occupation of Britain.

4.2.3.3 Glaciation models suggest that the Marine and Intertidal Archaeology Study Area was likely covered by ice during much of MIS 12, 6 and ice-free during MIS 5d to 5a and MIS 3 and covered once more during the Last Glacial Maximum (LGM; *c.* 27,000 BP; MIS 2). The full extents of the ice sheet have been debated; however, many researchers now believe that the SIS extended eastward into the North Sea and coalesced with Scandinavian ice sheets (Ballantyne and Small, 2019), indicating that the

MHPGC Project PEIR Red Line Boundary is likely to have seen sub glacial conditions during the Devensian glacial maximum.

4.2.3.4 During the Wolstonian Complex (MIS 10 to 6), a series of glacial retreats and readvances characterised the Marine and Intertidal Archaeology Study Area, with more northerly parts most likely to have lain under ice (Batchelor *et al.*, 2019; Hughes *et al.*, 2016; Gibbard and Clark, 2011).

Glacial geology

Scottish waters

4.2.3.5 The Aberdeen Ground Formation represents the earliest deposits recorded within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, possibly deposited from as early as MIS 100, within the Early Pleistocene, up to the Middle Pleistocene at MIS 13. This long expanse of time, from about 2.5 million to 528,000 years ago, witnessed multiple periods of glacial advance and retreat, ending during the Cromerian Complex. These deposits therefore pre-date the Anglian glacial period.

4.2.3.6 The Ling Bank Formation, which may be present within Scottish waters of the MHPGC PEIR Red Line Boundary, is dated to between MIS 12 and 10, which extends from the Anglian and into the Hoxnian interglacial (MIS 11), but is generally considered to have been deposited within interglacial conditions (Stoker *et al.* 1985). Evidence of the Anglian is rare offshore and subsequent glacial and hydrodynamic processes are understood to have eroded much to the Anglian-era geological deposits and landforms.

4.2.3.7 The maximum extent of Wolstonian glaciations is recorded northward of that of the Anglian, although this also covered much of the North Sea and the entirety of the Marine and INtertidal Archaeology Study Area at its maximum. Subglacial and glaciomarine deposits of Wolstonian age are thought to be present within Scottish waters of the MHPGC PEIR Red Line Boundary, comprising Fisher Formation deposits. This formation is widely mapped by the BGS overlying the Ling Bank Formation (Stoker *et al.*, 1985). In addition, parts of the Coal Pit Formation, at present only identified as a channel deposit, could have been deposited within Wolstonian up to mid-Devensian glaciomarine environments (as well as interglacial marine and intertidal environments). The presence of this unit as a channel deposit is well attested by the BGS, often having been subject to erosion during or after the Devensian, but that can still exceed 120m in thickness, where appearing as a channel infill (Gatliff *et al.,* 1994).

4.2.3.8 The Devensian glaciations are the best understood and most widely studied of the Pleistocene glaciations, particularly the Late Devensian (MIS 2) Dimlington (29,000 to 14,700 BP) and Loch Lomond (12,900 to 11,700 BP) stadials. The greatest extent of ice during the LGM was attained at various times for different locations, generally peaking at *c.* 26,000 or 27,000 BP (Gibbard *et al.*, 1991).

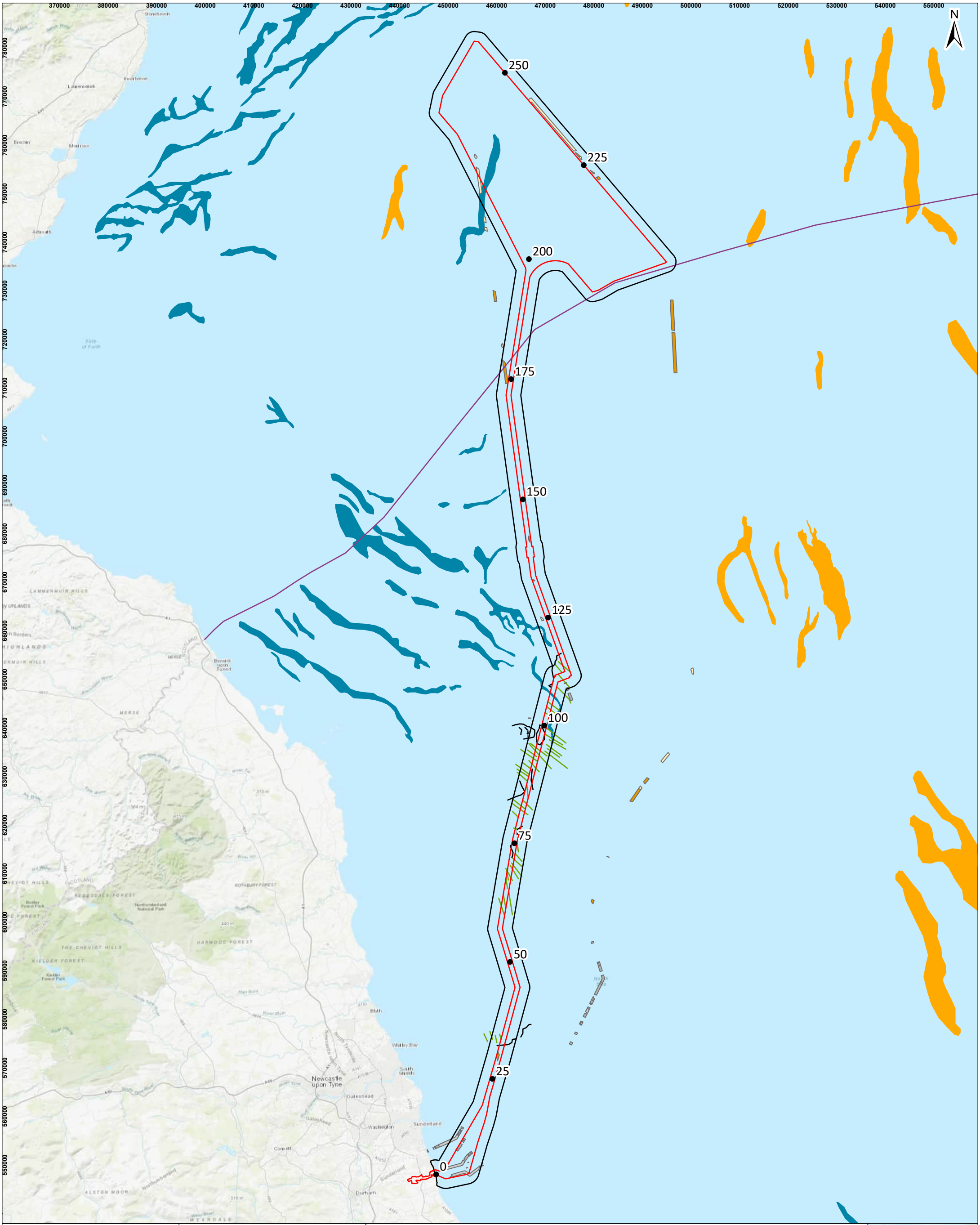
4.2.3.9 The Marr Bank Formation represents a range of conditions associated with the proglacial landscape, including glaciomarine and proglacial outwash plains, whilst lower elements of the Forth Formation may also be of Devensian date, being deposited by the retreating ice sheet.

English waters

4.2.3.10 No identified deposits within English waters pre-date the Devensian, with earlier deposits likely eroded by the effects of the last glacial period. The earliest unit identified is the Wee Bankie Formation, characterised by Devensian glacial till, which is overlain by the Marr Bank and Forth Formation deposits discussed above and which would have formed within the same potential range of environmental conditions as within Scottish waters.

Glacial landforms

4.2.3.11 Glaciation introduces a range of processes which result in changes to the bedrock, sedimentary deposits and geometry of the landscape. Some of the resultant landforms are determined by the movement and weight of the ice overburden, whereas others are caused by associated hydrodynamic processes.



Morven Offshore Wind Farm

MSDS Marine

Drawing Number: MHPGC-MSD-MA-0012	
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,
Drawing Title: FIGURE 4.9: GEOMORPHOLOGICAL FEATURES	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA

0 10 20 30 km

Scale@A3:1:700,000

VER	DATE	DETAILS	BY	CHECK
00	07/08/2026	Initial Issue	MJ	FLP
01	07/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

NGI 2023 features

- Bedrock outcrop
- Shallow-bedrock
- Sand waves
- Megaripples

Glacial features mapped by Roberts et al. (2019)

- Bedrock ridges
- Lineations

EMODnet Data (Channels)

- Glacial meltwater channel
- Open tunnel valley



4.2.3.12 The effects of the last glaciation are particularly prominent within the area and most geomorphological features relate to the Devensian glaciers and subsequent marine inundation. Key features mapped by NGI (2024), Hough (2023), Roberts *et al.* (2019) and EMODnet (2026) are:

- Moraines: Seabed moraines, marking the limits or recessional stages of former glaciers within the MHPGC Project PEIR Red Line Boundary, are visible within the MBES and seismic data and have been mapped and interpreted by a number of studies within the MHPGC Project PEIR Red Line Boundary. Large moraines are particularly common within the southern part of the MHPGC Project PEIR Red Line Boundary in English waters (e.g. KP116 to KP63), though moraine features are present along the length of the MHPGC Project PEIR Red Line Boundary;
- Mega-scale glacial lineations (MSGL): linear, wide and shallow ridge and groove features formed by fast flowing ice streams in subglacial conditions. These are particularly prominent within southern part of the MHPGC Project PEIR Red Line Boundary in English waters which lies east of Berwick-upon-Tweed, and northeast of Durham (e.g. KP116 to KP63), though they are present along the entire MHPGC Project PEIR Red Line Boundary (NGI, 2024; Figure 3.58);
- Other upstanding features including glacial ridges, drumlins, hummocks and mounds; and depressions including depressions and potential kettle holes are also present within the MHPGC Project PEIR Red Line Boundary;
- Meltwater channels and valleys are also present (in some cases partially infilled by Late glacial and Holocene deposits). These have been noted by NGI (2024), Roberts *et al.* (2019) and within the EMODnet data (**Figure 4.9**);
- Bedforms in the form of megaripples and sandwaves are present within some parts of the MHPGC Project PEIR Red Line Boundary.

4.2.3.13 The majority of the features in the above list are glacial landforms, with many relating to the flow of the Forth-Tay palaeo-ice stream, which split into two sections, one leading northeast and one southeast and through the export cable corridor, leaving drumlins, moraines, grounding zone wedges, channels and other features (NGI, 2024).

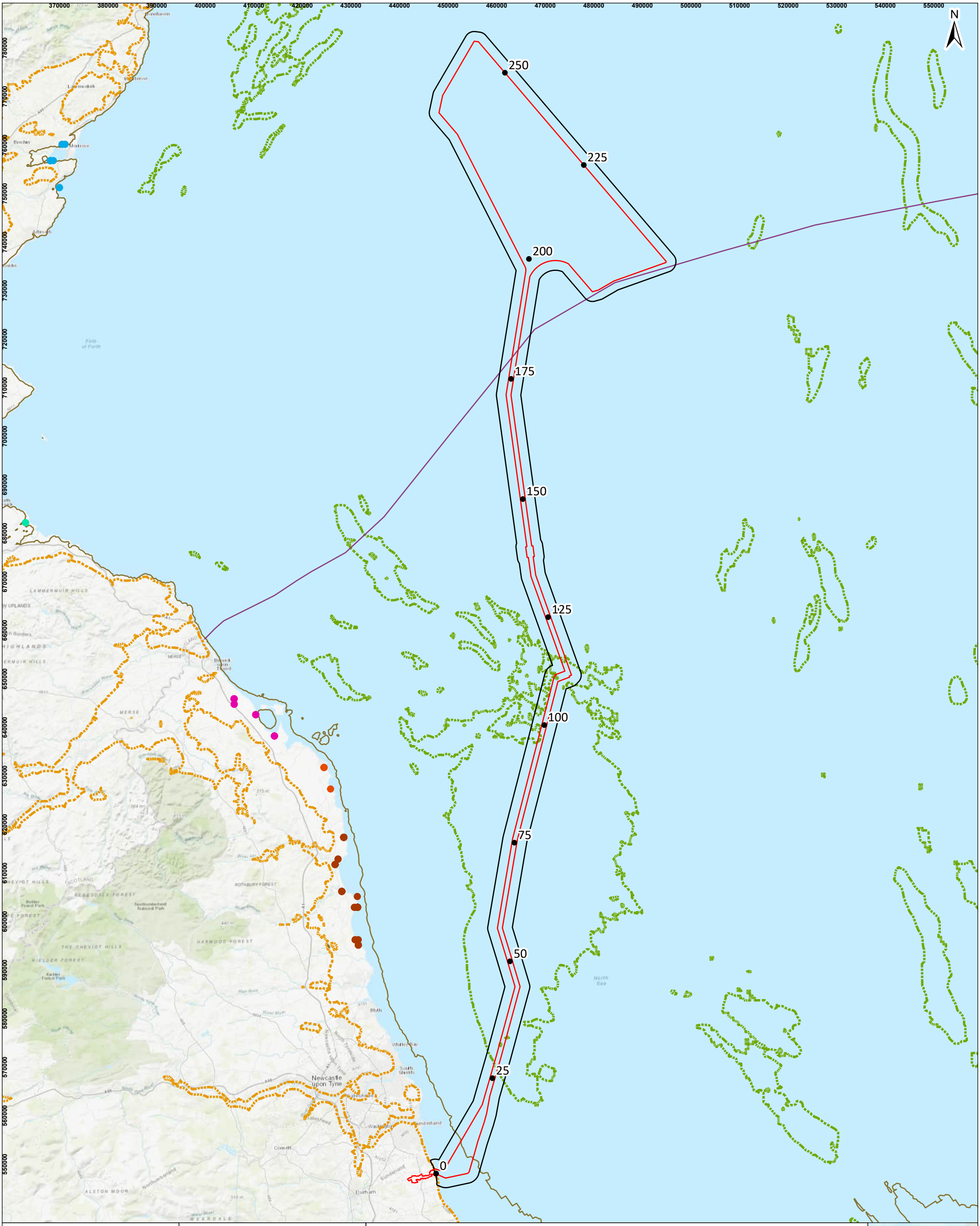
4.2.4 Sea level modelling

4.2.4.1 After the retreat of the LGM glaciers, parts of the Marine and Intertidal Archaeology Study Area may have lain subaerial, although northern parts may have rapidly transitioned from subglacial to glaciomarine. During periods of subaerial exposure, new drainage networks formed, partly reusing older, glacially formed channels or palaeochannels. Newer channels also formed, draining the landscape further west. Sea level modelling (discussed in more detail below) suggests that the whole Marine and Intertidal Archaeology Study Area was inundated by 18,000 BP except for *c.* 20km of subaerially exposed land within English inshore waters (inside 12nm). Water depths are varied, with a depth range of 0.42m LAT (from KP3 to KP2) to a maximum of *c.* 106.6m LAT around *c.* KP90 (XOCEAN Ltd., 2025).

4.2.4.2 Data relating to past sea levels can be correlated with geological and glaciogenic data to inform our understanding of palaeolandscape development during the Late Quaternary and Early Holocene. Analysis of reconstructed palaeolandscapes can inform discussions relating to human occupation and archaeological potential.

4.2.4.3 Studies of sea level in the past are complex and subject to a wide range of variables. One of the key factors is that of glacial isostatic adjustment (GIA), relating to the viscoelastic response (deformation) of Earth structures arising from glacial ice-load. The British Irish ice sheet developed outward from the Scottish Highlands during the Dimlington stadial (29,000 BP to 14,700 BP), extending as far south as the Norfolk coast and the Western Approaches. Northern parts of Britain were therefore subject to greater depression and rebound, with localised variations in ice thickness potentially causing further local variations in Relative Sea Level (RSL).

4.2.4.4 A variety of sources of evidence exist on former sea levels. These include Sea Level Index Points (SLIPs), GIA models, physical evidence observed in the site-specific survey data (e.g. deposit and environment types) and key features, such as submerged rock-cut platforms, indicating former stabilised shorelines. Key studies include models by Kuchar *et al.* (2012) and Bradley *et al.* (2011) and the SLIP index compiled by Shennan *et al.* (2018).



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0013				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.10: SEA LEVEL DATA	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA				
0 10 20 30 km Scale@A3:1:700,000	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	17/08/2026	Initial Issue	MJ	FLP
	01	17/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Sea Level Index Point Groups (based on Shennan et al. 2018)

- A
- B
- C
- D
- E
- F

BRITICE-CHRONO coastline (years BP)

- 31
- 21
- 15

4.2.4.5 There are numerous SLIPs located around the eastern coast of Scotland and England and these can be grouped into six main areas which mirror the general latitudes of the MHPGC Project PEIR Red Line Boundary (see **Figure 4.10** and **Appendix D**). The SLIPs generally date from the Late Glacial and Early Holocene period onward and demonstrate both the temporal changes in sea level and spatial differences, the latter caused in part by differential ice loading and subsequent rebound. Modelling by the BRITICE-CHRONO project (Clark *et al.*, 2022) also provides estimations of sea levels pre-dating most of the SLIPs in the area.

4.2.4.6 Work by the BRITICE-CHRONO project provides data and modelling relevant to the Late Glacial period and indicates a low stand at *c.* 31,000 BP, during which time the central (English) parts of the MHPGC Project PEIR Red Line Boundary may have been submerged but the northern and southern end of the MHPGC Project PEIR Red Line Boundary is likely to have been free from ice and sea. However, despite being free from ice and water, arctic conditions are likely to have persisted. A high stand is also recorded from *c.* 21,000 BP, during which point the entire MHPGC Project PEIR Red Line Boundary was submerged (Clark *et al.,* 2022). This is supported by data from the earliest nearby SLIPs (**Figure 4.10**, Group A), which demonstrate an RSL of *c.* 15m above current levels by *c.* 21,000 to 20,000 BP (Shennan *et al.*, 2018), correlating with the modelled palaeocoastlines of the BRITICE-CHRONO project (Clark *et al.*, 2022). This occurred prior to deglaciation of the MHPGC Project PEIR Red Line Boundary, and the MHPGC Project PEIR Red Line Boundary is likely to have been characterised by a tide water ice sheet at this point (Roberts *et al.*, 2019).

4.2.4.7 Other modelling and SLIPs provide evidence of RSLs after this period. In general, in Scotland, they show evidence of raised sea levels coinciding with the Windemere interstadial (14.7,000 to 12,900 BP), with Kuchar *et al.* (2012) indicating an RSL of up to 8m Ordnance Datum (OD) around this time though Bradley *et al.* (2020) indicate a contemporary RSL of -12m (higher than the previous period but lower compared to the estimations of Kuchar *et al.* (2012)). The different estimations in these sources relate to the estimated thickness of ice, creating different glacial loading within the models. Other data supports Kuchar's model and sediments from within the inner estuaries of eastern Scotland provide evidence of raised marine deposits in the Windemere Interstadial. This is supported by nearby SLIPs, which show an RSL of between 10 to 15m during this period (e.g. **Figure 4.10**, Groups A and E), demonstrating that sea levels were likely higher in both England and Scotland during this time.

4.2.4.8 Sea levels in the subsequent Loch Lomond stadial (12,900 BP to 11,700 BP), when re-expansion of the ice sheets occurred, were generally lower and a study by Stoker *et al.* (2008) found evidence of a submerged shoreline in Scottish waters, at around -20 to -30m OD (west of the MHPGC Project PEIR Red Line Boundary). From KP261 to KP136 (covering the northern part of the offshore export cable corridor in English waters and the entirety of the MHPGC Project PEIR Red Line Boundary within Scottish waters), water depths averaged 60 to 70m LAT. This indicates that the northern part of the MHPGC Project PEIR Red Line Boundary in English waters and entire MHPGC Project PEIR Red Line Boundary in Scottish waters is still likely to have been submerged.

4.2.4.9 Differences in ice loading materially affected RSL in Scotland and England. The differences in RSL at the northern and southern ends of the MHPGC Project PEIR Red Line Boundary are demonstrated comparing the two SLIP groups at the extreme ends of the MHPGC Project PEIR Red Line Boundary (**Figure 4.10**, Groups A and F; **Appendix D**). Group A is clustered around Montrose and is generally parallel with the northern most end of the MHPGC Project PEIR RLB. This group shows raised sea levels in every SLIP recorded, with an RSL of 14.82m at *c.* 21,000 to 20,000 BP, *c.* 2.6m at *c.* 8,000 BP, and 4.09m at 7,500 BP (the latest SLIP), indicating that the Scottish parts of the MHPGC Project PEIR Red Line Boundary are likely to have been submerged over this entire period. Later sea level data demonstrates that sea levels in this area were either around or above their current levels, broadly correlating with the findings of Stoker *et al.* (2008) and the modelled coastlines of the BRITICE-CHRONO project (Clark *et al.* 2022). Sea levels remained slightly higher than today's levels until at least *c.* 4,000 BP, with Stoker *et al.* (2008) indicating that sea levels returned to current levels just after 2,000 BP.

4.2.4.10 In contrast, group F, clustered around Middlesbrough and Hartlepool, *c.* 15km to the south of the MHPGC Project PEIR Red Line Boundary, shows lower sea levels, as does the BRITICE-CHRONO modelling (Clark *et al.*, 2022). The modelling indicates that sea levels were lowering from 21,000 to 15,000 BP at the southern end of the MHPGC Project PEIR Red Line Boundary, reaching a low point

around 15,000 BP, during which the southernmost part of the MHPGC Project PEIR Red Line Boundary (out to *c.* KP10) were potentially exposed as dry land. After this, sea levels rose again. The earliest SLIP from the area dates to *c.* 11,000 BP (i.e. just after the Loch Lomond stadial, which ended *c.* 11,700 BP) and shows an RSL of -12.45m, dropping to -15.46m at 8,870 BP and raising thereafter (*c.* –6.3m at *c.* 8,000 BP; *c.* 5m at 7,000 BP; *c.* 4 to 3m at 6,000 BP; -2m at 5,000 BP and <1m by 3,000 BP). Sea levels were therefore around their current level by *c.* 5,000 BP.

4.2.4.11 The lowest sea level recorded within the SLIP dataset considered here is the one from group F, showing an RSL of -15.46m at 8,870 BP.

4.2.4.12 In summary, the northern and southern parts of the MHPGC Project PEIR Red Line Boundary may have been exposed but remained under arctic conditions, during a low stand at *c.* 31,000 BP. After this, sea levels rose to a high point at *c.* 21,000 BP, likely witnessing submersion of the entire MHPGC Project PEIR Red Line Boundary. Differences in ice loading and rebound affected the English and Scottish parts of the MHPGC Project PEIR Red Line Boundary differently, with the latter likely continually submerged after this high stand. Though sea levels lowered in Scotland during the Loch Lomond stadial, the depth of the MHPGC Project PEIR RLB in Scottish waters still indicates that the MHPGC Project PEIR Red Line Boundary was likely characterised by marine/glaciomarine conditions.

4.2.4.13 In English waters, sea levels lowered after 21,000 BP, with a possible low stand at *c.* 15,000 BP, which probably exposed the southernmost part of the MHPGC Project PEIR Red Line Boundary (to *c.* KP10). After this, sea levels gradually rose to present day levels.

4.2.4.14 This suggests that archaeological potential is likely to be focused on the English part of the MHPGC Project PEIR Red Line Boundary (out to around KP10), in the areas exposed as dry land following the retreat of the glaciers and reduced sea levels. The nearshore parts of the Fth 1 and Fth 2 units extend close to this area (**Figure 4.6**, **Figure 4.7** and **Figure 4.8**) and exposure and continued deposition of these units is therefore possible, during the Late Upper Palaeolithic and Mesolithic periods. Cores in this area (VC 134) and the seismic data show that the upper parts of the unit have undergone erosion, potentially associated with the marine transgression. However, uneroded areas may survive and hold archaeological and palaeoenvironmental potential dating to these periods.

4.2.5 Palaeolandscape assessment and prehistoric archaeological potential

4.2.5.1 This section considers the potential for submerged prehistoric remains, including archaeological sites, palaeolandscape elements and palaeoenvironmental evidence, to be present within the Marine and Intertidal Archaeology Study Area.

4.2.5.2 The prehistoric archaeological record of the UK covers the period from the earliest hominin occupation, potentially as far back as 970,000 BP, to the “end” of the Iron Age and the Roman invasion of Britain in AD 43. The coastline of the UK changed drastically during early prehistory and large tracts of what is now the seabed were once sub-aerially exposed.

4.2.5.3 Prehistoric archaeological potential is gauged with reference to evidence for human activity in Britain during each period and the contemporary environment of the area under scrutiny, also considering depositional and post-depositional factors through interpretation of geological deposits present. Deposits with potential are generally those laid during periods of sub-aerial exposure or by fluvial process, rather than sub-glacial or marine deposits. However, there is also potential for archaeological material to be redeposited or reworked within secondary contexts resulting from fluvial erosion or glacial processes (Hosfield, 2004).

Lower and Middle Palaeolithic (c. 970,000 to 57, 000BP; MIS 25 to 4)

4.2.5.4 The Lower and Middle Palaeolithic span most of the known human history of the British Isles (*c.* 970,000 BP to 57,000 BP; MIS 25 to 4). Pre-dating the earliest recorded modern human remains, these periods witnessed the occupation of the British Isles and associated palaeolandscape by human ancestors, such as *homo heidelbergensis* and *h. neanderthalensis*.

4.2.5.5 The oldest postulated Quaternary geological units within the Marine and Intertidal Archaeology Study Area that encompass the Early Palaeolithic were identified within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, although the extent of

the units are not fully mapped. These comprise the Aberdeen Ground, Ling Bank, Fisher and Coal Pit formations, spanning MIS100 to MIS 3. A range of glacial or sub-glacial and marine environmental deposition conditions have been attributed to these units which would have been incompatible with hominid activity.

4.2.5.6 Additionally, these units pre-date the earliest known human activity within Scotland which dates to the Late Upper Palaeolithic. Whilst evidence for human activity in England does extend into these earlier periods, no evidence has been identified from the available heritage records and archaeological potential is therefore considered to be low.

4.2.5.7 Archaeological assessment of available cores and sediments has determined that the geoarchaeological potential is also low.

4.2.5.8 The overall potential for archaeological remains within the Aberdeen Ground, Ling Bank, Fisher and Coal Pit formations remains of Early and Middle Palaeolithic date is therefore considered to be low.

Upper Palaeolithic (c. 57, 000 to 11, 000B; MIS 3 to 2), Mesolithic and Neolithic (c. 11,400BP to 1,200BP)

4.2.5.9 The Upper Palaeolithic (57,000 BP to 11,700 BP; MIS 3 to 2) spans the Mid to Late Devensian, including the Dimlington and Loch Lomond stadials. There is evidence of hominin activity in Britain in the Mid to Late Devensian, after a period yet to be associated with occupation (180,000 to 60,000 BP). Flint artefacts and skeletal remains indicating the presence of *h. neanderthalensis* or *h. sapiens* (modern humans) have been identified in Kent's Cavern (Devon) (Hijma, 2011), Dartford (Kent) (Wenban-Smith, 2010), Gower (Wales) (Dinnis, 2012) and Creswell (Derbyshire) (Pike, 2005).

4.2.5.10 The Wee Bankie and Marr Bank formations are evidence of the extent of the Devensian glaciation. Formation, identified within that section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South only, but which has been interpreted as forming a sub-glacial till laid down by the Late Devensian glaciation. The Wee Bankie Formation has only been identified within the offshore export cable elements of the Red Line Boundary (i.e. not within the area of the MHPGC PEIR Red Line Boundary that overlaps with Morven North and Morven South) and, being comprised of sub-glacial diamicton, has been concluded to have no potential for *in situ* archaeological remains. Meanwhile, the Marr Bank Formation has been interpreted as glaciomarine in origin, but channelling may indicate a lower sea level, potentially as part of outwash plain. Such conditions are deemed to have been inhospitable for human occupation and, in addition, a minimum date for this Formation falls within the Dimlington stadial, when the British Isles are thought to have been uninhabited.

4.2.5.11 There is some geoarchaeological potential within the sediments identified as 'Marr Bank', which were found to contain very fragmented shell, suggestive of transportation. These remains, should it possible to date them, may indicate the extent and progress of ice sheet retreat, however previous work has suggested this potential to be limited (MSDS Marine, 2025).

4.2.5.12 The archaeological potential for the Wee Bankie and Marr Bank Formation deposits is therefore considered to be low.

4.2.5.13 The Forth Formation deposits have been identified throughout the MHPGC Project PEIR Red Line Boundary and may represent Early Holocene as well as Late Devensian deposition. The depositional environment of these deposits is likely to have been more varied.

4.2.5.14 The Forth Formation originated in the Late Glacial and Holocene periods and can be divided into two members spanning this period: the Largo Bay Member and the St Andrew's Bay Member (BGS 1986). The Largo Bay Member of the Forth Formation is thought to have been deposited during the Late Glacial interstadial (Merritt *et al*., 2003). Although sea levels were likely regressing on the east coast of Scotland during this period following the high stand during the Late Glacial period (Stoker *et al*. 2008), deposits within the inner estuaries in eastern Scotland provide evidence of raised marine deposits in the Windemere interstadial (Holloway *et al*., 2002; Peacock, 1999) (*c*. 15,000 to 13,000 BP), demonstrating the likelihood that the northern parts of the MHPGC Project PEIR Red Line Boundary in English and Scottish waters outside of that which overlaps with Morven North and Morven South experienced marine to glaciomarine conditions during this period. This correlates with the marine and glaciomarine characteristics of the Fth 1, Fth 2 and Fth 3 units.

4.2.5.15 During the Loch Lomond stadial (*c.* 13,000 to 12,000 BP) colder conditions were re-established, and there was a short-lived period of ice sheet expansion between *c.* 13,000 BP to 12,000 BP during which sea levels fell (Stoker *et al.*, 2008). Around the east coast of Scotland, evidence of this now-submerged shoreline, termed the Main Late Glacial Shoreline, has been encountered. Deposition of the St. Andrews Bay Member of the Forth Formation is thought to have begun during this cold period and continued throughout the Holocene (Merritt *et al.*, 2003; Stoker *et al.*, 2008). Evidence of the St Andrew's Member has been identified in the MHPGC Project PEIR Red Line Boundary by the BGS (Figure 4.5). The deposit represents shallow marine or estuarine environments (Gatliff *et al.*, 1994). The channelling noted within the Fth 1, Fth 2 and Fth 3 units could represent these estuarine environments and the distribution of Fth 1 ties in with the recorded locations of the St. Andrews Bay Member by the BGS.

4.2.5.16 The estuarine elements of the deposit indicates broad archaeological and palaeoenvironmental potential associated with the Forth Formation, spanning the Late Upper Palaeolithic and potentially Mesolithic.

4.2.5.17 The Mesolithic period (11,700 to 6,000 BP; MIS 1) correlates with the start of the Holocene and the culmination of the Last Glacial period. As climatic conditions ameliorated during the onset of the Holocene, carr woodland would have developed in stable terrestrial areas which could support a much greater variety and density of fauna. Meltwater from the recently retreated Devensian glaciers shaped the landscape with river valleys and lakes, which, in turn, supported new and extensive flora and fauna. These fluvial and adjacent environments provided ideal conditions for human exploitation. Available resources would have increased as the local flora and fauna became more diverse, and the range of environmental conditions would have presented more varied opportunities for exploitation.

4.2.5.18 Sea level modelling indicates that the Marine and Intertidal Archaeology Study Area witnessed a drop from *c.* 18,000 BP and reaching a low stand by *c.* 15,000 BP but with only the English nearshore shore significantly exposed (up to 20km). The units of the Forth Formation in this extend close to areas exposed as dry land following the recession of the glaciers. Active continued formation of these units is therefore possible during the Late Upper Palaeolithic and Mesolithic. Whilst upper parts of the unit have undergone erosion, potentially associated with the marine transgression, uneroded areas may survive and hold archaeological and palaeoenvironmental potential. Over 70 flint artefacts of Mesolithic date have been recorded within the Marine and Intertidal Archaeology Study Area (Figure 4.63; ST_002; ST_004-9; and TI_010; none within 1km of the MHPGC Project PEIR Red Line Boundary) indicating a higher potential for remains of Mesolithic date within the English nearshore area. However, these were apparently translocated, possibly by the cliff-top industrial activity or eroded from the cliff and hence may have originally been terrestrially deposited (see **Section 4.5.5**).

4.2.5.19 Forth Formation deposits therefore have a broad low to locally moderate potential for archaeological remains, with the higher potential being Fth 3 and Fth 2 within the English nearshore waters where *in situ* remains may be found associated with the formerly sub-aerially exposed landscape in this area.

4.2.5.20 Sea level modelling indicates that sea levels began to rise again after *c.* 15,000 BP, with those areas in English waters (between MHWS and *c.* KP10 that had been sub-aerially exposed becoming gradually inundated towards present day MHWS. Holocene deposits (MIS 1) have been recorded in both MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South (Surface Sediment), inundated from *c.* 18,0000BP; and the MHPGC Project PEIR Red Line Boundary in English waters (Hol 1-3; Surface Sediments).

4.2.5.21 These have all been identified as being deposited within fully marine environment. Considering the previously sub-aerially exposed areas in the English nearshore, there is potential here for translocated archaeological remains to be found within these deposits particularly when considering the high number of Mesolithic flints recovered from the nearshore south of the landfall. The potential for archaeological remains be present within Hol 1, Hol 2, Hol 3 and Surface Sediment is considered to be broadly low, but marginally higher between MHWS and *c.* KP10 in English nearshore waters.

4.2.5.22 The likelihood of encountering deposits with palaeoenvironmental potential is higher within the marine zone than onshore, because of the possible depositional environment of units Fth 2 and Fth 3 and their proximity to formerly sub-aerially exposed landscape. **Volume 3, Annex 4.1: Onshore**

Archaeological Desk-Based Assessment identified a small area of alluvium with possible palaeoenvironmental potential just within the western limit of the Onshore Archaeology Study Area.

4.3 Baseline environment: results of geophysical anomalies

4.3.1.1 A total of 262 surface anomalies of potential archaeological were identified within the MHPGC Project PEIR Red Line Boundary, of these, nine originate from the 2023 archaeological assessment within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South. The anomalies are categorised by potential in Table 4.3: Distribution of archaeological anomalies by potential **Table 4.3**.

Table 4.3: Distribution of archaeological anomalies by potential

Potential	Scottish waters	English waters	Total
Low	159	56	**215**
Medium	12	11	**23**
High	5	19	**24**
Total	**176**	**86**	**262**

4.3.1.2 The distribution of anomalies is shown in **Figure 4.11** and is fairly uniform across the surveyed area. The ratios and distribution of medium and low potential anomalies are relatively consistent with a typical archaeological assessment of data. However, there is a notable and atypical number of high potential anomalies extending from KP41 to KP4.

4.3.1.3 The distribution of anomalies within the geophysical data shows a consistent approach to the assessment. The high, medium and low potential anomalies are discussed below according to their assessed potential.

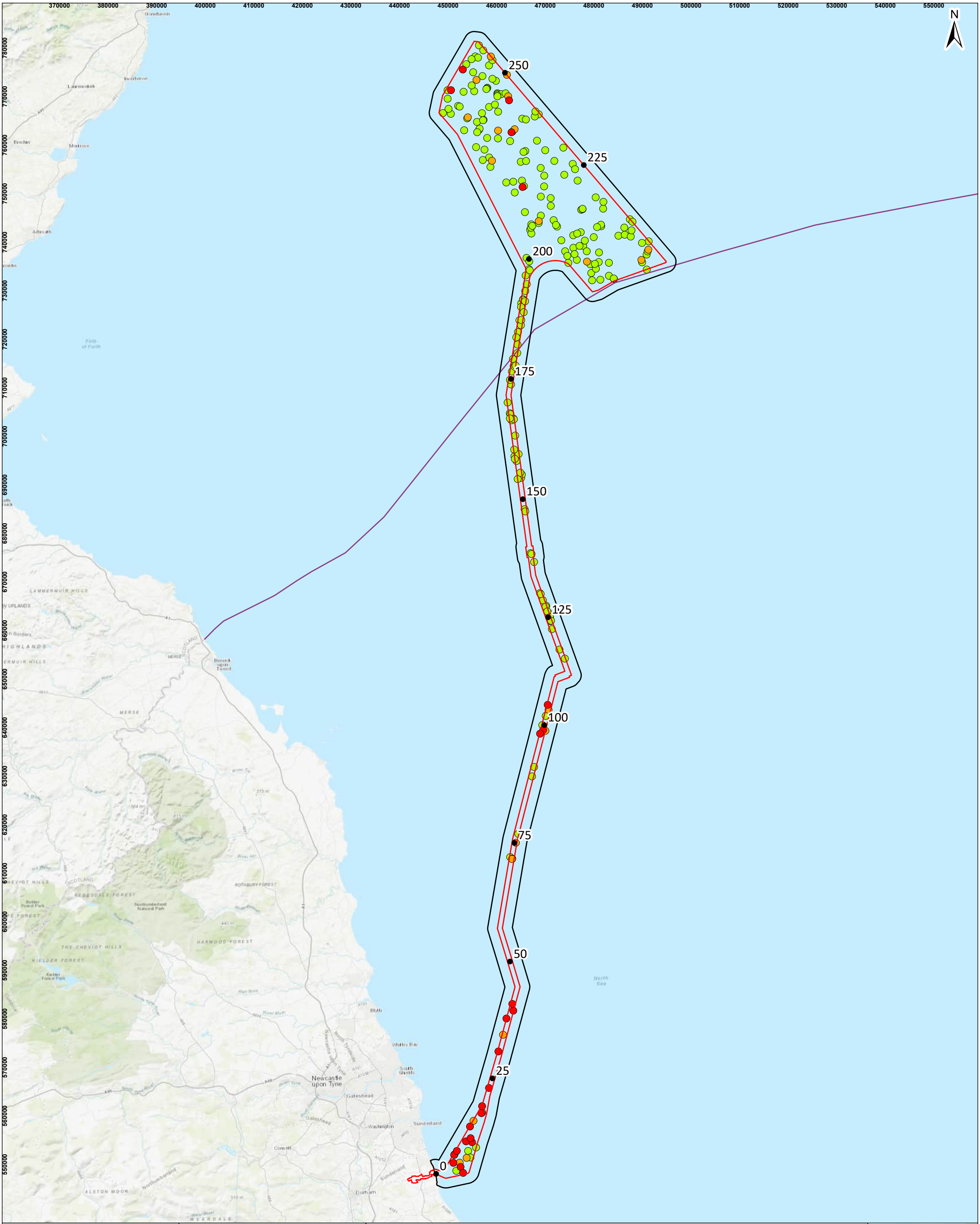
4.3.2 Low potential anomalies

4.3.2.1 A total of 215 anomalies interpreted as of low archaeological potential were identified within the MHPGC Project PEIR Red Line Boundary (+50m), of which 159 are within Scottish waters and 56 are within English waters. The anomalies can be categorised as follows in **Table 4.4**.

Table 4.4: Low potential anomaly categories

Potential	Scottish waters	English waters	Total
Chain, cable or rope	51	17	**68**
Fishing gear	7	3	**10**
Likely geological	24	7	**31**
Linear feature	9	3	**12**
Mound	1	0	**1**
Potential debris	64	24	**88**
Seabed disturbance	3	2	**5**
Total	**159**	**56**	**215**

4.3.2.2 The anomalies interpreted as of low archaeological potential are a mixture of small features, often boulder-like, or likely to represent modern debris, such as chain, cable, or rope or small items of debris with no features indicating archaeological potential. Each anomaly was reviewed and interpreted to be of low archaeological potential. A further review was undertaken following the assessment of the survey area extents to ensure each anomaly was viewed in the wider context, and to identify distributions of anomalies which may indicate larger features of higher archaeological potential.



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0014				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.11: DISTRIBUTION OF ARCHAEOLOGICAL ANOMALIES	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS				
0 10 20 30 km Scale@A3:1:700,000	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Archaeological Anomalies

Potential

- High
- Medium
- Low

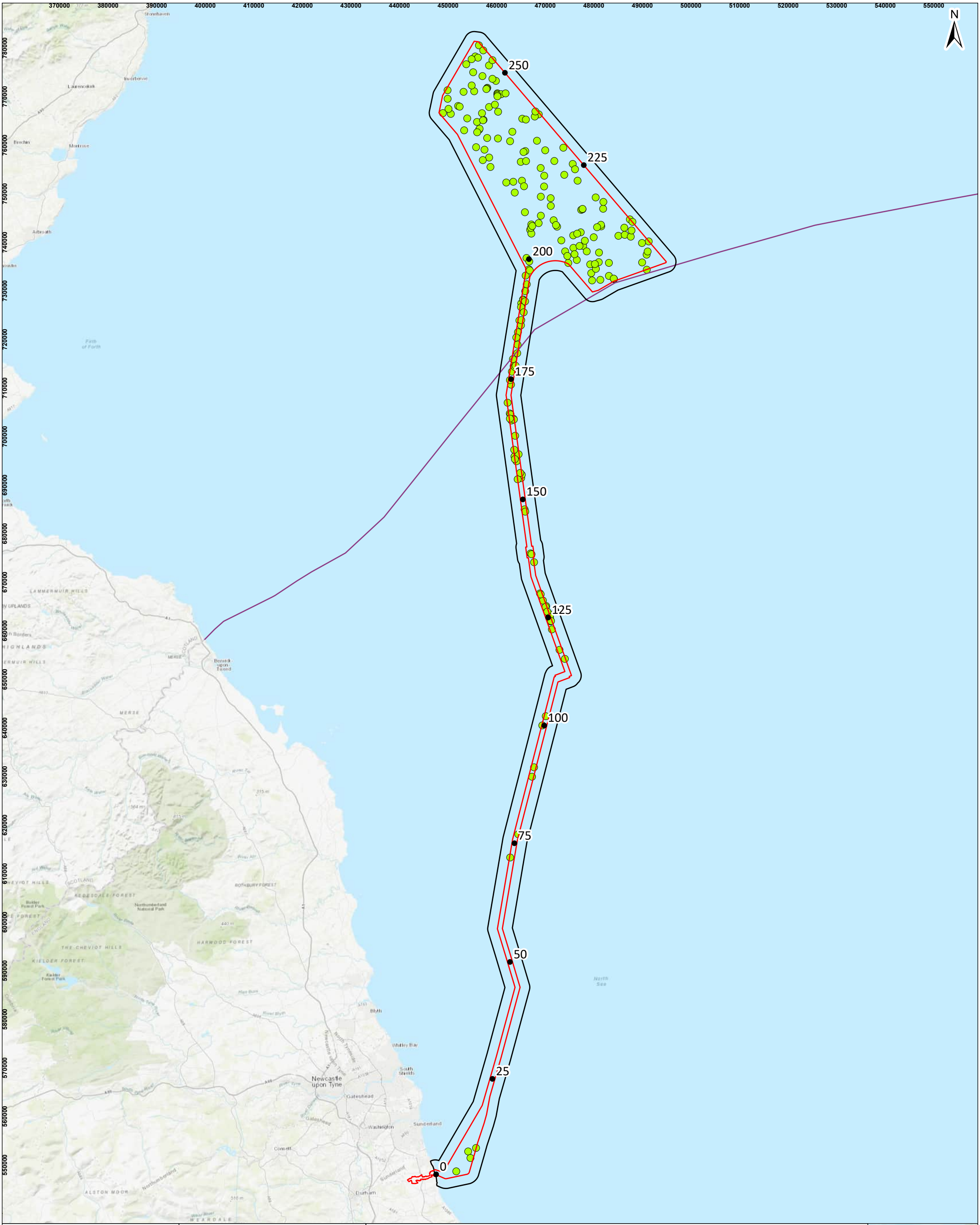
4.3.2.3 **Table 4.5** provides a brief justification for the interpretation of each category of low potential anomalies. To note, the descriptions below are generalised and each anomaly is interpreted based on individual characteristics, other anomalies within the wider area and seabed characterisation.

Table 4.5: Low potential anomaly descriptions

Anomaly category	Description
Chain, cable, or rope	Features identified as chain, cable, or rope are generally identified as long, linear, or curvilinear features with little or no measurable height. The length and form will generally preclude their assessment as of a higher archaeological potential.
Fishing gear	Features identified as fishing gear may include pot strings where small features are linked by rope like features, features with a mid-water component indicating snagged nets, or features associated with trawl scars.
Likely geological	Features identified as likely geological, are generally precautionary identifications where the form is indictive of a geological feature but may be of a size, or form, which is unusual in the surrounding area.
Linear feature	Linear features are anomalies which primarily consist of a single linear element, but that do not appear to be chain, cable or rope. A single isolated linear feature, whilst potentially indicative of anthropogenic debris, may not warrant an interpretation of higher archaeological interest.
Mound	Mounds can represent buried material or anthropogenic interest. The archaeological potential is determined through the assessment of the size, form, related features, and associated magnetic anomalies.
Potential debris	Features identified as potential debris will generally display characteristics indicating anthropogenic origin, such as straight or angular edges. Boulder like features, with associated magnetic anomalies can also be categorised as potential debris.
Seabed disturbance	Features identified as seabed disturbances are where the main characteristic is a change in the seabed surface that may indicate either low lying material, or partially buried material. The potential will be determined based on the size, associated magnetic anomalies, and the surrounding environment.

4.3.2.4 Low potential anomalies have been assessed against all available evidence and are deemed unlikely to be of archaeological significance and as such are not discussed further within the results section of this technical report.

4.3.2.5 The distribution of low potential anomalies is shown in **Figure 4.12** and a gazetteer of low potential anomalies, including positions and dimensions, can be found in **Appendix A**.



Morven Offshore Wind Farm

MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0015

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Data Sources:
BP, Ordnance Survey,

Drawing Title:
FIGURE 4.12: DISTRIBUTION OF LOW POTENTIAL ARCHAEOLOGICAL ANOMALIES

Service Layer Credits:
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS

0 10 20 30 km

Scale@A3:1:700,000

VER	DATE	DETAILS	BY	CHECK
00	07/08/2026	Initial Issue	MJ	FLP
01	07/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Archaeological Anomalies
Potential
- High
- Medium
- Low



4.3.3 Medium potential anomalies

4.3.3.1 A total of 23 anomalies interpreted as of medium archaeological potential were identified within the MHPGC Project PEIR Red Line Boundary (+50m), of which 12 are within Scottish waters and 11 are within English waters. The anomalies can be categorised as follows in **Table 4.6** and the distribution is presented in **Figure 4.13**.

Table 4.6: Medium potential anomaly categories

Potential	Scottish waters	English waters	Total
Mound	1	7	**8**
Potential debris	9	2	**11**
Wreck debris		2	**2**
Likely geological	2	0	**2**
Total	**12**	**11**	**23**

4.3.3.2 The anomalies interpreted as of medium archaeological potential have characteristics that indicate a likelihood of representing anthropogenic material that has the potential to be of archaeological interest, or where a precautionary approach has been taken for anomalies where the ID is not clear.

4.3.3.3 Each medium potential anomaly is discussed, along with an image, within this section of this technical report and a gazetteer of medium potential anomalies, including positions and dimensions can be found in **Appendix A.**

Medium potential anomalies in Scottish waters

Medium potential MOR23_83

4.3.3.4 Medium potential MOR23_083 (**Figure 4.14**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South between KP255 and KP254. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.5 The anomaly is visible in the SSS data as a substantial, irregular and prominent feature, measuring 15.4 by 2.5m, with a measurable height of 0.6m. The form of the shadow indicates an irregular surface. The feature is similar within the MBES data and bisects a sandwave. The origin of the feature is unclear, however, the form and irregularity may indicate anthropogenic origin and a medium potential rating has been assigned due to the size.

Medium potential MOR23_085

4.3.3.6 Medium potential MOR23_085 (**Figure 4.15**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South between KP250 and KP249. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.7 The anomaly is visible in the SSS data as three distinct features or clusters of features, in a line with overall dimensions of 13.8 by 2.1m, with a measurable height of 1.0m. The form of the northwestern feature is indicative of anthropogenic debris, the association with the other features may indicate a similar origin. Whilst visible in the MBES data, the area around the anomaly is not dissimilar to other seabed features within the area. It is likely the anomaly is geological in origin, however, the size and potential for anthropogenic origin means a precautionary medium potential rating has been assigned.

Medium potential MOR23_058

4.3.3.8 Medium potential MOR23_058 (**Figure 4.16**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 7.9km south of the northernmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.9 The anomaly is visible in the SSS data as a cluster of features measuring 16.1 by 10.9m, with a measurable height of 0.2m. The form of the features is potentially indicative of anthropogenic debris. Within the MBES the anomaly is visible as two ovular depressions surrounded by a slight ridge of seabed. The depressions are separated by a small ridge. It is not clear from the data whether the form of the anomaly within the SSS data is a result of the slight ridge and the depressions or the presence of potential debris. A precautionary medium potential rating has been assigned.

Medium potential MOR_093

4.3.3.10 Medium potential MOR23_093 (**Figure 4.17**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 13.3km south-southeast of the northernmost corner. The anomaly is visible in the SSS, is covered by the MBES data, and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.11 The anomaly is visible in the SSS data as two prominent features, linear in form, potentially indicative of anthropogenic debris, and covering an area 14.6 by 10.1m, with a measurable height of 0.2m. The anomaly is not definitively visible within the MBES data, although it is noted it lies in the trough between two sandwaves. The form of the features indicates anthropogenic material of unknown origin and their size has justified a medium potential rating.

Medium potential MOR23_021

4.3.3.12 Medium potential MOR23_021 (**Figure 4.18**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 6.0km east-southeast of the western most corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.13 The anomaly is visible in the SSS data as two prominent, but incoherent, clusters of potential debris, linked by a thin, linear feature. The overall dimensions of the anomaly are 10.6 by 4.4m, with a measurable height of 0.4m. Within the MBES data, the features of the anomaly are not visible, however, they are associated with scour, bisecting the edge of a sandwave. The scour indicates a large feature that is impacting on the movement of the sandwave. The location could potentially indicate the presence of additional, but buried, material. The interpretation of the anomaly as potential debris, the size of the anomaly and the potential for partial burial has justified a medium potential rating.

Medium potential MOR23_101

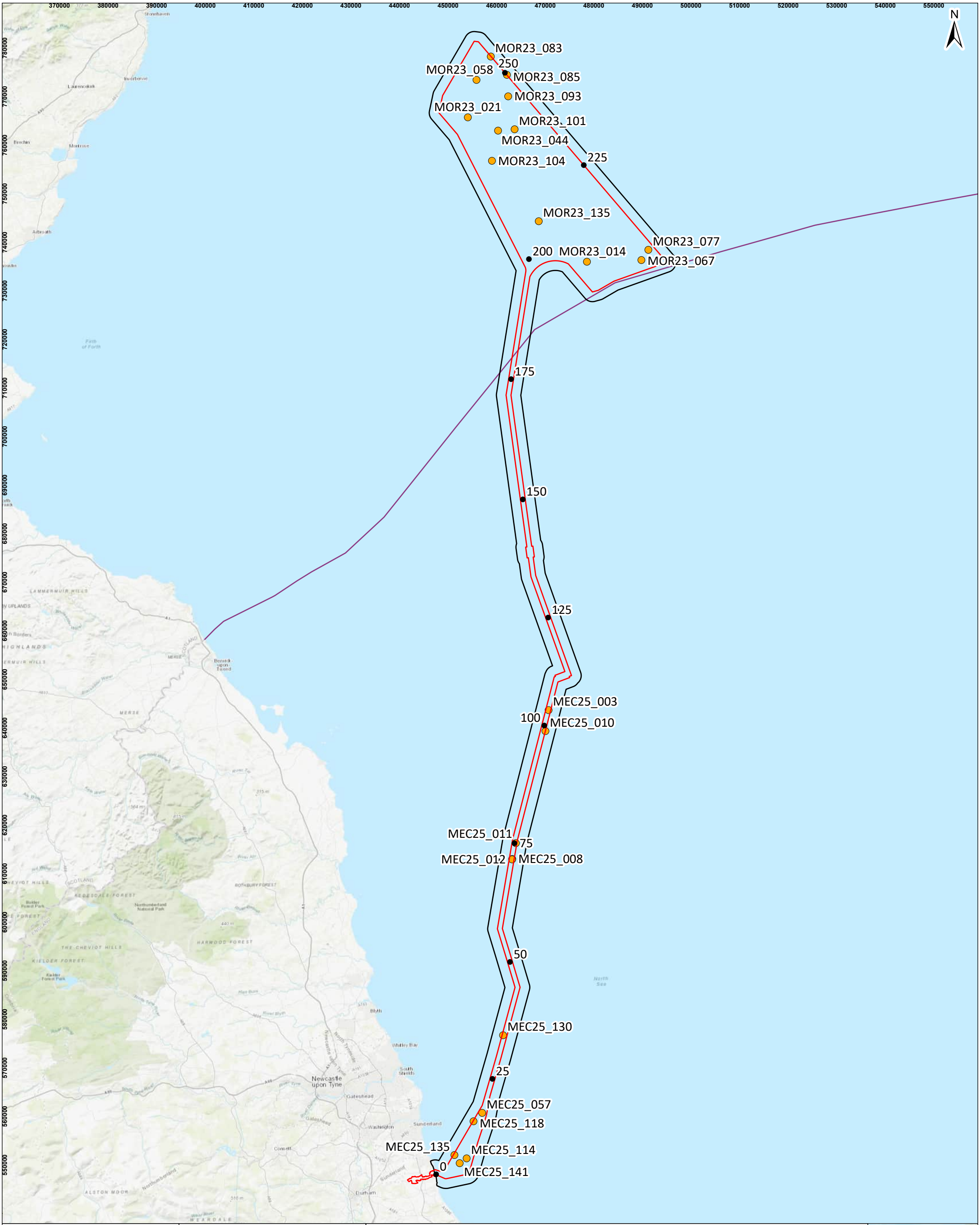
4.3.3.14 Medium potential MOR23_101 (**Figure 4.19**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 19.9km south-southeast of the northernmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.15 The anomaly is visible in the SSS as two prominent linear features, the largest of which measures 9.1m, in association with smaller features within the immediate vicinity. The MBES data shows the anomaly lying within a large scour pit measuring *c.* 35 by 30m. It is not clear within either dataset whether the features are partially buried or whether they are fully exposed. Whilst the origin of the anomaly is not clear, it is highly likely to be of anthropogenic origin and the size may indicate archaeological interest, therefore a medium potential rating has been assigned.

Medium potential MOR23_044

4.3.3.16 Medium potential MOR23_044 (**Figure 4.20**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 19.0km south-southeast of the northernmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.17 The anomaly is visible in the SSS data as a prominent 'L' shaped feature, measuring 8.6 by 2.6m. The associated shadow is irregular and the form is suggestive of an anthropogenic origin. Within the MBES data, the anomaly is visible as an isolated and prominent mound, with a measurable height of 0.6m. Whilst not possible to interpret the anomaly further, the presence of a large feature of likely anthropogenic origin, in association with a mound (potentially indicating further buried material), justifies a medium potential rating.



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0016				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.13: DISTRIBUTION OF MEDIUM POTENTIAL ARCHAEOLOGICAL ANOMALIES	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS				
0 10 20 30 km Scale@A3:1:700,000	VER	DATE	DETAILS	BY	CHECK
	00	07/08/2026	Initial Issue	MJ	FLP
	01	07/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Archaeological Anomalies

Potential

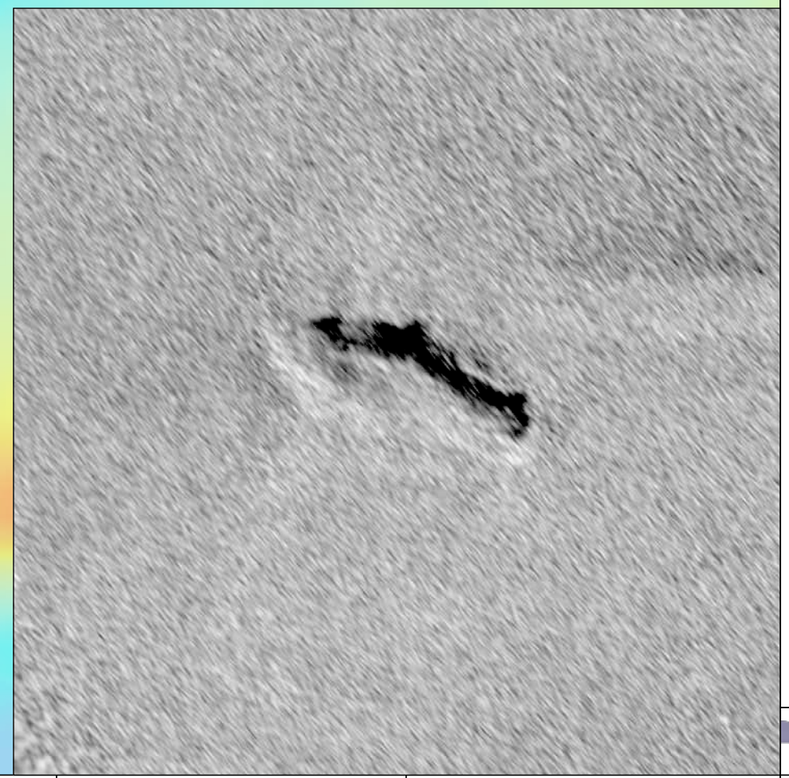
- High
- Medium
- Low

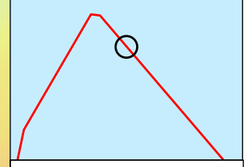
458610 458615 458620 458625 458630 458635 458640 458645 458650 458655 458660 458665 458670 458675 458680 458685 458690

776750 776745 776740 776735 776730 776725 776720 776715 776710 776705 776700 776695

N

MOR23_083





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-70.870

-71.574

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.14: MEDIUM POTENTIAL MOR23_083

0 1 2 3 4 5 Meters

Scale@A3: 1:239

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0017

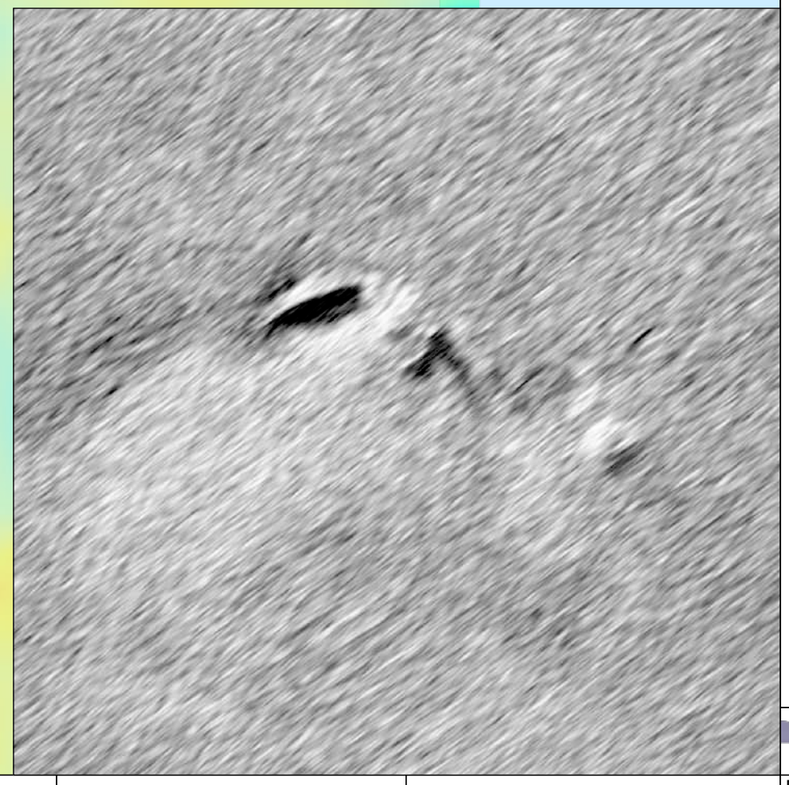
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

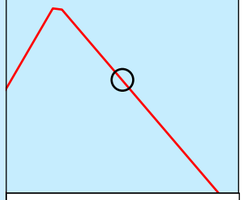
461880 461885 461890 461895 461900 461905 461910 461915 461920 461925 461930

772925 772920 772915 772910 772905 772900 772895 772890 772885

N

MOR23_085





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-67.229

-67.540

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.15: MEDIUM POTENTIAL MOR23_085

0 1 2 3 4 5 Meters

Scale@A3: 1:153

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0018

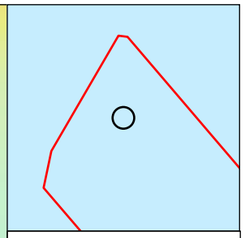
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

455610 455615 455620 455625 455630 455635 455640 455645 455650

771970 771965 771960 771955 771950 771945

N

MOR23_058



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-68.716

-69.422

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.16: MEDIUM POTENTIAL MOR23_058

0 1 2 3 Meters

Scale@A3: 1:121

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0019

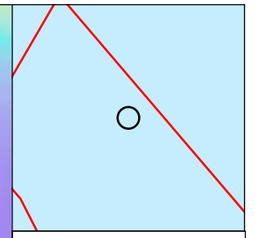
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

462080 462085 462090 462095 462100 462105 462110 462115 462120 462125

768490 768485 768480 768475 768470 768465

N

MOR23_093



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-68.573

-69.144

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.17: MEDIUM POTENTIAL MOR23_093

0 1 2 3 Meters

Scale@A3: 1:127

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0020

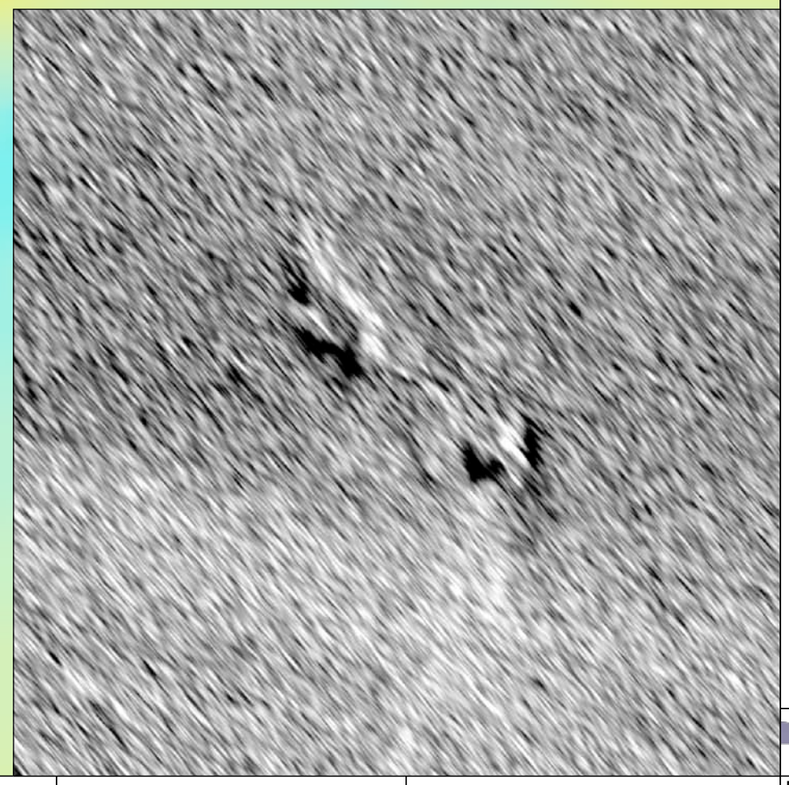
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

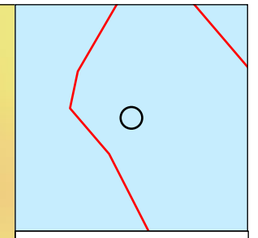
453715 453720 453725 453730 453735 453740 453745 453750

764290 764285 764280 764275 764270 764265

N

MOR23_021





LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

Medium

Multibeam Bathymetry

Depth (m) LAT

-68.078

-68.472

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.18: MEDIUM POTENTIAL MOR23_021

0 1 2 3 Meters

Scale@A3: 1:114

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0021

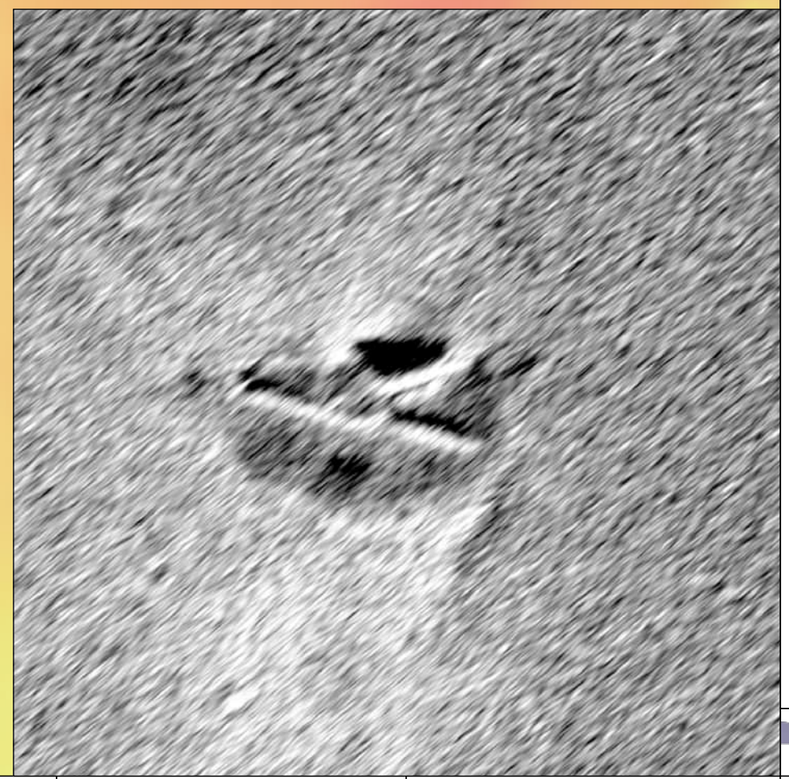
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

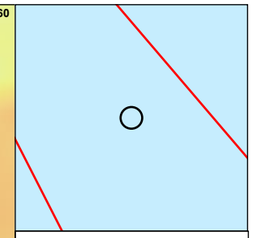
463300 463305 463310 463315 463320 463325 463330 463335 463340 463345 463350 463355 463360

761695 761690 761685 761680 761675 761670 761665 761660 761655

N

MOR23_101





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-66.534

-67.314

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.19: MEDIUM POTENTIAL MOR23_101

0 1 2 3 Meters

Scale@A3: 1:172

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0022

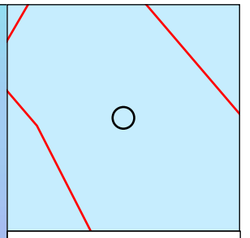
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

459890 459895 459900 459905 459910 459915 459920 459925 459930 459935

761465 761460 761455 761450 761445 761440 761435 761430

N

MOR23_044



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-68.930

-69.647

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.20: MEDIUM POTENTIAL MOR23_044

0 1 2 3 Meters

Scale@A3: 1:141

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0023

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

Medium potential MOR23_104

4.3.3.18 Medium potential MOR23_104 (**Figure 4.21**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 24.8km south of the northernmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.19 The anomaly is visible in the SSS data as two prominent and irregular features, measuring 10.8 by 7.8m and 8.4 by 5.1m. The form is unusual within the wider dataset and the irregularity may indicate anthropogenic origin, however, they may represent geological features. Within the MBES data, only the northwestern feature is visible, as a prominent mound with an irregular surface which has the potential to indicate partially buried material. Due to the indeterminate origin, the anomaly has been assigned a precautionary medium potential rating.

Medium potential MOR23_135

4.3.3.20 Medium potential MOR23_135 (**Figure 4.22**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 24.8km northwest of the southeastern corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.21 The anomaly lies at the edge of the SSS line and thus is only partially ensonified. The anomaly is visible as an incoherent cluster of primarily linear features, indicating anthropogenic debris. Within the SSS data, the visible extents measure 29.1 by 15.4m, with a measurable height of 0.4m. Within the MBES data, the anomaly is visible primarily as an area of disturbed seabed, with small mounds and areas of scour extending to the south of the features visible in the SSS data. The extents in the MBES data are 54.3 by 26.8m. The origin of the anomaly is not clear and though it likely has and anthropogenic origin, this may be characterised by modern debris, such as fishing gear.

Medium potential MOR23_077

4.3.3.22 Medium potential MOR23_077 (**Figure 4.23**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 4.2km northwest of the easternmost corner. The anomaly is visible in the SSS and MBES data and has an associated magnetic anomaly of 19nT. The location does not correlate with any UKHO or Canmore records.

4.3.3.23 The anomaly is visible in the SSS data as a large (3.6 by 3.1m) feature, with smaller features to the northwest, northeast, southwest and southeast, over an area 28.0 by 24.3m, with a measurable height of 1.8m. The form of the features, their distribution and the associated magnetic anomaly indicate an anthropogenic origin of potential archaeological interest. Within the MBES data, the anomaly is visible as a prominent mound with visible but incoherent features to the southwest, associated with areas of scour. Although not conclusive, the form could indicate the remains of a wrecked vessel, therefore, a medium potential rating is considered appropriate.

Medium potential MOR23_067

4.3.3.24 Medium potential MOR23_067 (**Figure 4.24**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 5.1km west of the easternmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

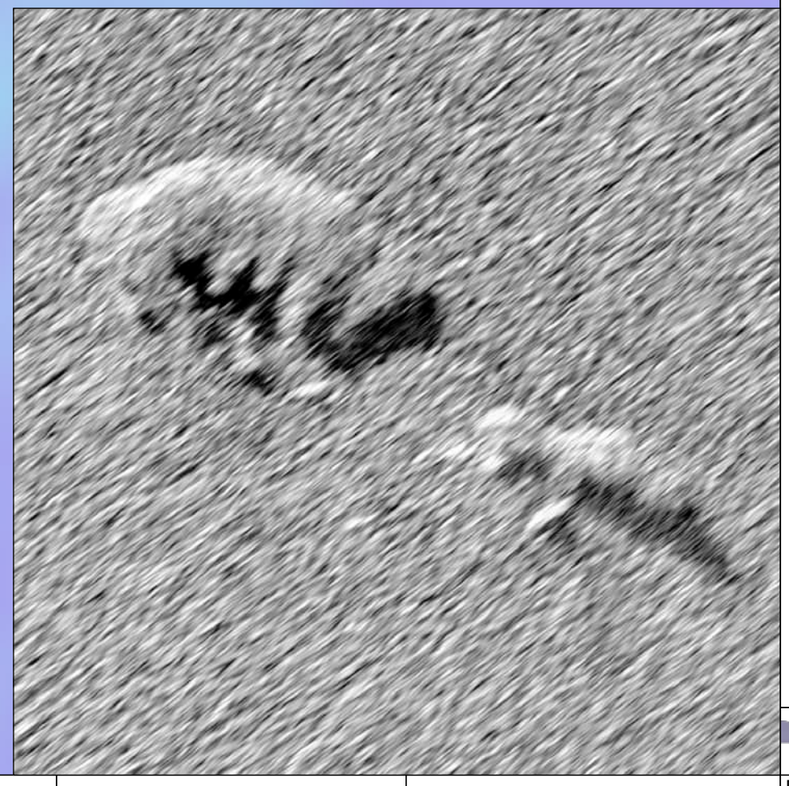
4.3.3.25 The anomaly is visible in the SSS data as an area of associated small features measuring 25.7 by 4.1m, with a measurable height of 0.3m. Individually, the form of the features would suggest boulders, however, the distribution is unusual in the surrounding environment, with the closest (single) boulders being over 500m away. Within the MBES, the anomaly is visible as a series of depressions or scour pits, likely caused by the features. The probability is that the anomaly is geological in origin, however, this is not certain and a precautionary medium potential rating has been assigned.

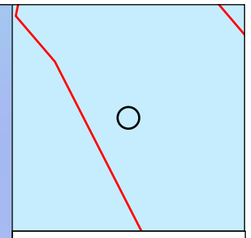
458550 458555 458560 458565 458570 458575 458580 458585 458590

755275 755270 755265 755260 755255 755250 755245

N

MOR23_104





LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

Medium

Multibeam Bathymetry

Depth (m) LAT

-73.012

-73.631

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.21: MEDIUM POTENTIAL MOR23_104

0 1 2 3 Meters

Scale@A3: 1:122

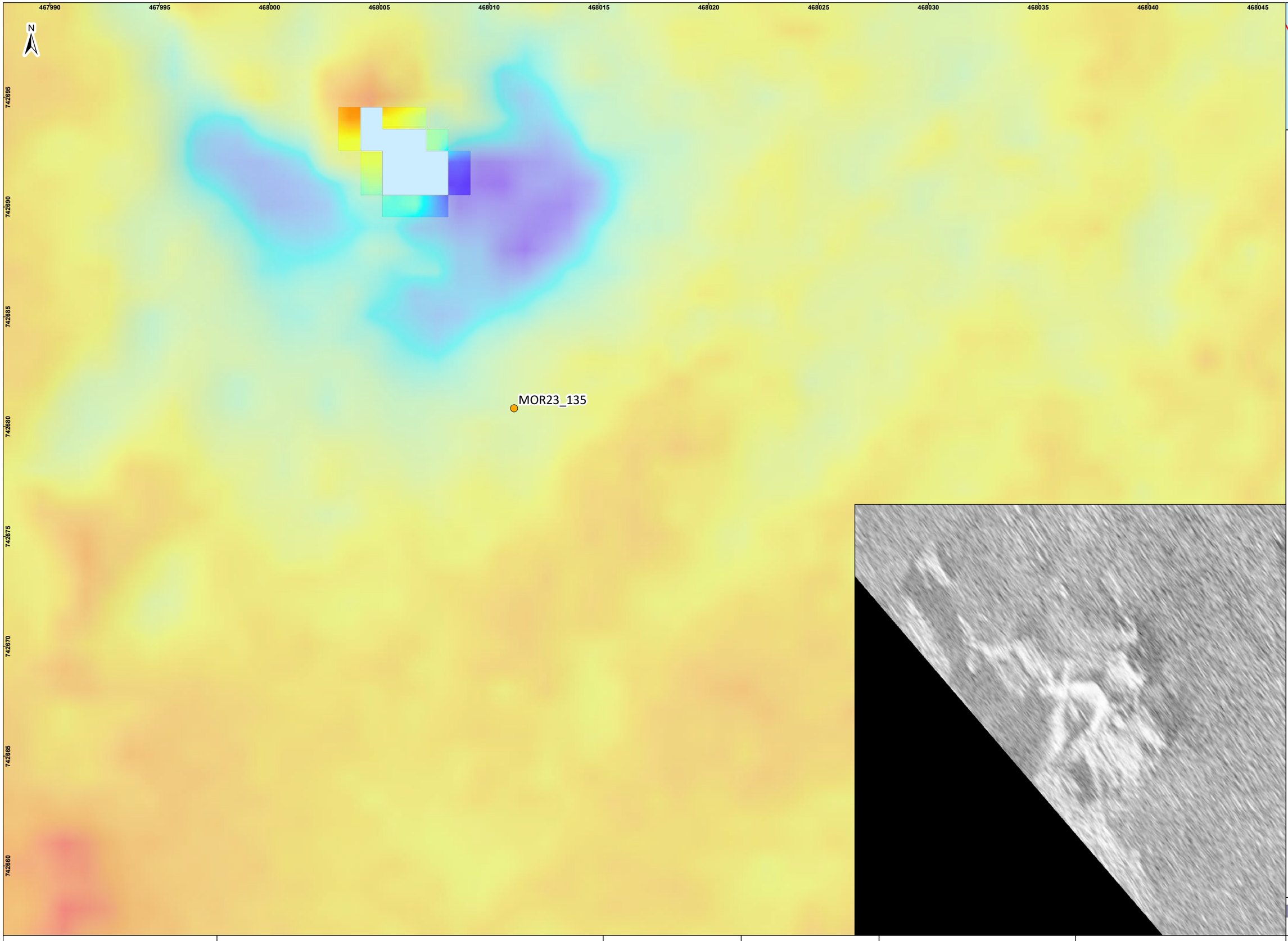
Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

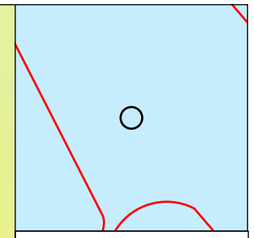
Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0024

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-68.638

-69.258

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.22: MEDIUM POTENTIAL MOR23_135

0 1 2 3 Meters

Scale@A3: 1:157

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0025

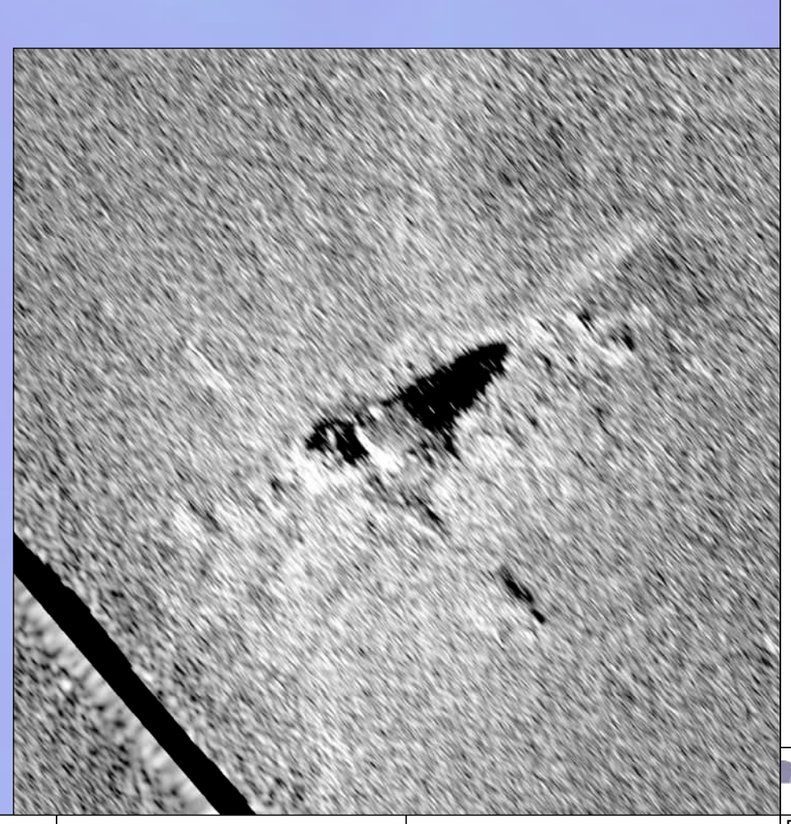
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

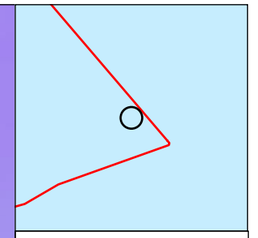
490475 490480 490485 490490 490495 490500 490505 490510

736475 736470 736465 736460 736455 736450

N

MOR23_077





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-73.217

-75.030

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.23: MEDIUM POTENTIAL MOR23_077	0 1 2 3 Meters Scale@A3: 1:101	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0026

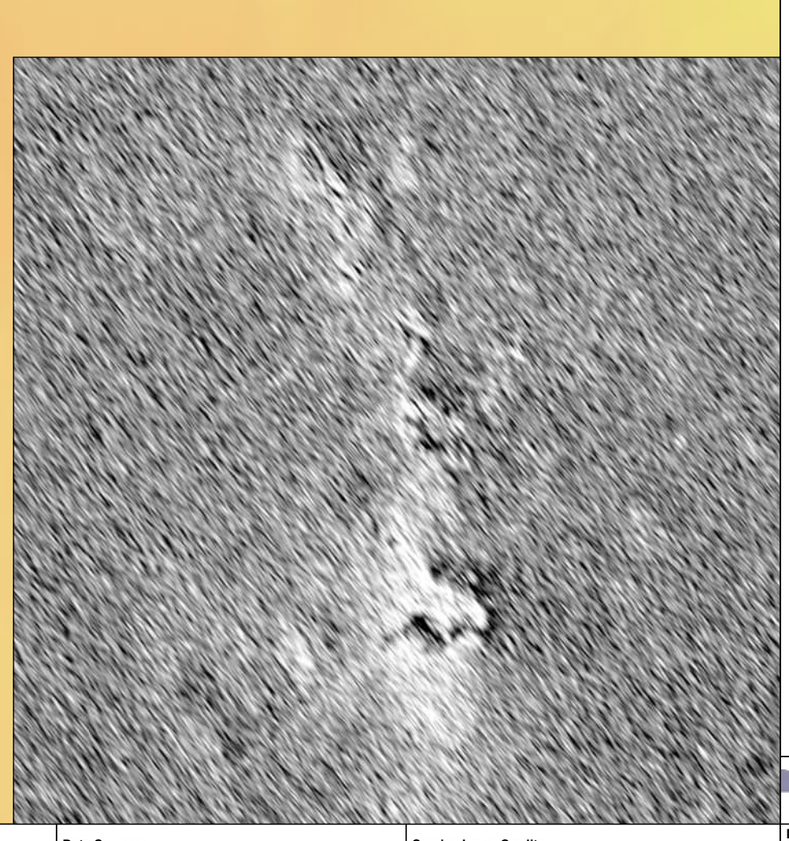
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

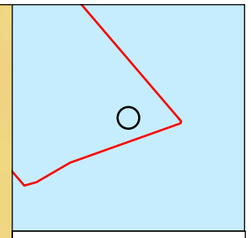
489010 489015 489020 489025 489030 489035 489040 489045 489050 489055 489060

734390 734385 734380 734375 734370 734365 734360 734355

N

MOR23_067





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-72.695

-73.355

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.24: MEDIUM POTENTIAL MOR23_067

0 1 2 3 Meters

Scale@A3: 1:150

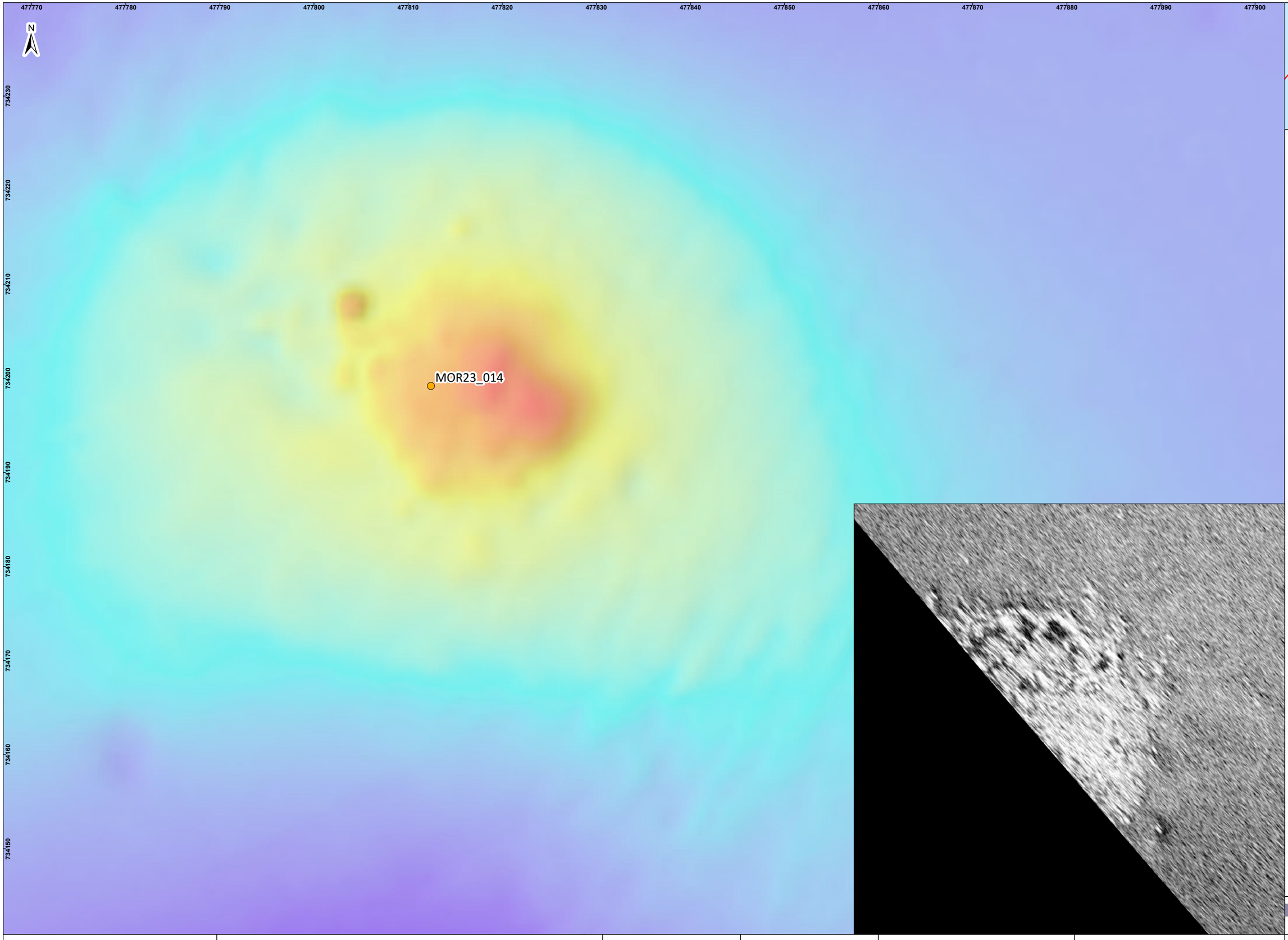
Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

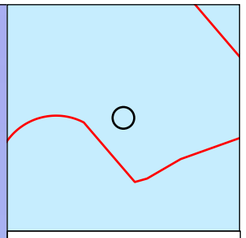
Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0027

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-67.984

-70.416

Morven Offshore Wind Farm

MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.25: MEDIUM POTENTIAL MOR23_014	0 1 2 3 Meters Scale@A3: 1:366	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0028

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

Medium potential MOR23_014

4.3.3.26 Medium potential MOR23_014 (**Figure 4.25**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 6.3km north of the southern corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.3.27 The anomaly is visible in the SSS data as an area of small features and coarse seabed with higher reflectivity that the surrounding area. Within the MBES data, the anomaly is visible as a prominent and isolated mound, measuring 28.6 by 17.5m, with a measurable height of 1.3m. The surface of the mound is irregular, with a further concentration of features to the northwest, some of which appear linear in form and thus are potentially indicative of anthropogenic material. The form of the mound and the association with potentially anthropogenic material, could indicate the presence of partially buried material of archaeological interest, therefore a precautionary medium potential rating is considered appropriate.

Medium potential anomalies in English waters

Medium potential MEC25_003

4.3.3.28 Medium potential MEC25_003 (**Figure 4.26**) lies between KP104 and KP103. The anomaly is visible in both the SSS and the MBES data and has no associated magnetic anomaly although it lies *c.* 73m from the nearest trackline. The location does not correlate with any UKHO or Historic Environment (HER) records.

4.3.3.29 The anomaly is visible in the SSS data as an incoherent cluster of irregular anomalies measuring 8.4m x 4.5m with a measurable height of 0.5m. With the MBES data the anomaly is predominantly characterised by an area of scour measuring 21.7m x 12.3m. The form of the anomaly is indicative of anthropogenic debris, with the overall size meaning that a medium potential rating is considered appropriate.

Medium potential MEC25_010

4.3.3.30 Medium potential MEC25_010 (**Figure 4.27**) lies near KP99. The anomaly is outside the extents of the MBES data but visible in the SSS data and has no associated magnetic anomaly although it lies *c.* 67m from the nearest trackline. The location does not correlate with any UKHO or HER records.

4.3.3.31 The anomaly is visible in the SSS data as an irregular mound measuring 18.4m x 7.7m with a measurable height of 1.4m. Mounds, especially where irregular in form and of a size equal to MEC25_010, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

Medium potential MEC25_011

4.3.3.32 Medium potential MEC25_011 (**Figure 4.28**) lies near KP99. The anomaly is visible in both the SSS and the MBES data and has an associated magnetic anomaly of 38.6nT (1,804.7kg). The location does not correlate with any UKHO or HER records.

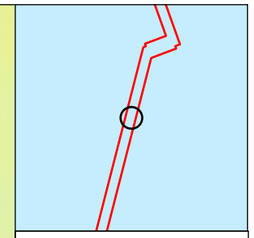
4.3.3.33 The anomaly is visible in the MBES data as a regular mound measuring 18.4m x 7.7m with a measurable height of 1.4m. Mounds, especially in association with a magnetic anomaly, and of a size equal to MEC25_011, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

468565 468570 468575 468580 468585 468590 468595 468600 468605

642015 642010 642005 642000 641995 641990 641985

N

MEC25_003



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-88.528

-89.120

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.26: MEDIUM POTENTIAL MEC25_003

0 1 2 3 Meters

Scale@A3: 1:125

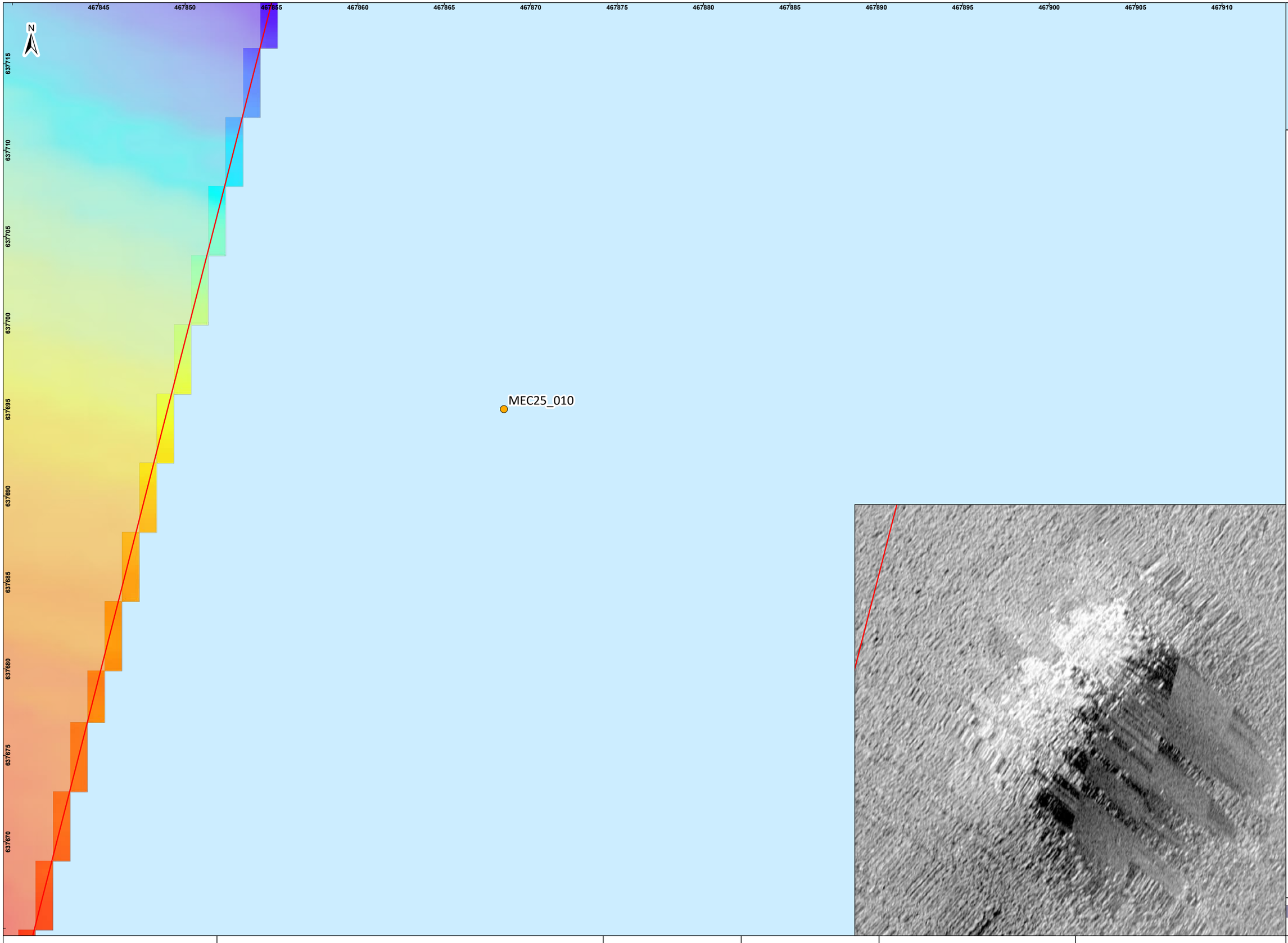
Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

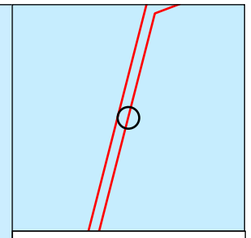
Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0029

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-87.681

-89.054

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.27: MEDIUM POTENTIAL MEC25_010	0 1 2 3 Meters Scale@A3: 1:200	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0030

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

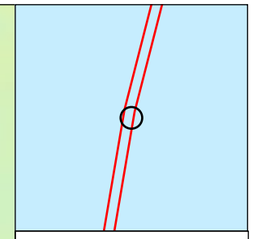
461415 461420 461425 461430 461435 461440 461445 461450 461455 461460 461465 461470 461475 461480

614740 614735 614730 614725 614720 614715 614710 614705 614700 614695

N

MEC25_011

38.6



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Magnetic anomalies

Amplitude range (nT)

- 5 to 50

Multibeam Bathymetry

Depth (m) LAT

-93.746

-94.836

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.28: MEDIUM POTENTIAL MEC25_011

0 1 2 3 Meters

Scale@A3: 1:192

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0031

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

Medium potential MEC25_008

4.3.3.34 Medium potential MEC25_008 (**Figure 4.29**) lies between KP72 and KP71. The anomaly is visible in both the SSS and the MBES data and has no associated magnetic anomaly although it lies *c.* 48m from the nearest trackline. The location does not correlate with any UKHO or HER records.

4.3.3.35 The anomaly is visible in the MBES data as an irregular mound measuring 17.1m x 7.2m with a measurable height of 1.2m. Mounds, especially where irregular in form and of a size equal to MEC25_008, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

Medium potential MEC25_012

4.3.3.36 Medium potential MEC25_012 (**Figure 4.30**) lies between KP72 and KP71. The anomaly is visible in both the SSS and the MBES data and has no associated magnetic anomaly although it lies *c.* 65m from the nearest trackline. The location does not correlate with any UKHO or HER records.

4.3.3.37 The anomaly is visible in the MBES data as an irregular mound measuring 16.2m x 12.5m with a measurable height of 2.1m. Mounds, especially where irregular in form and of a size equal to MEC25_011, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

Medium potential MEC25_130

4.3.3.38 Medium potential MEC25_130 (**Figure 4.31**) lies between KP35 and KP34. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 124.2nT (6,524.8kg). The location does not correlate with any UKHO or HER records.

4.3.3.39 The anomaly is visible in the MBES data as a regular mound measuring 22.2m x 12.4m with a measurable height of 1.2m. Mounds, especially in association with a magnetic anomaly, and of a size equal to MEC25_130, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

Medium potential MEC25_057

4.3.3.40 Medium potential MEC25_057 has been interpreted as debris potentially relating to high potential MEC25_053 and is discussed as such in **Section 4.5.9**.

Medium potential MEC25_118

4.3.3.41 Medium potential MEC25_118 (**Figure 4.32**) lies between KP16 and KP15. The anomaly is visible in both the SSS and the MBES data and has no associated magnetic anomaly although it lies *c.* 70m from the nearest trackline. The location does not correlate with any UKHO or HER records.

4.3.3.42 The anomaly is visible in the MBES data as a regular, but prominent, mound measuring 12.2m x 7.2m with a measurable height of 2.0m. Mounds, especially where prominent and of a size equal to MEC25_118, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

Medium potential MEC25_135

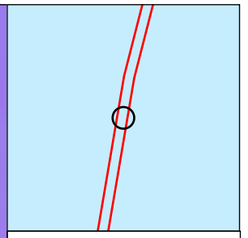
4.3.3.43 Medium potential MEC25_135 has been interpreted as debris potentially relating to high potential MEC25_134 and is discussed as such in **Section 4.5.9**.

460630 460635 460640 460645 460650 460655 460660 460665 460670 460675 460680 460685 460690 460695

611485 611480 611475 611470 611465 611460 611455 611450 611445 611440 611435

N

MEC25_008



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-87.971

-91.619

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.29: MEDIUM POTENTIAL MEC25_008	0 1 2 3 Meters Scale@A3: 1:192	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey **Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0032

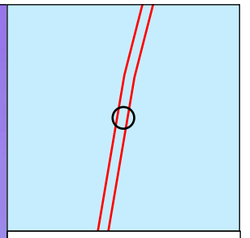
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

460595 460600 460605 460610 460615 460620 460625 460630 460635 460640 460645 460650 460655 460660 460665 460670 460675 460680

611410 611405 611400 611395 611390 611385 611380 611375 611370 611365 611360 611355 611350

N

MEC25_012



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-85.711

-89.719

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.30: MEDIUM POTENTIAL MEC25_012

0 1 2 3 Meters

Scale@A3: 1:239

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0033

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

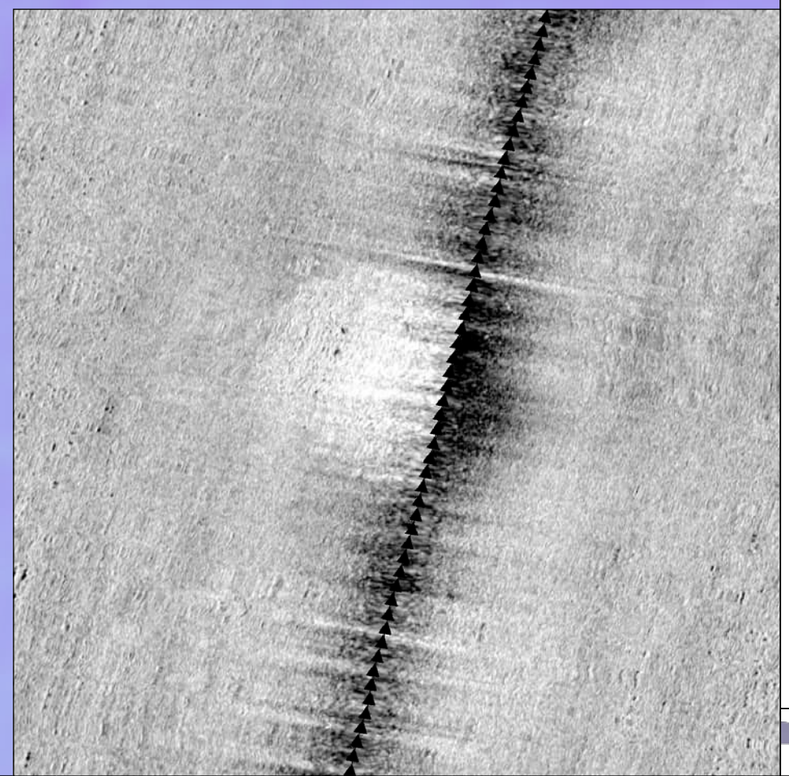
458220 458225 458230 458235 458240 458245 458250 458255 458260 458265 458270 458275 458280 458285 458290 458295 458300

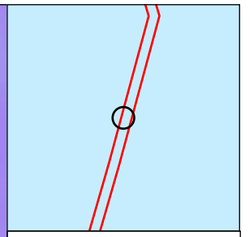
575235 575230 575225 575220 575215 575210 575205 575200 575195 575190 575185 575180 575175

N

MEC25_130

124.2





LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

Medium

Magnetic anomalies

Amplitude range (nT)

100 to 200

Multibeam Bathymetry

Depth (m) LAT

-80.953

-82.232

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.31: MEDIUM POTENTIAL MEC25_130

0 1 2 3 Meters

Scale@A3: 1:239

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0034

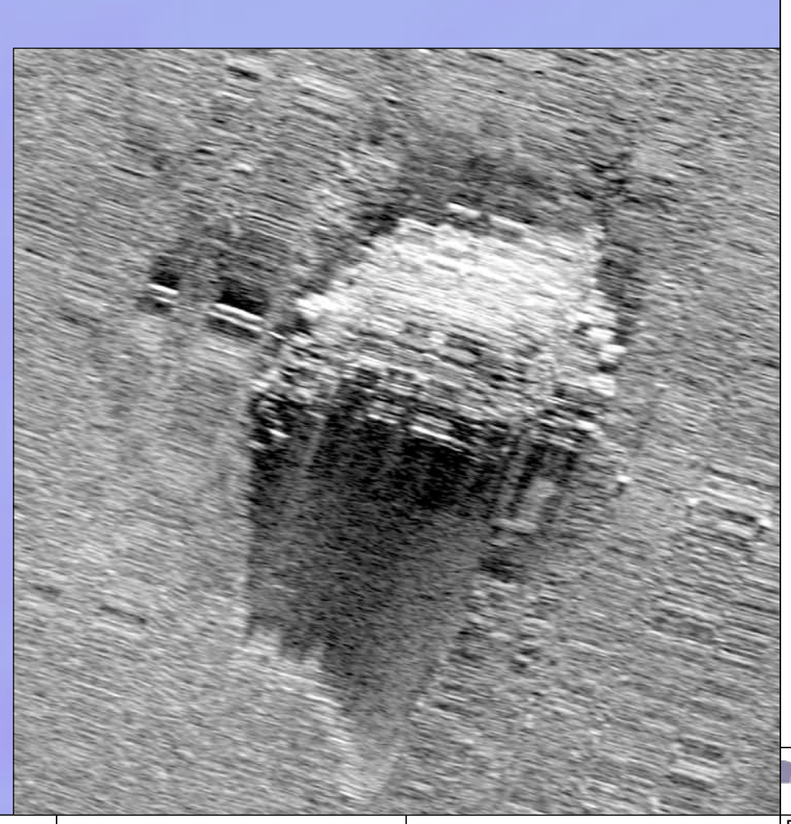
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

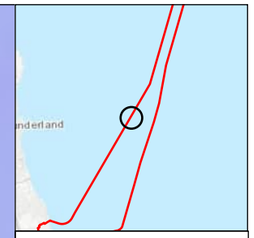
451895 451900 451905 451910 451915 451920 451925 451930 451935

557595 557590 557585 557580 557575 557570 557565

N

MEC25_118





LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

Medium

Multibeam Bathymetry

Depth (m) LAT

-45.413

-46.577

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.32: MEDIUM POTENTIAL MEC25_118

0 1 2 3 Meters

Scale@A3: 1:130

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0035

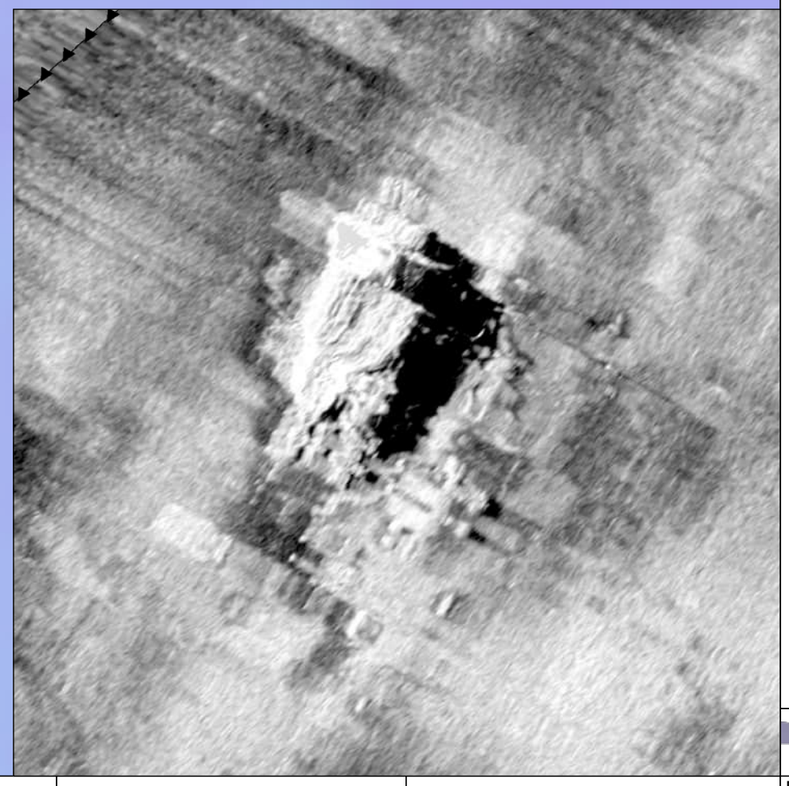
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

450370 450375 450380 450385 450390 450395 450400 450405 450410 450415

549980 549975 549970 549965 549960 549955 549950

N

MEC25_114





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-35.662

-36.922

Morven Offshore Wind Farm

MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.33: MEDIUM POTENTIAL MEC25_114	0 1 2 3 Meters Scale@A3: 1:126	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0036

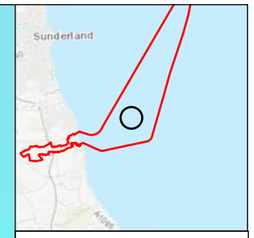
VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

448920 448925 448930 448935 448940 448945 448950 448955 448960

549010 549005 549000 548995 548990 548985

N

MEC25_141



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- Medium

Multibeam Bathymetry

Depth (m) LAT

-24.103

-26.061

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.34: MEDIUM POTENTIAL MEC25_141	0 1 2 3 Meters Scale@A3: 1:123	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0037

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

Medium potential MEC25_114

4.3.3.44 Medium potential MEC25_114 (**Figure 4.33**) lies between KP8 and KP7. The anomaly is visible in both the SSS and the MBES data and has an associated magnetic anomaly of 64.4nT (326.0kg). The location does not correlate with any UKHO records but lies approximately 150m from NRHE records 2311039 and 2311040, both of which are recorded as wrecks.

4.3.3.45 The anomaly is visible in the MBES data as a regular mound measuring 10.2m x 5.7m with a measurable height of 1.2m. Mounds, especially in association with a magnetic anomaly, and of a size equal to MEC25_114, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

Medium potential MEC25_141

4.3.3.46 Medium potential MEC25_141 (**Figure 4.34**) lies near KP6. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 176.0nT (7,396.6kg). The location does not correlate with any UKHO or HER records.

4.3.3.47 The anomaly is visible in the MBES data as a regular mound measuring 12.7m x 7.2m with a measurable height of 1.2m. Mounds, especially in association with a magnetic anomaly, and of a size equal to MEC25_141, can represent buried anthropogenic material of potential archaeological interest. However, it is noted that mounds can be a result of natural processes or be geological in origin, as such the medium potential rating is considered precautionary.

4.3.4 High potential anomalies

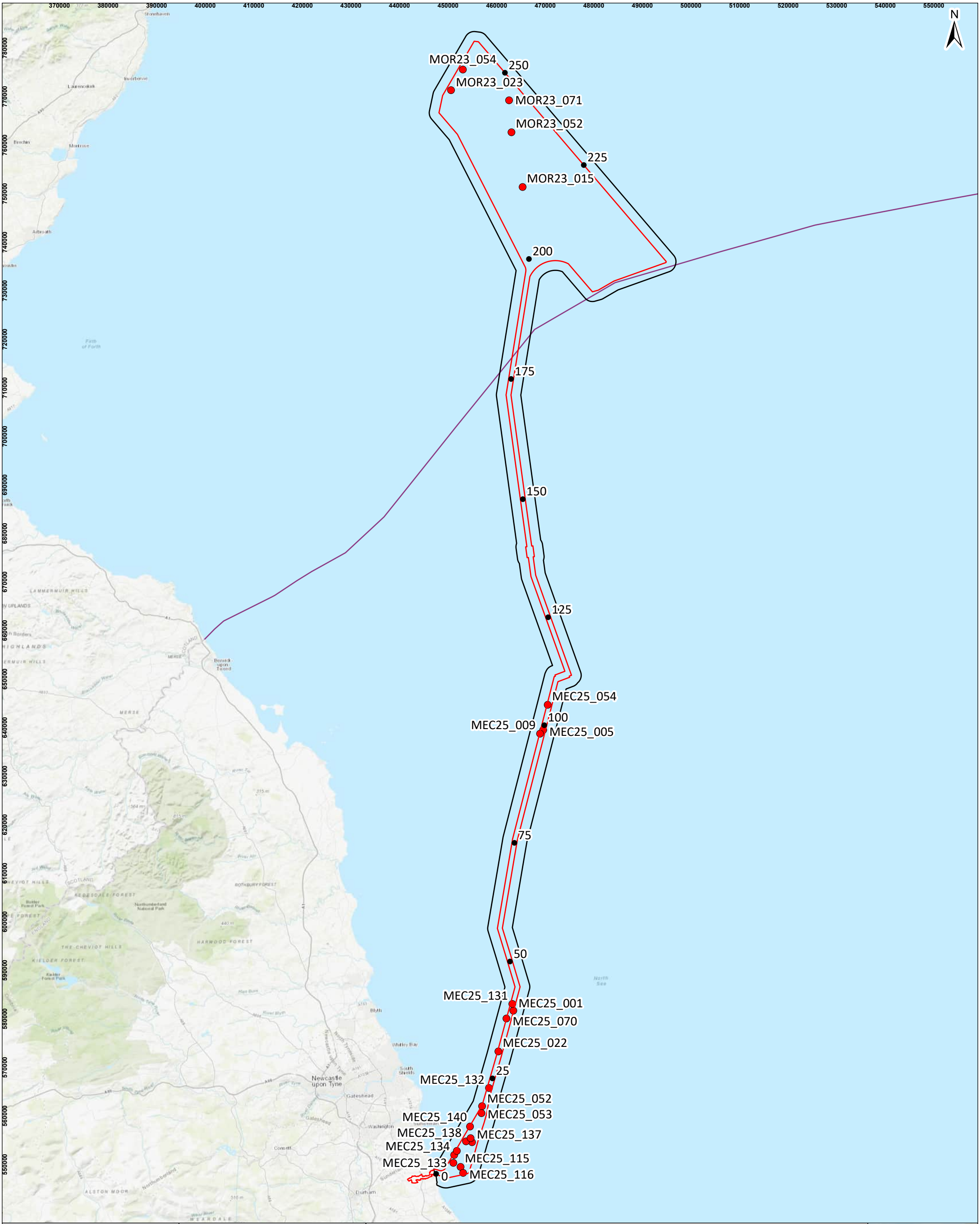
4.3.4.1 A total of 24 anomalies interpreted as of high archaeological potential were identified within the MHPGC Project PEIR Red Line Boundary, of which five are within Scottish waters and 19 are within English waters. The anomalies can be categorised as follows in **Table 4.7**, the distribution is presented in **Figure 4.35**.

Table 4.7: High potential anomaly categories

Potential	Scottish waters	English waters	Total
Wreck	4	13	**17**
Potential wreck	1	6	**7**
Total	**5**	**19**	**24**

4.3.4.2 The anomalies interpreted as of high archaeological potential (see **Table 4.7)** have characteristics that indicate a high likelihood of representing anthropogenic material that has a high potential to be of archaeological interest, or where a precautionary approach has been taken for anomalies where the ID isn't clear.

4.3.4.3 Each high potential anomaly is discussed, along with an image, within this section of this technical report and a gazetteer of high potential anomalies, including positions and dimensions can be found in **Appendix A**.



Morven Offshore Wind Farm

MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0038

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Data Sources:
BP, Ordnance Survey,

Drawing Title:
FIGURE 4.35: DISTRIBUTION OF HIGH POTENTIAL ARCHAEOLOGICAL ANOMALIES

Service Layer Credits:
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA

0 10 20 30 km

Scale@A3:1:700,000

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

VER	DATE	DETAILS	BY	CHECK
00	07/08/2026	Initial Issue	MJ	FLP
01	07/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Archaeological Anomalies

Potential

- High
- Medium
- Low

High potential anomalies in Scottish waters

High potential MOR23_054

4.3.4.4 High potential MOR23_054 (**Figure 4.36**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 6.3km southwest of the northernmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location correlates with UKHO record 75090 and Canmore record 324516.

4.3.4.5 The anomaly is the coherent remains of a wrecked vessel measuring 27.9m x 9.1m, with a measurable height of 2.4m. The wreck is orientated approximately northeast, southwest with what appears to be the bow to the northeast although this is not clear. Scour is visible all around the wreck but is most prominent around the bow and the stern. Within the SSS data the outline of the wreck appears largely intact with some potential superstructure visible. Extending to the south is a linear feature with larger feature at the end, potentially indicating the ship's anchor, or an anchor snagged by another vessel. The MBES data show much greater evidence of collapse with sections of the wreck to the north and to the south not really visible, there is, however, an apparent concentration of material towards the centre.

4.3.4.6 The UKHO and Canmore both record the wreck, although to note the Canmore record is derived from the UKHO record, but other than stating the year of ID as 2009 and dimensions, neither provide any details regarding construction, date of sinking, or identity

High potential MOR23_023

4.3.4.7 High potential MOR23_023 (**Figure 4.37**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 11.2km southeast of the northernmost corner. The anomaly is visible in the SSS and MBES data and has no associated magnetic anomaly. The location does not correlate with any UKHO or Canmore records.

4.3.4.8 The anomaly is the potential remains of a wrecked vessel, characterised on the seabed in the SSS data by a prominent concentration of debris measuring 23.m x 11.9m (note the SSS data does not cover the full extents of the anomaly). Three further features, likely representing debris, are visible approximately 19.0m to the south and to the east. Within the MBES data the anomaly is predominantly characterised by a kidney shaped mound measuring 10.7m x 4.7m, with a measurable height of 0.6m, a further smaller mound measuring 4.1m x 3.0m lies to the north, with potential evidence of partially buried material to the west. The anomaly is highly likely to represent material of anthropogenic origin, the form and distribution potentially indicate the remains of a wrecked vessel, as such a high potential rating is considered appropriate.

High potential MOR23_071

4.3.4.9 High potential MOR23_071 (**Figure 4.38**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 14.2km south-southwest of the northernmost corner. The anomaly is visible in the SSS and MBES data and has an associated magnetic anomaly of 36,854. The location correlates with UKHO record 70421 and Canmore record 324312.

4.3.4.10 The anomaly is the coherent remains of a wreck vessel measuring 66.4m x 14.8m, with a measurable height of 7.5m. The wreck is orientated approximately northeast, southwest with what appears to be the bow to the northeast. Scour, although limited, extends *c.* 200m to the north and south, with prominent localised scour predominantly to the northeast. The wreck appears to be upright, and whilst showing signs of potential collapse the outline remains largely coherent, with significant height. A large area of debris measuring 24.8m x 14.7m lies to the stern and appears associated with an area of collapsed wreck, potentially indicating damage when impacting the seabed, or damage that resulted in the sinking. A linear feature c. 28m in length extends from the northwestern side.

4.3.4.11 The UKHO and Canmore both record the wreck, although to note the Canmore record is derived from the UKHO record, but other than stating the year of ID as 2007 and dimensions, neither provide any details regarding construction, date of sinking, or identity.

452815 452820 452825 452830 452835 452840 452845 452850 452855 452860 452865 452870 452875 452880

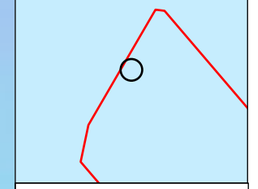
774150 774145 774140 774135 774130 774125 774120 774115 774110 774105

N

MOR23_054

75090

324516



LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

High

Canmore Maritime

UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-66.075

-67.827

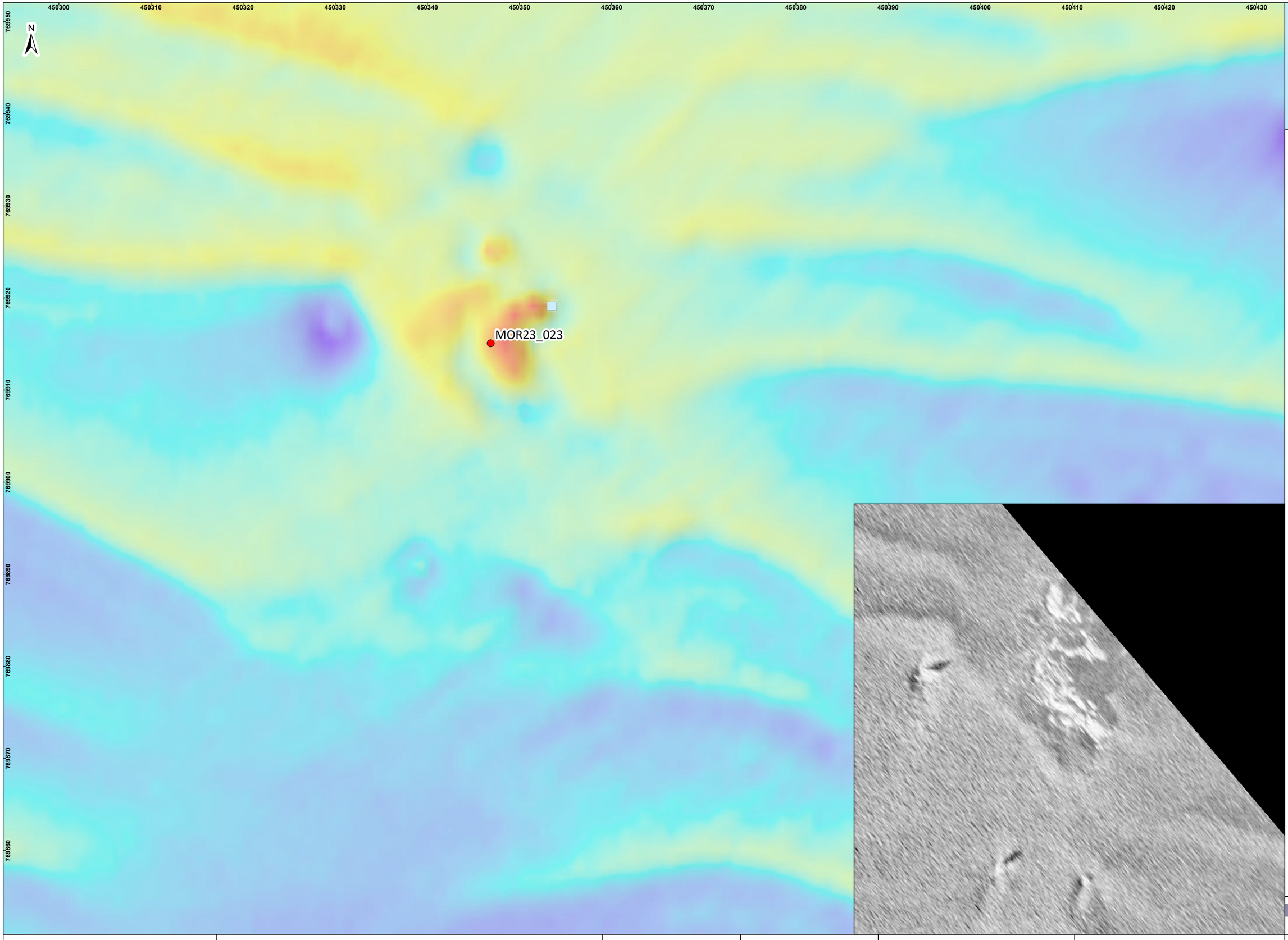
Morven Offshore Wind Farm

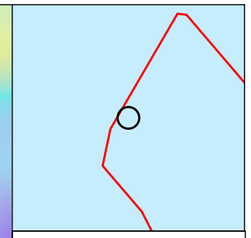
MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.36: HIGH POTENTIAL MOR23_054	0 1 2 3 Meters Scale@A3: 1:192	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0039

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Multibeam Bathymetry

Depth (m) LAT

-66.953

-68.096

Morven Offshore Wind Farm

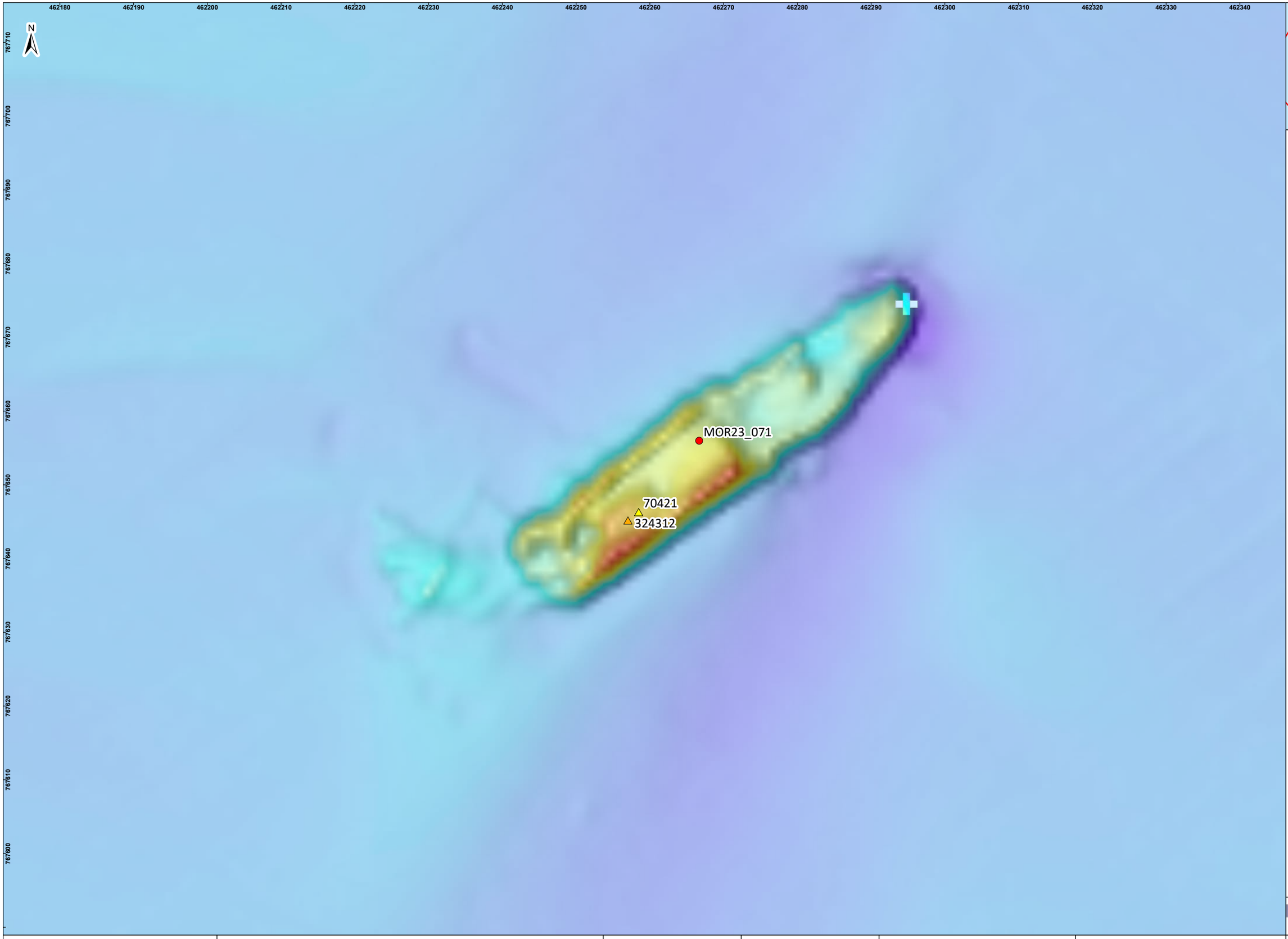
MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.37: HIGH POTENTIAL MOR23_023	0 1 2 3 Meters Scale@A3: 1:374	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0040

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- Canmore Maritime
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-62.083

-71.702

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.38: HIGH POTENTIAL MOR23_071	0 1 2 3 4 5 Meters Scale@A3: 1:468	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0041

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

462635 462640 462645 462650 462655 462660 462665 462670 462675 462680 462685 462690 462695 462700 462705 462710

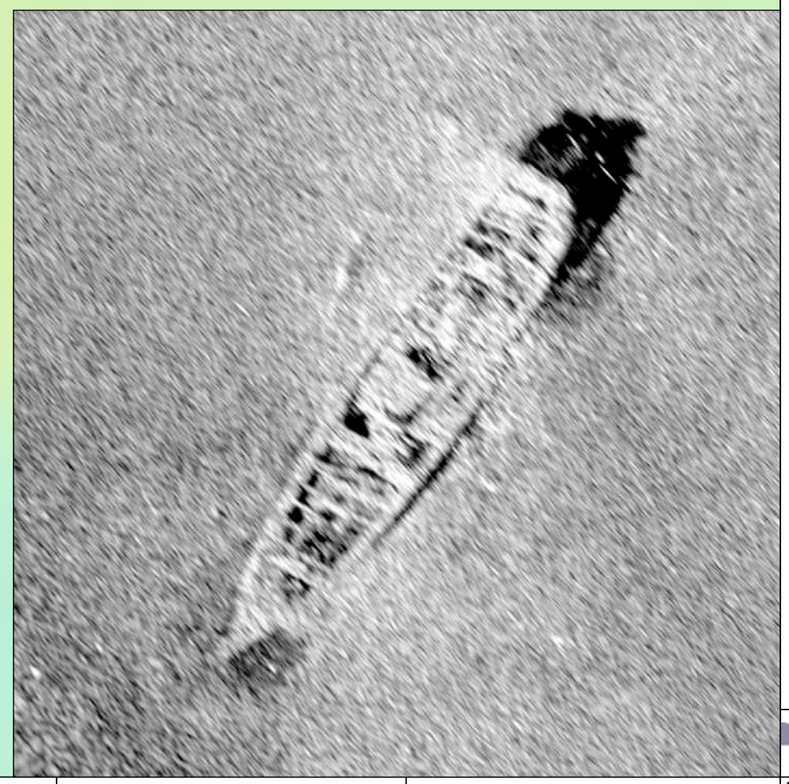
761085 761080 761075 761070 761065 761060 761055 761050 761045 761040 761035 761030

N

MOR23_052

3168

322378



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- Canmore Maritime
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-66.674

-69.352

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.39: HIGH POTENTIAL MOR23_052

0 1 2 3 4 5 Meters

Scale@A3: 1:221

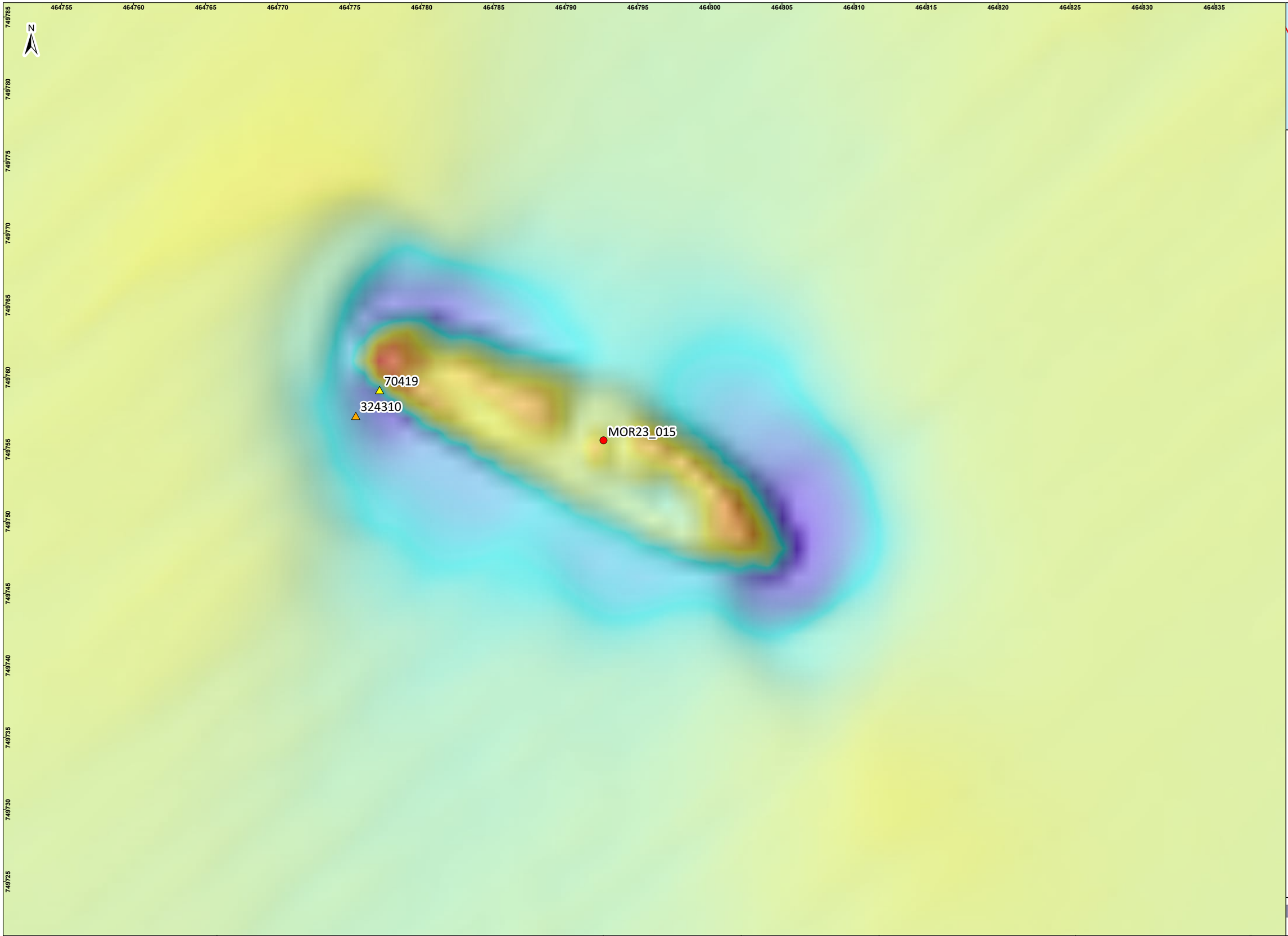
Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0042

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- Canmore Maritime
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-66.336

-70.546

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.40: HIGH POTENTIAL MOR23_015	0 1 2 3 4 5 Meters Scale@A3: 1:239	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0043

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MOR23_052

4.3.4.12 High potential MOR23_052 (**Figure 4.39**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 20.3km south-southwest of the northernmost corner. The anomaly is visible in the SSS and MBES data and has an associated magnetic anomaly of 557nT. The location correlates with UKHO record 3168 and Canmore record 322378.

4.3.4.13 The anomaly is the coherent remains of a wrecked vessel measuring 33.7m x 7.6m, with a measurable height of 2.4m. The wreck is orientated approximately north-northeast, south-southwest with what appears to be the bow to the south. Scour is visible all around the wreck, but most prominent around the bow and to the west of the stern. The wreck appears to lie upright, as evidenced by the collapse visible to the northwest, and towards the bow, along with the presence of what are assumed to be deck beams in the SSS data. The form of the visible structure, and the magnetic anomaly, suggest steel construction.

4.3.4.14 The UKHO and Canmore both record the wreck, although to note the Canmore record is derived from the UKHO record, but other than stating the year of ID as 1919 and dimensions, neither provide any details regarding construction, date of sinking, or identity.

High potential MOR23_015

4.3.4.15 High potential MOR23_015 (**Figure 4.40**) lies within that part of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, *c.* 25.9km northwest of the southernmost corner. The anomaly is visible in the MBES data, is outside the extents of the SSS data, and has no associated magnetic anomaly. The location correlates with UKHO record 74019 and Canmore record 324310.

4.3.4.16 The anomaly is the coherent remains of a wrecked vessel measuring 35.8m x 10.1m, with a measurable height of 3.5m. The wreck is orientated approximately northwest, southeast with what appears to be the bow to the southeast. Scour is visible all around the wreck but is most prominent around the bow and the stern. The wreck appears largely intact with likely superstructure visible. There is a depression noted towards the bow on the starboard side which indicates an area of partial collapse.

4.3.4.17 The UKHO and Canmore both record the wreck, although to note the Canmore record is derived from the UKHO record, but other than stating the year of ID as 2007 and dimensions, neither provide any details regarding construction, date of sinking, or identity.

High potential anomalies in English waters

High potential MEC25_054

4.3.4.18 High potential MEC25_054 (**Figure 4.41**) lies between KP105 and KP104. The anomaly is visible in both the SSS and the MBES data and has an associated magnetic anomaly of 6.2nT (273.5kg). The location correlates with UKHO record 65635 and Canmore record 324103.

4.3.4.19 The anomaly is the remains of a wrecked vessel measuring 21.7m x 7.3m with a measurable height of 1.2m. Whilst the anomaly is identifiable as a wreck and appears largely intact, the detail in the data is limited. The MBES data shows a depression towards the western end, potentially indicative of a slight collapse, whist the SSS data shows potential debris *c.* 5m south of the western end, and 30m south of midships. The form of the wreck, and the associated magnetic anomaly, would suggest steel construction of indeterminate age.

4.3.4.20 The UKHO provide no information in relation to the identity, or the loss, of the vessel, other than it was first recorded in 2005. The Canmore record originates from the UKHO record and offers no further information.

468380 468390 468400 468410 468420 468430 468440 468450 468460 468470

643060 643050 643040 643030 643020 643010 643000

N

MEC25_054

65635

LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

High

UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-82.225

-85.003

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.41: HIGH POTENTIAL MEC25_054

0 1 2 3 4 5 Meters

Scale@A3: 1:263

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0044

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MEC25_005

4.3.4.21 High potential MEC25_005 (**Figure 4.42**) lies at KP99. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 223.2nT (7,886.7kg). The location correlates with UKHO record 58007 and Canmore record 323738.

4.3.4.22 The anomaly is the remains of a wrecked vessel measuring 45.2m x 8.6m with a measurable height of 4.9m. The wreck is broadly coherent although appears collapsed towards the northwestern end. Within the SSS data there is evidence of associated debris around the wreck extending up to *c.* 15m on all sides. Although not clear, the bow potentially lies to the northwest. Scour is visible to the northwest. Whilst not certain, the form of the wreck, and the associated magnetic anomaly, would suggest steel construction of indeterminate age.

4.3.4.23 The UKHO provide no information in relation to the identity, or the loss, of the vessel, other than it was first recorded in 1999. The Canmore record originates from the UKHO record and offers no further information.

High potential MEC25_009

4.3.4.24 High potential MEC25_009 (**Figure 4.43**) lies around KP98. The anomaly is visible in both the SSS and the MBES data and has no associated magnetic anomaly although it lies *c.* 43m from the nearest trackline. The location does not correlate with any UKHO or HER records.

4.3.4.25 The anomaly is visible in the MBES data as a prominent and irregular mound measuring 10.6m x 7.4m with a measurable height of 1.3m. The mound is surrounded by irregular scour, most prominent to the southwest, potentially indicating further buried, or partially buried, material. Whilst a precautionary interpretation, the overall form of the anomaly has the potential to represent the remains, or partial remains, of a wrecked vessel of indeterminate age and as such has been assigned a high potential rating.

High potential MEC25_131

4.3.4.26 High potential MEC25_131 (**Figure 4.44**) lies between KP41 and KP40. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 102m from the nearest trackline. The location correlates with UKHO record 4328 and NRHE record 1525529.

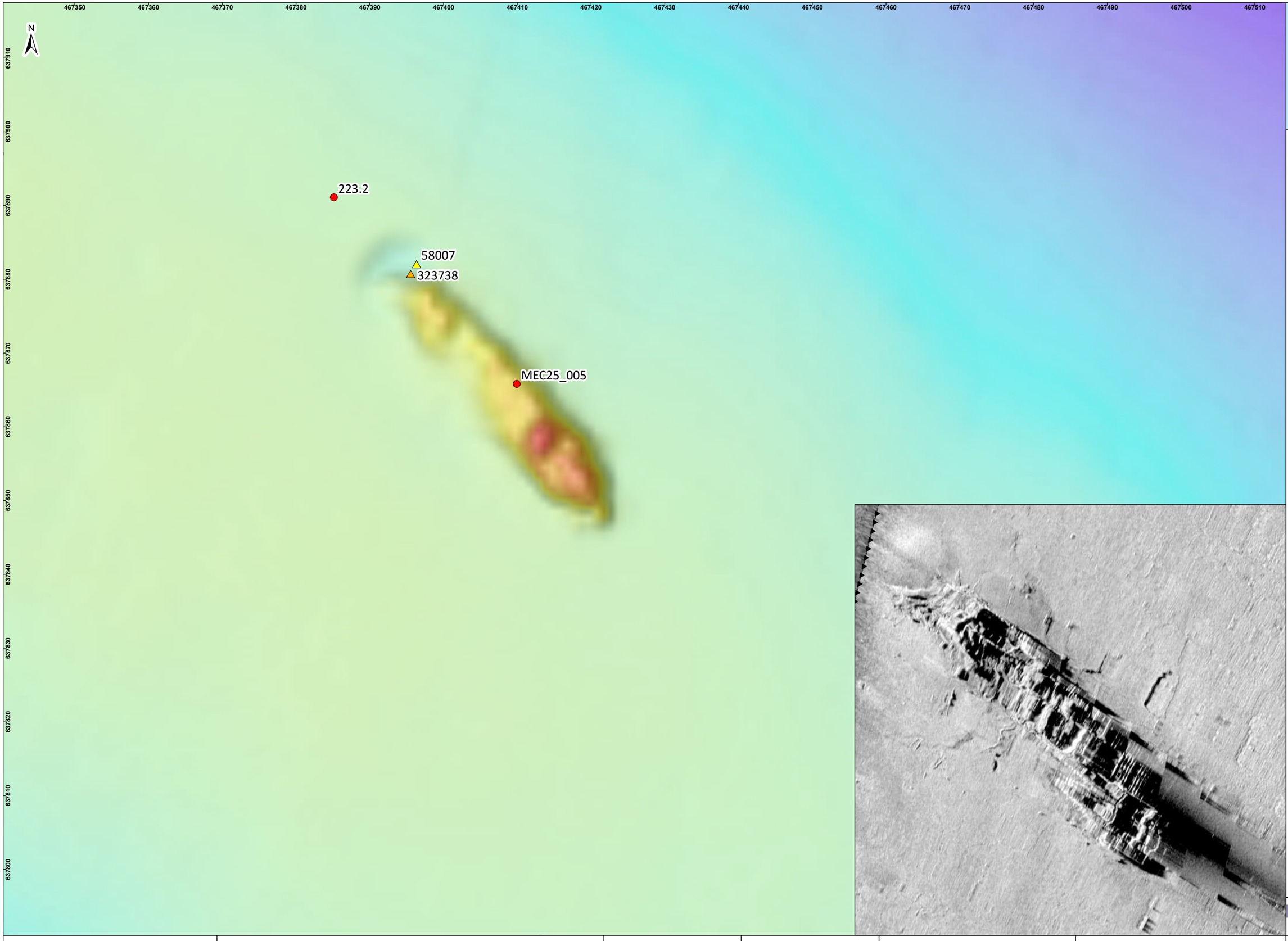
4.3.4.27 The anomaly is visible within the MBES data as a prominent mound measuring 17.9m x 7.7m with a measurable height of 3.3m. The resolution of the data is not sufficient to identify details; however, the form and size is indicative of a wrecked vessel. Scour is visible on all sides of the anomaly. There is potential for some outlying debris to be present up to 7.0m to the east of the wreck, although this is not clear.

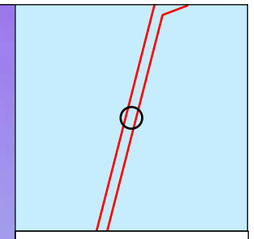
4.3.4.28 The UKHO record the wreck at that of the *Hans Hoth* (probably), a German steam ship that sank in 1952 whilst en-route from Bo'ness to Hamburg. The *Hans Hoth* took on a heavy list when cargo shifted and sank whilst under tow. The NRHE state that the *Hans Hoth* was a steel hulled vessel, and either a steam ship or an engine driven vessel, built between 1940 and 1949 (probably 1945).

High potential MEC25_001

4.3.4.29 High potential MEC25_001 (**Figure 4.45**) lies between KP40 and KP39. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 83.2nT (4,195.3kg). The location does not correlate with any UKHO or HER records.

4.3.4.30 Within the SSS data the anomaly appears as a largely incoherent mound measuring 13.8m x 5.5m with a measurable height of 1.2m. The mound is comprised of irregular and linear features, with further linear features visible to the south and the east. Within the MBES data the anomaly appears as a prominent mound, with scour visible predominantly to the east and west, within the scour smaller mounds are visible to the south and the southeast. The form of the anomaly, along with the magnetic anomaly, indicate anthropogenic material (potentially ferrous), and potentially a wrecked vessel of indeterminate age.





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 200+
- Canmore Maritime
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-77.879

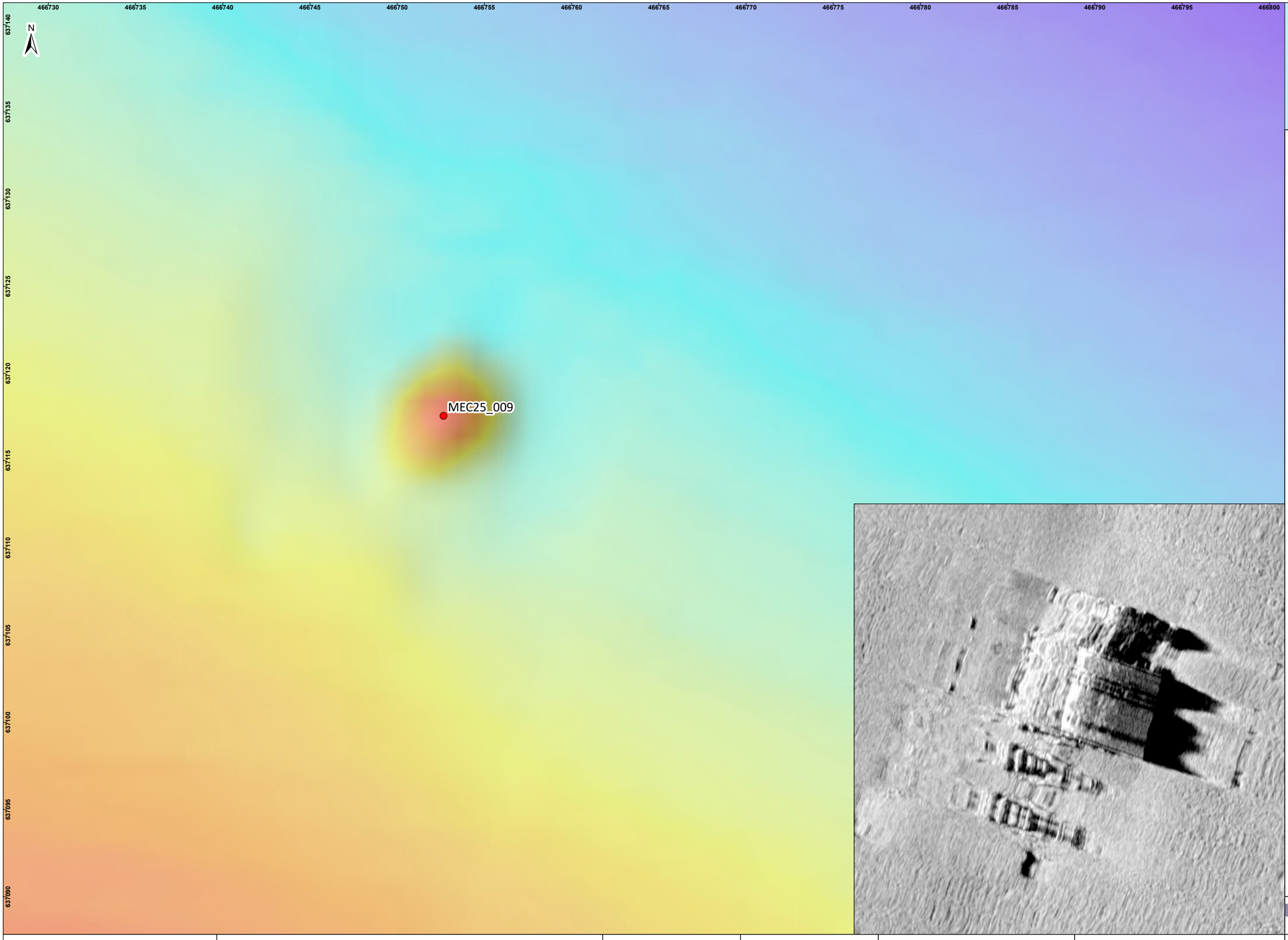
-86.001

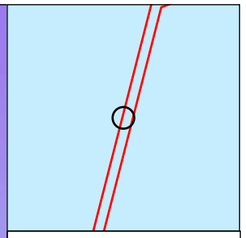
Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.42: HIGH POTENTIAL MEC25_005	0 1 2 3 4 5 Meters Scale@A3: 1:468	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0045

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Multibeam Bathymetry

Depth (m) LAT

-81.398

-83.824

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.43: HIGH POTENTIAL MEC25_009	0 1 2 3 4 5 Meters Scale@A3: 1:198	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Morven Offshore Wind Farm

MSDS Marine

Drawing Number: MHPGC-MSD-MA-0046

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

460210 460215 460220 460225 460230 460235 460240 460245 460250 460255 460260 460265 460270 460275

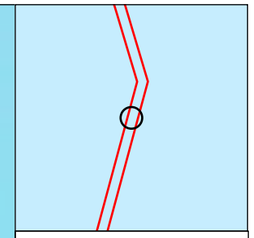
581560 581555 581550 581545 581540 581535 581530 581525 581520 581515

N

1525529

MEC25_131

4328



LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

High

UKHO 2026

National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-89.415

-92.967

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.44: HIGH POTENTIAL MEC25_131

0 1 2 3 4 5 Meters

Scale@A3: 1:192

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0047

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

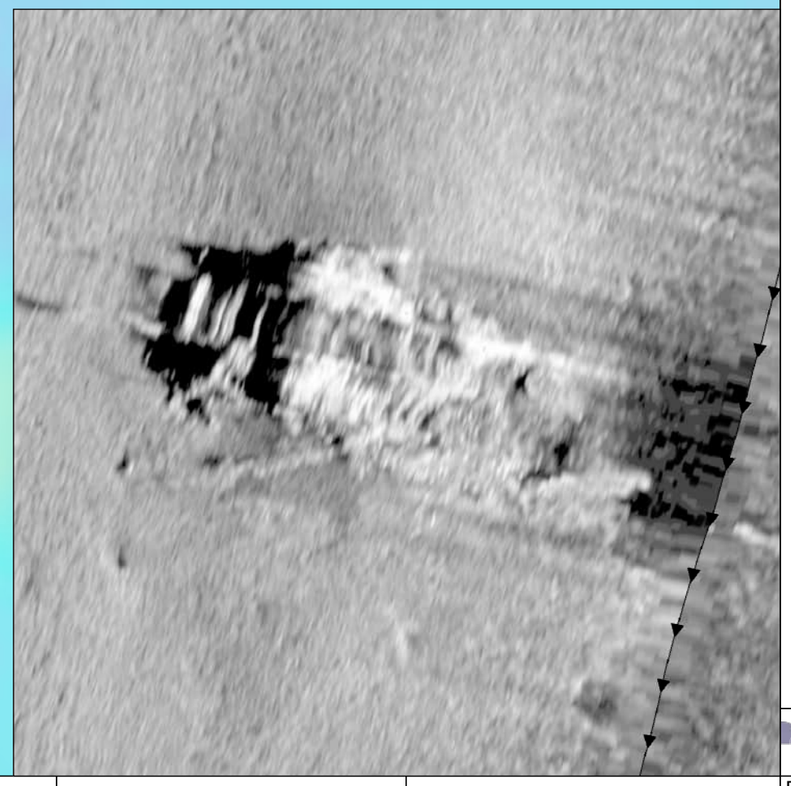
460400 460405 460410 460415 460420 460425 460430 460435 460440 460445 460450 460455 460460

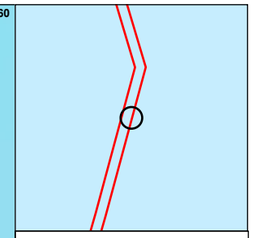
580170 580165 580160 580155 580150 580145 580140 580135 580130

N

MEC25_001

83.2





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 50 to 100

Multibeam Bathymetry

Depth (m) LAT

-89.308

-90.736

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.45: HIGH POTENTIAL MEC25_001	0 1 2 3 4 5 Meters Scale@A3: 1:167	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0048

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MEC25_070

4.3.4.31 High potential MEC25_070 (**Figure 4.46**) lies between KP38 and KP37. The anomaly is visible in the SSS but lies outside the MBES data coverage. The anomaly has no associated magnetic anomaly although it lies c. 62m from the nearest trackline. The location correlates with UKHO record 4536.

4.3.4.32 The anomaly is visible in the SSS data as an irregular mound measuring 19.8m x 7.6m with a measurable height of 2.1m. Small features, likely to represent debris, are visible within 10m of the mound. No further interpretation is possible with just the SSS data due to the quality.

4.3.4.33 The UKHO provide no information in relation to the identity, or the loss, of the potential wreck other than it was first recorded in 1988. The UKHO describe the record as a large area of debris with three distinct high points, noting that if it is a wreck then much of it is buried in sediment.

High potential MEC25_022

4.3.4.34 High potential MEC25_022 (**Figure 4.47**) lies between KP31 and KP30. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 100.3nT (4,650.3kg). The location correlates with UKHO record 4281 and NRHE record 908763.

4.3.4.35 The anomaly is the remains of a wrecked vessel measuring 41.8m x 8.4m with a measurable height of 5.8m. The wreck is broadly coherent and appears largely contained within the main body, although it is broken/collapsed at midships. There is potential evidence within the SSS data to the east of outlying debris. Within the MBES data there is a small mound to the north of the northeastern end which likely represents outlying debris. Scour is visible at both ends running north to south, with an accumulation of seabed north and south of midships.

4.3.4.36 The UKHO record the wreck as that of the *John M Smart* (possibly), a British trawler sunk by gunfire from a German torpedo boat in 1917. The NRHE record originates from the UKHO record and offers no further information.

High potential MEC25_132

4.3.4.37 High potential MEC25_132 (**Figure 4.48**) lies between KP23 and KP22. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 131m from the nearest trackline. The location correlates with UKHO record 5737 and NRHE record 908639.

4.3.4.38 The anomaly is visible within the MBES data as a wreck like feature measuring 30.2m x 7.5m with a measurable height of 2.6m. The resolution of the data is not sufficient to identify details; however, the form and size is indicative of a wrecked vessel, with the bow potentially to the west. Whilst the overall shape of the wreck is coherent, it appears that the wreck is collapsed to some degree. Scour is visible at both the bow and the stern and also extending to the north and the south. There is an accumulation of seabed along the southern edge. The form of the wreck potentially indicates a steel wreck of indeterminate age.

4.3.4.39 The UKHO provide no information in relation to the identity, or the loss, of the vessel, other than it was first recorded in 1962. The UKHO also notes that the wreck may be lying on its side. The NRHE record originates from the UKHO record and offers no further information.

High potential MEC25_052

4.3.4.40 High potential MEC25_052 (**Figure 4.49**) lies at KP19. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 13,933.6nT (705,404.1kg). The location correlates with UKHO record 5720 and NRHE record 1001779.

4.3.4.41 The anomaly is the remains of a wrecked vessel measuring 86.9m x 14.5m with a measurable height of 6.1m. The wreck appears to be lying on its side with debris extending to the east, within the SSS data this is visible as potentially structural elements of the vessel. Slight scour is visible to the east and the west of the wreck, with slightly more visible scour present at the southern end.

4.3.4.42 The UKHO record the wreck as that of the *Zeeland* (possibly), a Dutch steam ship built in 1870 and captured by German submarine UB *39* in 1916 and subsequently sunk by gunfire. The NRHE record states that the *Zeeland* was en-route from Methil to Rouen with a cargo of coal.

458965 458970 458975 458980 458985 458990 458995 459000 459005 459010 459015 459020 459025 459030 459035

578575 578570 578565 578560 578555 578550 578545 578540 578535 578530 578525 578520

N

MEC25_070

4536

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-87.774

-88.996

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.46: HIGH POTENTIAL MEC25_070

0 1 2 3 4 5 Meters

Scale@A3: 1:212

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0049

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

457205 457210 457215 457220 457225 457230 457235 457240 457245 457250 457255 457260 457265 457270 457275 457280

571820 571815 571810 571805 571800 571795 571790 571785 571780 571775 571770 571765

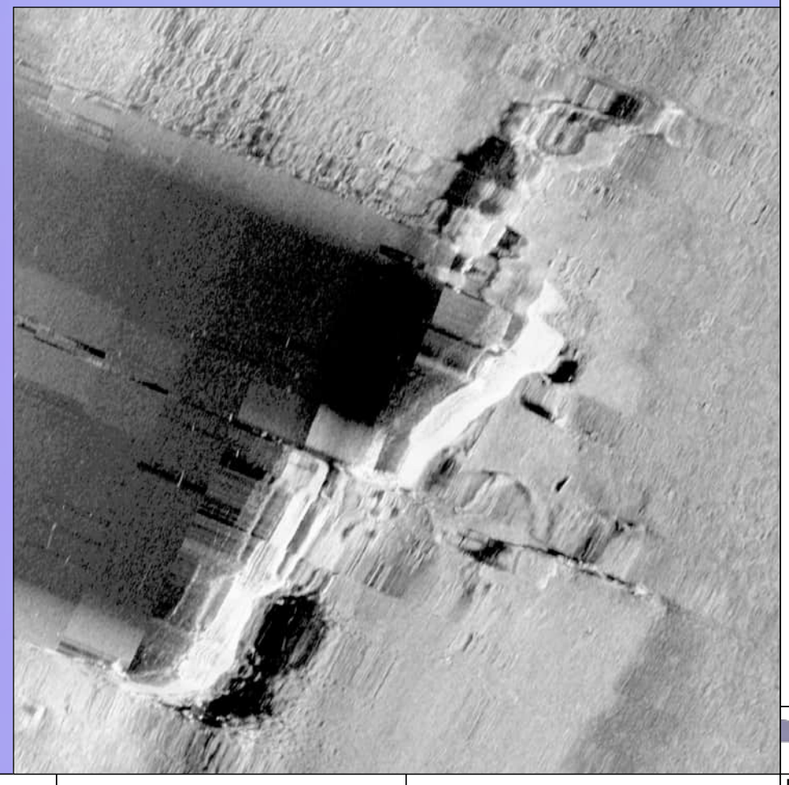
N

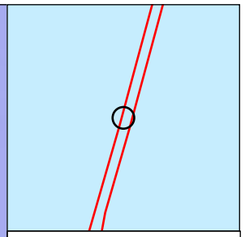
MEC25_022

100.3

4281

908763





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 100 to 200

- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-75.420

-81.820

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.47: HIGH POTENTIAL MEC25_022	0 1 2 3 4 5 Meters Scale@A3: 1:221	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey **Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0050

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

455160 455165 455170 455175 455180 455185 455190 455195 455200 455205 455210 455215 455220 455225

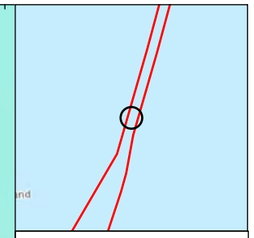
564320 564315 564310 564305 564300 564295 564290 564285 564280 564275

N

MEC25_132

5737

908639



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-54.101

-58.916

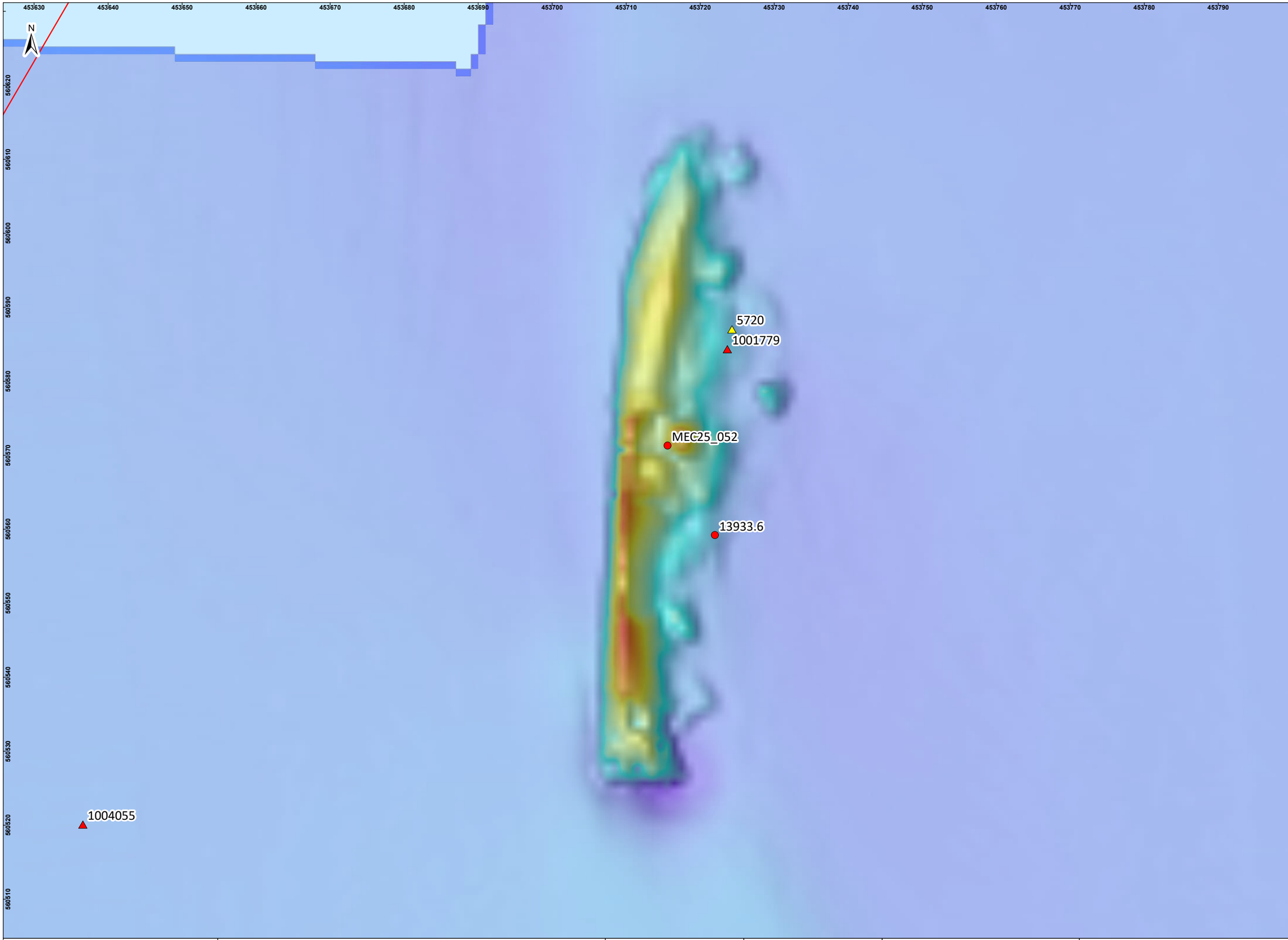
Morven Offshore Wind Farm | MSDS Marine

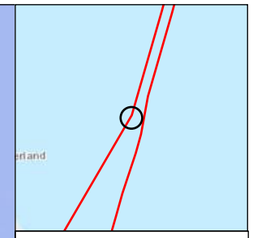
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.48: HIGH POTENTIAL MEC25_132	0 1 2 3 4 5 Meters Scale@A3: 1:192	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0051

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 200+
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-43.666

-53.038

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.49: HIGH POTENTIAL MEC25_052	0 1 2 3 4 5 Meters Scale@A3: 1:468	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0052

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MEC25_053

4.3.4.43 High potential MEC25_053 (**Figure 4.50**) lies between KP18 and KP17. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 403.8nT (15,967.4kg). The location correlates with UKHO record 5708, NRHE record 1001761 and HER record 2880847.

4.3.4.44 The anomaly is the remains of a wrecked vessel measuring 81.5m x 20.5m with a measurable height of 4.2m. The wreck appears to be lying upright with the bow towards the west. The wreck is largely collapsed, whilst the overall form is identifiable as a wreck, the visible features are largely incoherent with material extending up to 10m from the outline of the wreck. There is a general pattern of slight scour extending northwest and southeast, with more prominent scour around the bow and the stern (west and east). Medium potential MEC25_057 *c.* 185m to the northeast, is debris measuring 11.6m x 9.1m and is likely related to the wreck although is not identifiable.

4.3.4.45 The UKHO record the wreck as that of the *Hogarth*, a British steam ship built in 1893 and torpedoed and sunk by German submarine *UB-107* in 1918 whilst en-route from London to Aberdeen. The NRHE record states that the *Hogarth* was carrying a general cargo at the time of loss.

High potential MEC25_140

4.3.4.46 High potential MEC25_140 (**Figure 4.51**) lies at KP14. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 201m from the nearest trackline. The location correlates with UKHO record 5680.

4.3.4.47 The anomaly is visible within the MBES data as a small mound measuring 5.4m x 4.1m with a measurable height of 1.0m. Scour is visible on all sides, with slight scour and disturbed seabed extending to 38.1m x 24.6m. The interpretation as a potential wreck is precautionary, due in part to the presence of a UKHO record and the lack of SSS or magnetometer data. There are no diagnostic elements, and the size and form would typically result in a medium potential rating. However, the area of scour and disturbed seabed may indicate very low lying, or partially buried material.

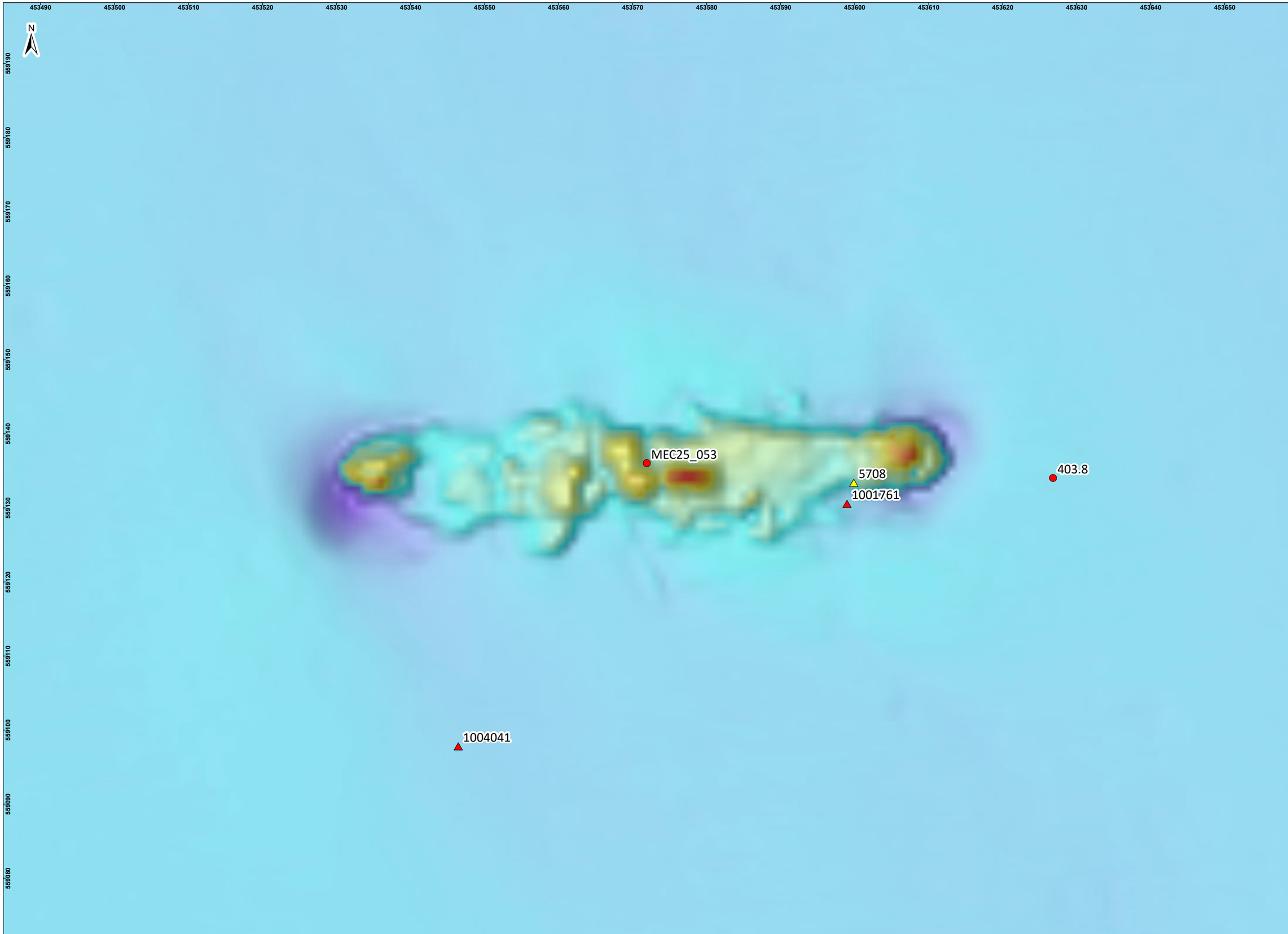
4.3.4.48 The UKHO provide no information in relation to the identity, or the loss, of the vessel, other than it was first recorded in 1940, and first identified during survey in 1970. However, the description of the anomaly varied from what is visible on the seabed. In 1988 the anomaly was described as an apparent small wreck measuring 15.0m x 5.0m or cargo/container lost from a vessel. In 2019 the anomaly was described as an intact vessel, lying on its side with the wheelhouse clearly visible, and measuring 10.9m x 4.3m. The discrepancy between the remains visible on the seabed now, and the description from 2019, is unusual and may well be the result of an error in the UKHO record.

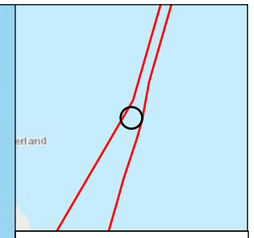
High potential MEC25_139

4.3.4.49 High potential MEC25_139 (**Figure 4.52**) lies at KP12. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 682m from the nearest trackline. The location correlates with UKHO record 5658 and NRHE record 1001754.

4.3.4.50 The anomaly is visible within the MBES data as an irregular mound measuring 10.6m x 9.9m with a measurable height of 1.8m. The mound is broadly triangular and appears to be made up of three parts. Scour is visible on all sides. There are no diagnostic elements, and the size and form would typically result in a medium potential rating. However, due in part to the presence of a UKHO record and the lack of SSS or magnetometer data, a precautionary approach has been taken with the interpretation as a potential wreck.

4.3.4.51 The UKHO record the wreck at that of the *Helvetia* (possibly), a British trawler captured and sunk by a German submarine in 1916. The NRHE provide no further information.





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 200+
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-42.777

-51.958

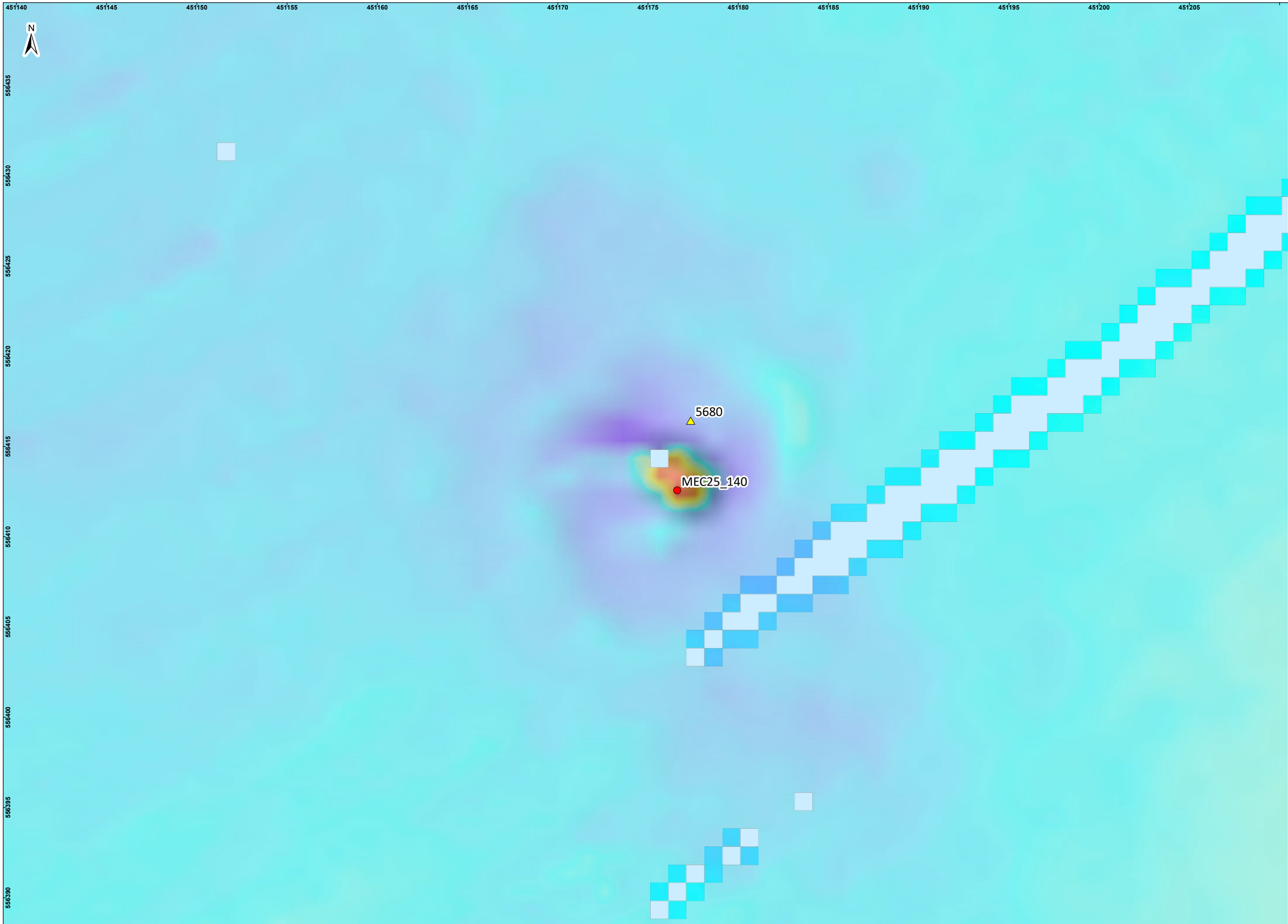
Morven Offshore Wind Farm

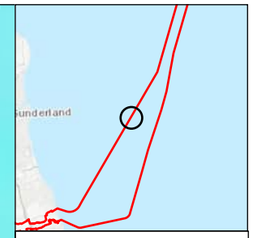
MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.50: HIGH POTENTIAL MEC25_053	0 1 2 3 4 5 Meters Scale@A3: 1:468	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0053

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

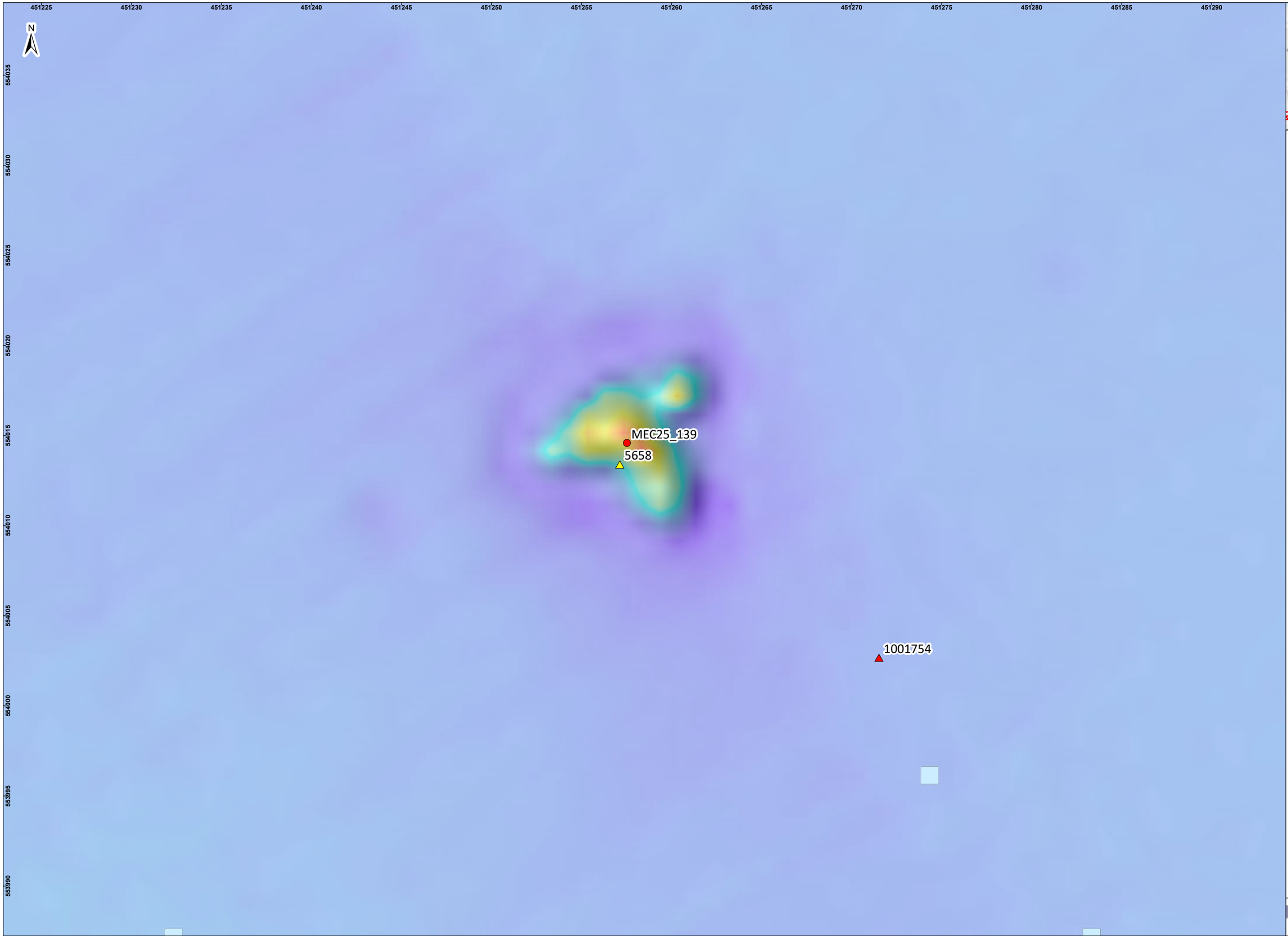
-44.198

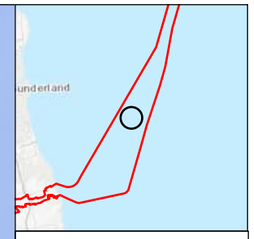
-45.638

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.51: HIGH POTENTIAL MEC25_140	0 1 2 3 4 5 Meters Scale@A3: 1:192	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0054

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-42.325

-44.337

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.52: HIGH POTENTIAL MEC25_139

0 1 2 3 4 5 Meters

Scale@A3: 1:192

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0055

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MEC25_138

4.3.4.52 High potential MEC25_138 (**Figure 4.53**) lies at KP11. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 1.4km from the nearest trackline. The location correlates with UKHO record 5670, NRHE record 1001753 and HER record 2880774.

4.3.4.53 The anomaly is visible within the MBES data as the broken up remains of a wrecked vessel measuring 82.4m x 18.9m with a measurable height of 2.2m. The wreck is relatively low lying, with high points to the southeast, midships and the west. Whilst broadly in line the wreck is in three distinct parts. Although not clear, the bow is potentially to the southeast. Debris lies up to *c.* 50m from all sides of the main body of wreckage, although is most prominent to the south. Scour is visible around the majority of the wreck and the outlying debris.

4.3.4.54 The UKHO record the wreck at that of the Intent, a British steam ship torpedoed and sunk by German submarine *UC-40* in 1918. The NRHE state that the Intent was a steel hulled steamer in ballast at the time of sinking.

High potential MEC25_137

4.3.4.55 High potential MEC25_137 (**Figure 4.54**) lies between KP12 and KP11. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 177m from the nearest trackline. The location correlates with UKHO record 5669, NRHE record 1001752 and HER record 2880981.

4.3.4.56 The anomaly is visible within the MBES data as a wreck measuring 65.6m x 11.8m with a measurable height of 6.5m. The wreck appears largely intact and upright; however, evidence of collapse or damage is visible to the southwest. No evidence of a debris field is visible within the data.

4.3.4.57 The UKHO record the wreck as that of RFA *Creosol*, an Admiralty designed tanker built in 1916 and sunk in 1918. The *Creosol* was reported to be sunk by German submarine *UC-17* whilst en-route from the Humber to Sunderland. The wreck was subject to Remotely Operated Vehicle (ROV) inspection by the MoD Salvage and Marine Operations (SALMO) survey team in 2018 where the wreck was described as largely intact and upright but with the tanks open and frames exposed.

4.3.4.58 RFA *Creosol* is designated under the Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2026 as a Protected Place.

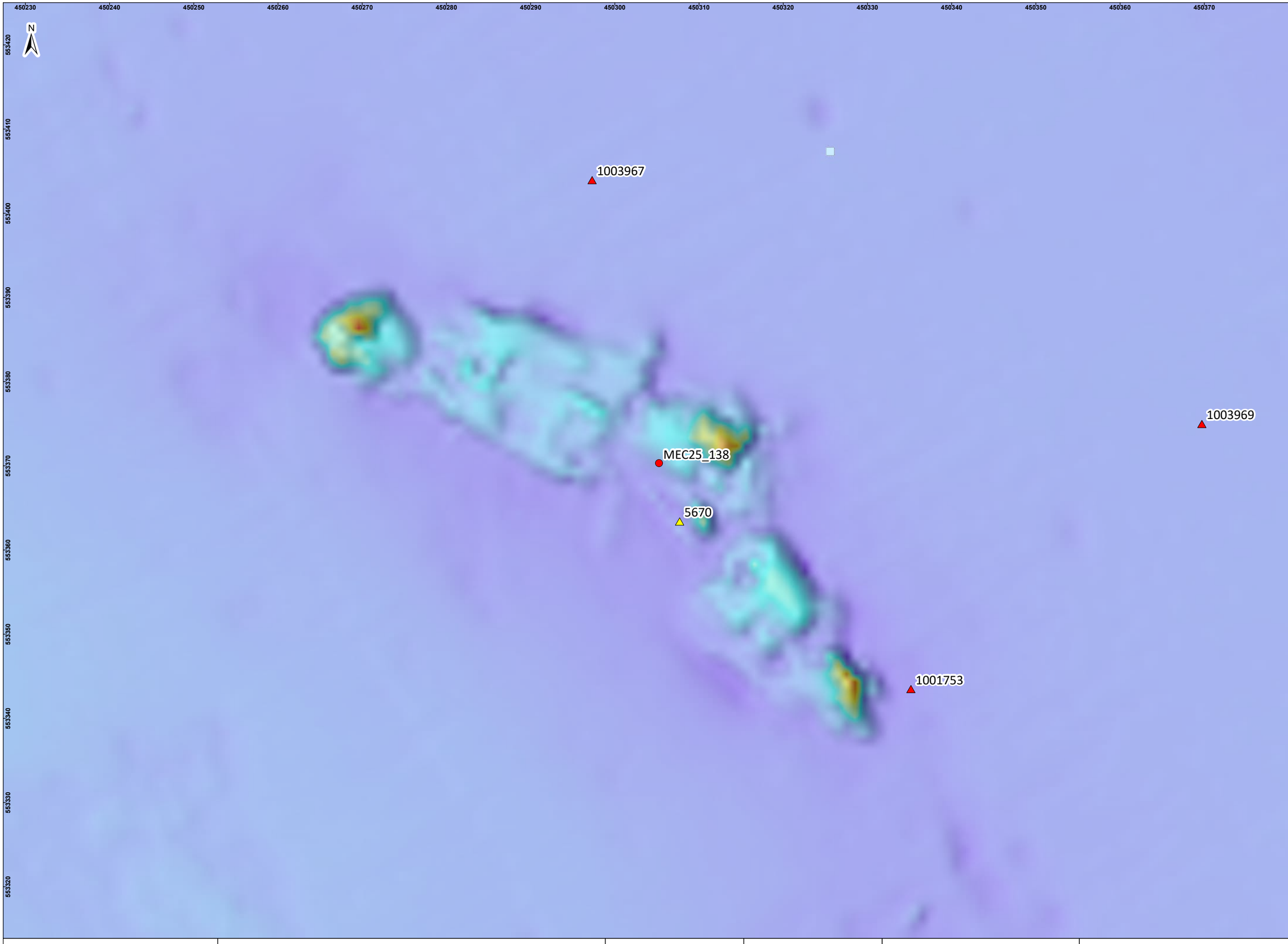
High potential MEC25_136

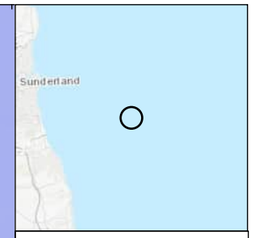
4.3.4.59 High potential MEC25_136 (**Figure 4.55**) lies between KP8 and KP7. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 1.5km from the nearest trackline. The location correlates with UKHO record 5665, NRHE record 1001751 and HER record 2861431.

4.3.4.60 The anomaly is visible within the MBES data as the remains of a wrecked vessel measuring 44.6m x 6.8m with a measurable height of 2.6m. The wreck is identifiable as such; however, it is largely collapsed in places with only prominent remains at the east and at the west. Wreck debris appears largely contained within the footprint of the wreck. The form of the wreck indicates steel construction.

4.3.4.61 The UKHO record the wreck at that of the *Carmarthen Coast* (possibly), a British steam ship built in 1921. The Carmarthen Coast sank in 1939, after striking a mine, whilst enroute from Methil to London with a general cargo. However, following what is believed to be an assessment by divers, high potential MEC25_134/UKHO record 5664 was determined to be the actual location of the *Carmarthen Coast*.

4.3.4.62 The NMHR record the remains of a broken-up wreck at this location, possibly the British cargo ship *Vianna*, with the wreck previously believed to be the remains of the *Teal*. The HER record the wreck as that of the *Teal*. Therefore, it remains unclear as to the identity of the wreck.





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-37.915

-42.096

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.53: HIGH POTENTIAL MEC25_138

0 1 2 3 4 5 Meters

Scale@A3: 1:411

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0056

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

451460 451470 451480 451490 451500 451510 451520 451530 451540 451550 451560 451570 451580 451590 451600 451610 451620

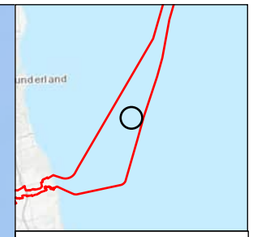
553240 553230 553220 553210 553200 553190 553180 553170 553160 553150 553140 553130

N

MEC25_137

5669

1001752



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-36.532

-44.829

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.54: HIGH POTENTIAL MEC25_137	0 1 2 3 4 5 Meters Scale@A3: 1:468	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number: MHPGC-MSD-MA-0057

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

448340 448350 448360 448370 448380 448390 448400 448410 448420 448430 448440

551460 551450 551440 551430 551420 551410 551400 551390

N

MEC25_136

5665



LEGEND

MHPGC Project PEIR Red Line Boundary

Marine Archaeology Study Area

Archaeological Anomalies

Potential

High

UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-26.847

-30.413

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.55: HIGH POTENTIAL MEC25_136

0 1 2 3 4 5 Meters

Scale@A3: 1:299

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0058

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MEC25_134

4.3.4.63 High potential MEC25_134 (**Figure 4.56**) lies at KP7. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 1.5km from the nearest trackline. The location correlates with UKHO record 5664 and NRHE record 1606892.

4.3.4.64 The anomaly is visible within the MBES data as the very broken up remains of a wrecked vessel measuring 85.8m x 31.3m with a measurable height of 3.9 m. Except for a prominent mound around midships, potentially a boiler, the wreck is low lying. Broadly the wreck material is confined within the outline of the wreck, however debris extends 20m east of the southern end. Further potential wreck debris has been identified as medium potential MEC25_135 *c.* 60m to the northeast of the northern end. Scour is visible predominantly to the north and south.

4.3.4.65 The UKHO record the wreck at that of the *Carmarthen Coast*, a British steam ship built in 1921 that sank after striking a mine in 1939, whilst enroute from Methil to London with a general cargo. The NRHE state that the *Carmarthen Coast* was a steel hulled vessel with a cargo that included granite kerb stones and rolls of linoleum.

High potential MEC25_133

4.3.4.66 High potential MEC25_133 (**Figure 4.57**) lies at KP5. The anomaly is visible in the MBES data, but is outside the SSS data coverage, and has no associated magnetic anomaly although it lies *c.* 540m from the nearest trackline. The location correlates with UKHO record 66531.

4.3.4.67 The anomaly is visible within the MBES data as a broken, curved, discreet, mound measuring 14.3m x 4.5m with a measurable height of 0.6m. There are no diagnostic elements, and the size and form would typically result in a medium potential rating. However, due in part to the presence of a UKHO record and the lack of SSS data, a precautionary approach has been taken with the interpretation as a potential wreck.

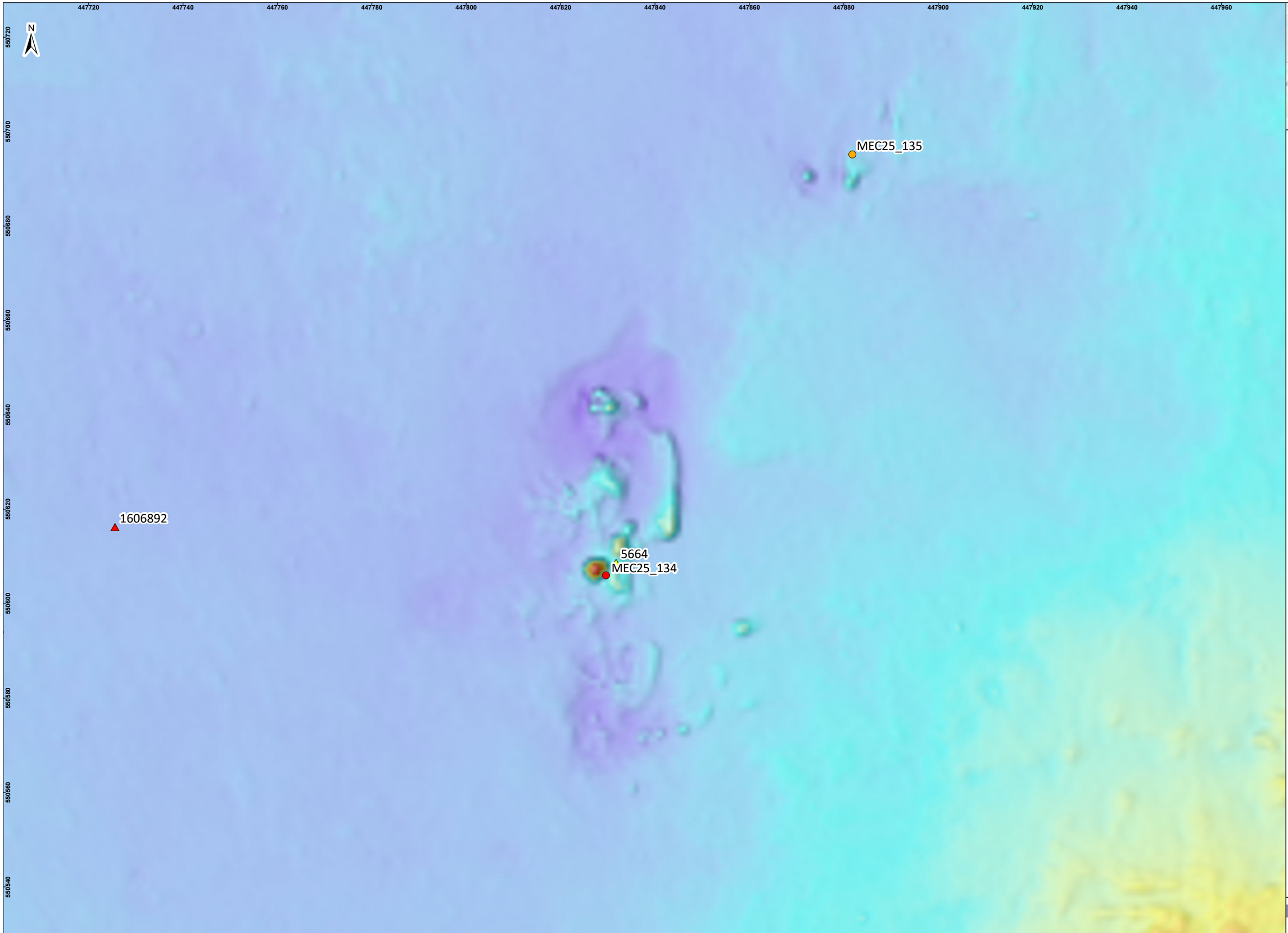
4.3.4.68 The UKHO record the wreck as that of the *Teal* (see high potential MEC25_115 and UKHO record 5785), with the position originating from a reported sinking. With the *Teal* potentially having been identified at another location, the record at this location was amended to dead.

High potential MEC25_115

4.3.4.69 High potential MEC25_115 (**Figure 4.58**) lies between KP6 and KP5. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 2,981.9nT (84,563.3kg). The location correlates with UKHO record 5785 and NRHE record 1001769.

4.3.4.70 The anomaly is the remains of a wrecked vessel measuring 80.2m x 23.3m with a measurable height of 2.6m. The hull (or a part of the hull) of the wreck, measuring 52.9m x 8.1m, is prominent and largely coherent, but appears to be inverted. A prominent mound lies towards the centre of the wreck, potentially representing boilers or superstructure. A significant quantity of incoherent debris lies along the northeastern edge, and to the southeast, extending up to 25m from the hull. Slight scour is visible along the southwestern edge and at the northwestern and southeastern ends.

4.3.4.71 The UKHO record the wreck as that of the *Teal* (possibly), a British steam ship built in 1876 and torpedoed and sunk by German submarine *UB-26* in 1916 whilst enroute from Leith to London. Prior to the successful sinking of the Teal, *UB-26* fired a torpedo which missed, it then went alongside and placed scuttling charges which failed to sink it. The NRHE record states that the *Teal* was an iron hulled steamer that was carrying a general cargo at the time of loss, the NRHE also record the German submarine that sank the *Teal* as *UB-27*, as opposed to *UB-26* in the UKHO record.





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- Medium
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-22.352

-26.938

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.56: HIGH POTENTIAL MEC25_134

0 2 4 6 8 10 Meters

Scale@A3: 1:731

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

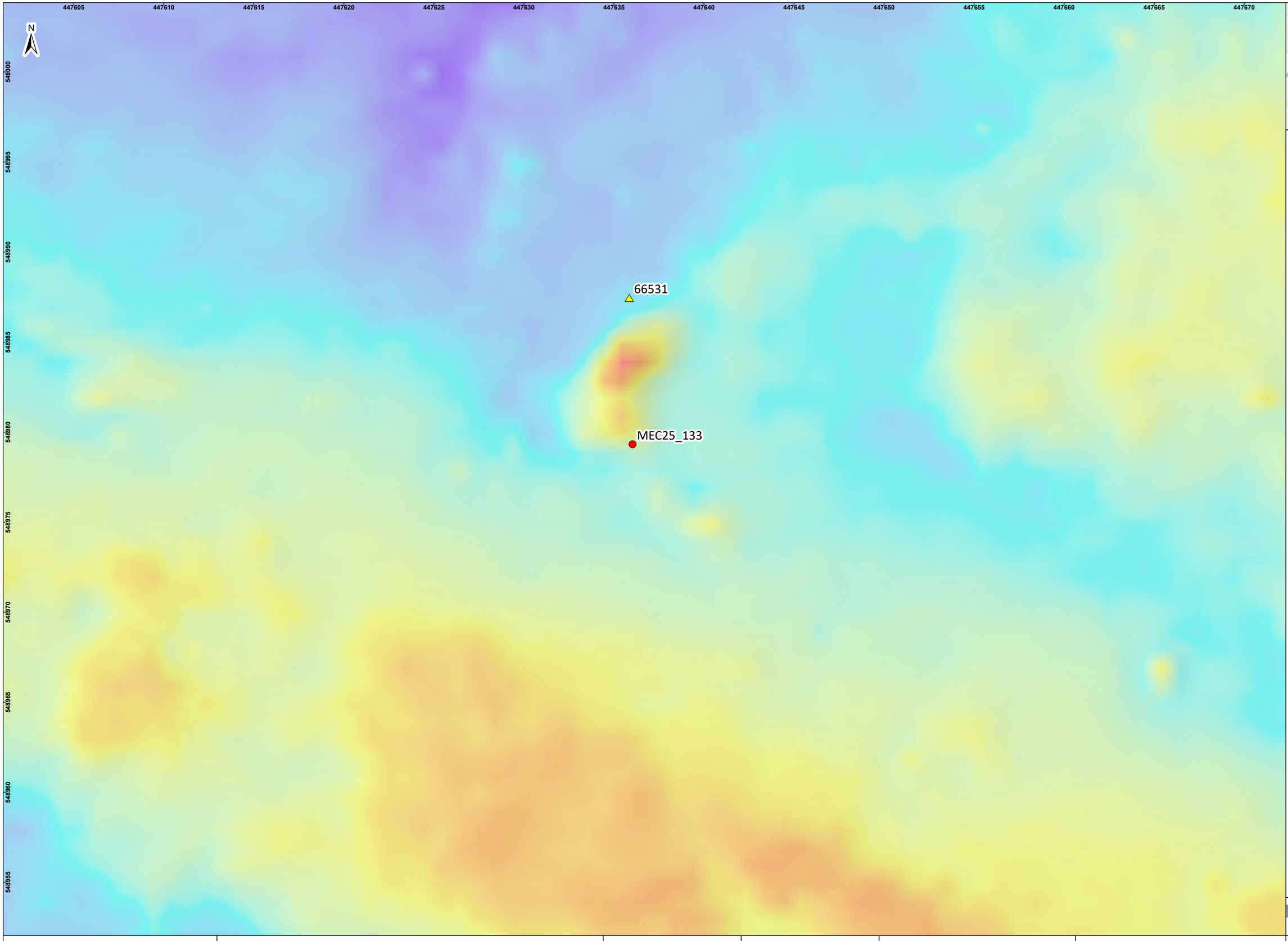
Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

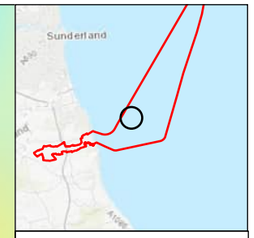
Morven Offshore Wind Farm

MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0059

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High
- UKHO 2026

Multibeam Bathymetry

Depth (m) LAT

-23.145

-23.878

Morven Offshore Wind Farm

MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.57: HIGH POTENTIAL MEC25_133

0 1 2 3 4 5 Meters

Scale@A3: 1:192

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: Esri, HERE, Garmin, FAO, USGS

Drawing Number:
MHPGC-MSD-MA-0060

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

449040 449050 449060 449070 449080 449090 449100 449110 449120 449130 449140 449150 449160 449170

548180 548170 548160 548150 548140 548130 548120 548110 548100 548090 548080

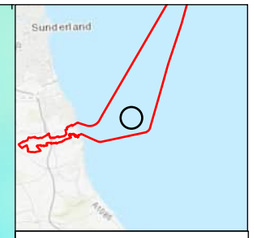
N

2981.9

MEC25_115

5785

1001769



LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 200+
- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-22.813

-27.604

Morven Offshore Wind Farm | MSDS Marine

Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Drawing Title:** FIGURE 4.58: HIGH POTENTIAL MEC25_115	0 1 2 3 4 5 Meters Scale@A3: 1:400	**Geodetic Information:** Datum: European 1950 Projection: ED 1950 UTM Zone 30N	**Data Sources:** BP, Ordnance Survey	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number: MHPGC-MSD-MA-0061

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

449510 449520 449530 449540 449550 449560 449570 449580 449590 449600 449610 449620 449630 449640 449650 449660 449670

546910 546900 546890 546880 546870 546860 546850 546840 546830 546820 546810 546800

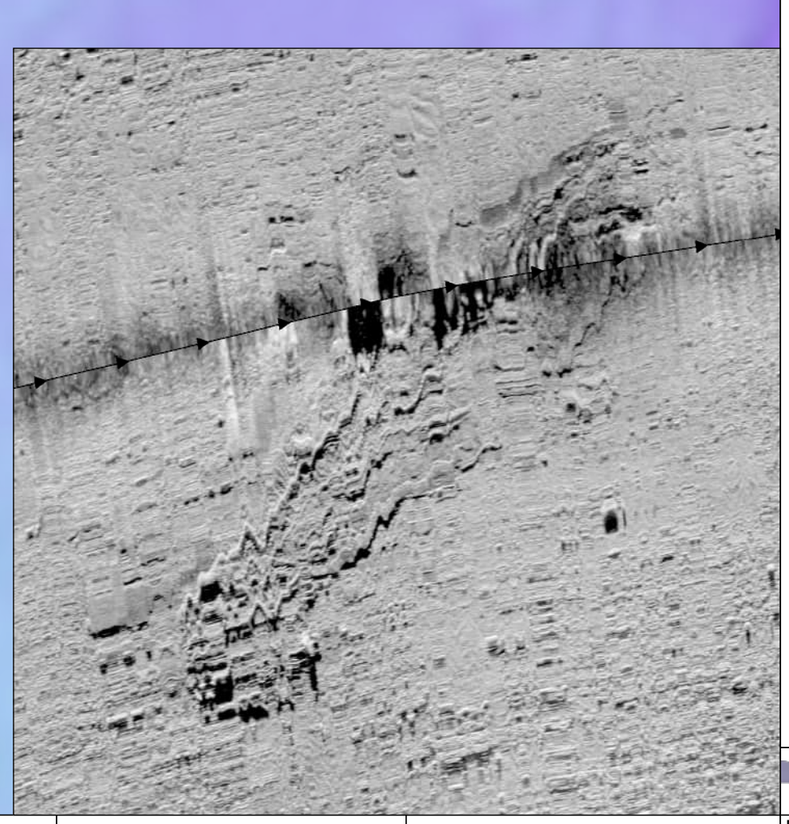
N

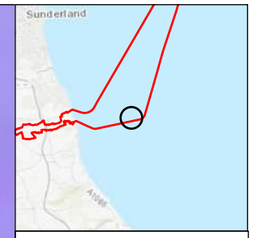
1264.9

MEC25_116

1606851

5663





LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area

Archaeological Anomalies

Potential

- High

Magnetic anomalies

Amplitude range (nT)

- 200+

- UKHO 2026
- National Record of the Historic Environment

Multibeam Bathymetry

Depth (m) LAT

-23.318

-28.104

Morven Offshore Wind Farm | MSDS Marine

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Drawing Title:
FIGURE 4.59: HIGH POTENTIAL MEC25_116

0 1 2 3 4 5 Meters

Scale@A3: 1:468

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

Data Sources:
BP, Ordnance Survey

Service Layer Credits:
World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA

Drawing Number:
MHPGC-MSD-MA-0062

VER	DATE	DETAILS	BY	CHECK
00	28/07/26	Initial Issue	MJ	FLP
01	28/07/26	Final Issue	MJ	FLP

High potential MEC25_116

4.3.4.72 High potential MEC25_116 (**Figure 4.59**) lies between KP5 and KP4. The anomaly is visible in both the SSS and the MBES data and has an associated significant magnetic anomaly of 1,264.9nT (67,970.0kg). The location correlates with UKHO record 5663 and NRHE record 1606851.

4.3.4.73 The anomaly is the remains of a wrecked vessel measuring 64.3m x 28.5m with a measurable height of 2.6m. The wreck is well broken up and low lying, although retains the overall shape of a wreck. Two prominent features lie around midships, which are likely to represent boilers. Small features are visible around the wreck within the SSS data; however, these are similar to features within the wider area and may be geological in origin.

4.3.4.74 The UKHO record the wreck at that of the *Vianna* (possibly), a British steam ship torpedoed and sunk by German submarine *UC-64* in 1918 whilst enroute from Tyne to Ipswich. The NRHE record states that the *Vianna* was a steel hulled steamer built in 1899 that was carrying a cargo of coal at the time of loss.

4.4 Baseline environment: magnetic anomalies

4.4.1.1 A total of 1,245 magnetic anomalies, ranging between 5.0nT and 42,863.0nT, were identified within the MHPGC Project PEIR Red Line Boundary, of these 1,170 do not correlate with known, or visible, features or infrastructure. Of the identified anomalies, 958 originate from the 2023 archaeological assessment within that section of the MHPGC Project Red Line Boundary that overlaps with Morven North and Morven South.

4.4.1.2 The distribution of anomalies by amplitude is shown below in **Table 4.8** with their spatial distribution presented in **Figure 4.60**.

Table 4.8: Magnetic anomalies by amplitude (nT)

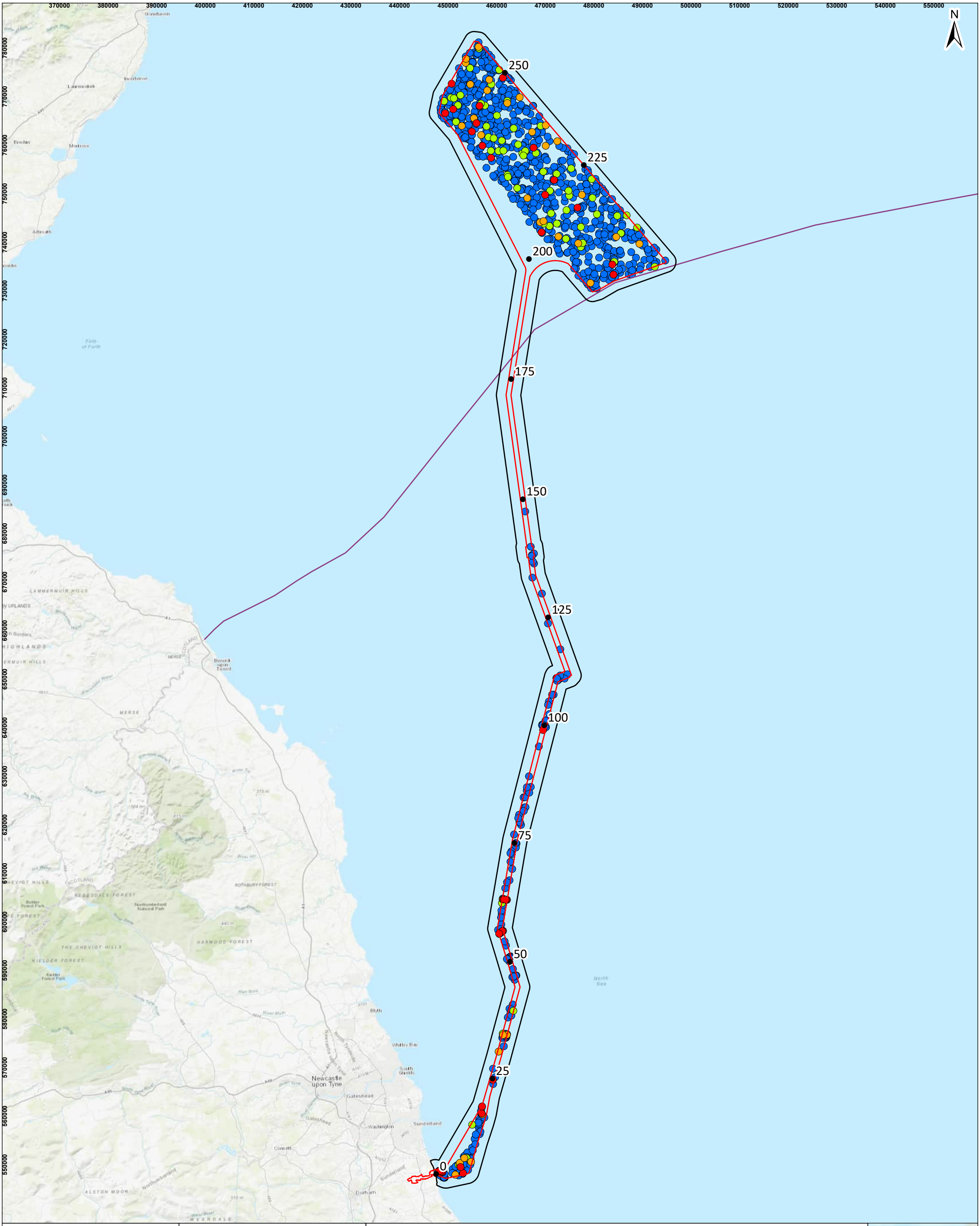
Amplitude (nT)	Scottish waters	English waters	Total
5 to 50	861	195	**1,056**
50 to 100	57	7	**64**
100 to 200	24	8	**32**
200 +	17	1	**18**
Total	**959**	**211**	**1,170**

4.4.1.3 Anomalies identified from the magnetometer data are ferrous and thus generally anthropogenic in origin although they can be associated with geological features, however, there is no visual interpretation as with other geophysical data.

4.4.1.4 The magnetometer data collection methodology across the geophysical survey data extents was to run lines concurrently with the SSS, thus the line spacing is not sufficient for the detailed assessment of small, ferrous features on or below the seabed. The position for a magnetic anomaly can only be determined from directly below a single sensor, or where lines are run close enough together to be able to confidently position an anomaly seen on two, or more, lines. However, in combination with SSS and MBES data the magnetometer specification is considered sufficient to develop a broad understanding of the potential of the survey area, and to identify larger features of potential archaeological significance.

4.4.1.5 The positions of magnetic anomalies were viewed in the available datasets and where there was a strong correlation with a seabed anomaly, they were assessed for archaeological potential. All remaining anomalies have been included within this section.

4.4.1.6 All isolated magnetic anomalies of 50nT to 100nT or less are considered to be of limited potential to be of archaeological significance. This is however dependant on the distance from the sensor.



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0063				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.60: DISTRIBUTION OF MAGNETIC ANOMALIES BY AMPLITUDE (NT)	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA				
0 10 20 30 km Scale@A3:1:700,000	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	17/08/2026	Initial Issue	MJ	FLP
	01	17/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Magnetic anomalies
Amplitude range (nT)

- 5 to 50
- 50 to 100
- 100 to 200
- 200+

4.4.2 Calculation of mass

4.4.2.1 The presentation, and categorisation, of magnetic anomalies by amplitude (nT) provides an effective way to gain a broad understanding of the distribution of ferrous material on, or just below, the seabed. However, to understand the data more comprehensively the ferrous mass needs to be calculated which is based on the amplitude and the distance from the magnetometer. However, with a line spacing of up to 150/300m this is not possible to undertake accurately for anomalies that are not visible on the surface or visible on two lines of data, due to the potential distance of an anomaly from the magnetometer ranging from the altitude to the slant range of 50% of the line spacing.

4.4.2.2 Therefore, all calculations of mass are made using the assumption the anomaly lies directly below the magnetometer, with the distance used for the calculation being equal to the recorded altitude of the magnetometer. Furthermore, calculations are made assuming an anomaly ratio of 1:1. The distribution of anomalies by estimated mass is shown below in **Table 4.9** with their spatial distribution presented in **Figure 4.61**.

Table 4.9: Magnetic anomalies by ferrous mass (kg)

Estimated mass (kg)	Scottish waters	English waters	Total
1 to 100	383	48	**431**
100 to 500	452	101	**553**
500 to 1,000	73	35	**108**
1,000 +	51	27	**78**
Total	**959**	**211**	**1,170**

4.4.2.3 As can be noted, the distribution of the anomalies by estimated mass is broadly similar to the distribution by amplitude.

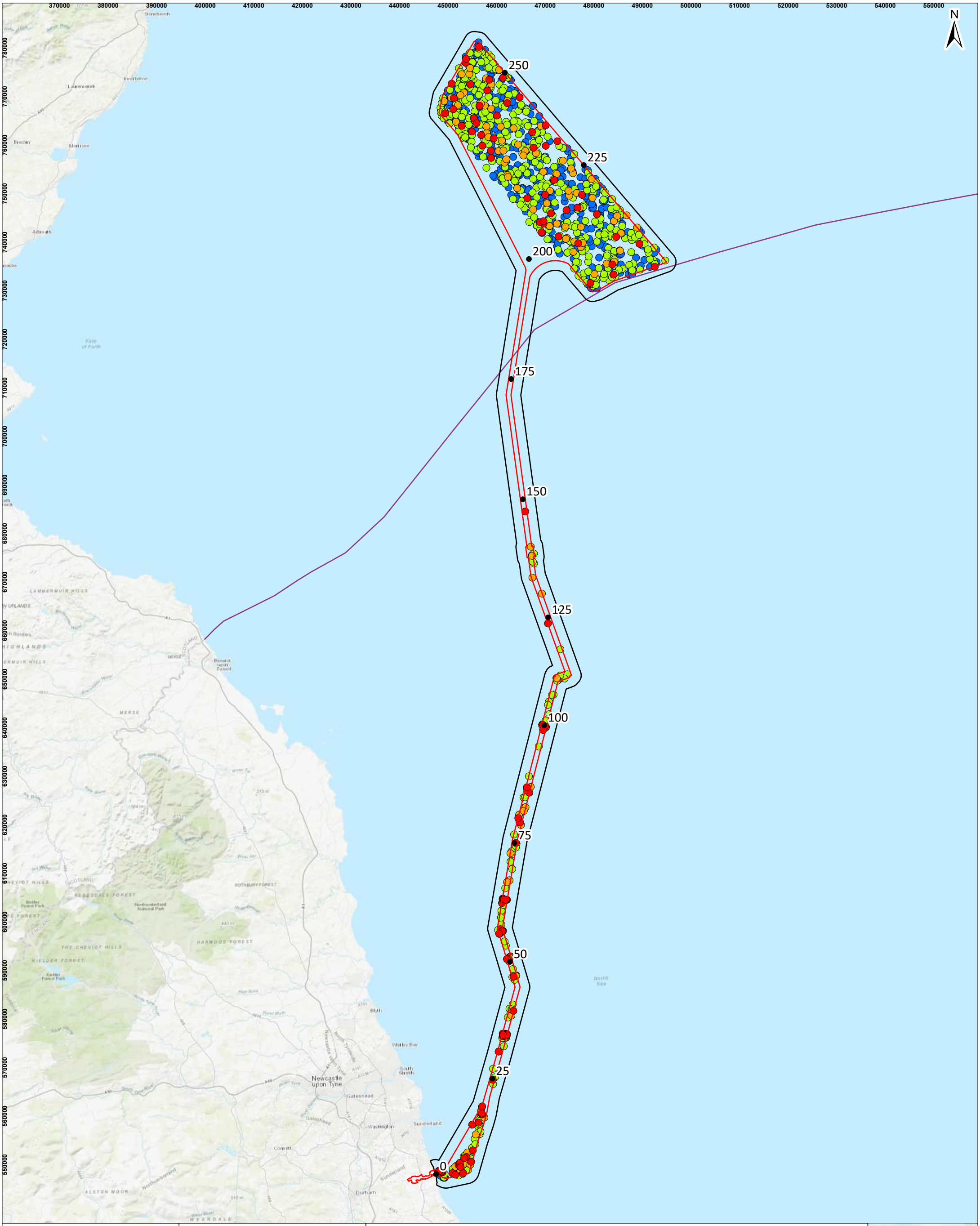
4.4.2.4 Typically, and dependant on the survey specification and the distance from the target, isolated anomalies under 50 to 100nT or 500 to 1,000kg are considered to be of limited, or low, potential to be of archaeological significance.

4.4.3 Overview of magnetic anomaly distribution

4.4.3.1 The distribution of magnetic anomalies is fairly uniform within the extents of the magnetometer data, primarily consisting of anomalies <50nT and <500kg. Due to the 150/300m line spacing used during data collection this is a fairly typical distribution, both geographically and in terms of recorded amplitude and mass.

4.4.3.2 The size (in nT) of a magnetic anomaly is dependent on both the mass of ferrous material, and the distance from the sensor. Therefore, unless there is a strong correlation between a magnetic anomaly and a seabed feature perpendicular to the track, it is not possible to accurately position or determine the mass of an anomaly. For example, an anomaly of <50nT relating to a feature directly below the track could, and often does, represent small pieces of debris, steel cable, fishing gear, etc. whilst an anomaly of <50nT 100m from the track could indicate a much larger feature. If that feature is not visible in the other geophysical datasets (potentially due to being buried) then the position is unable to be reconciled. As such, a bias towards anomalies <50nT is expected as the range to the sensor is greater than 37.5m for 50% of the seabed at a 150/300m line spacing.

4.4.3.3 The potential ferrous mass of anomalies has been calculated, however with a line spacing of up to 150/300m the accuracy of this is extremely limited, primarily due to the unknown distance from the magnetometer to the anomaly.



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0064					
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,					
Drawing Title: FIGURE 4.61: DISTRIBUTION OF MAGNETIC ANOMALIES BY MASS (KG)	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS					
0 10 20 30 km Scale@A3:1:700,000		VER	DATE	DETAILS	BY	CHECK
		00	17/08/2026	Initial Issue	MJ	FLP
		01	17/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N		-	-	-	-	-
		-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Magnetic anomalies

Mass Range (kg)

- 0 to 100
- 100 to 500
- 500 to 1000
- 1000+



4.4.4 Discussion of potential

4.4.4.1 Magnetic anomalies >100nT are typically described as large and have the potential to be of archaeological significance. It should be noted that these anomalies, and any interpretations, are based on a magnetic signature rather than a visible image of the anomaly on the seabed. It is often the case that during intrusive investigations these anomalies are identified as modern marine debris, including cable, chain, modern anchors, fishing gear and parts of modern vessels such as outboard engines, and other detritus either deliberately or accidentally, put overboard. Where anomalies are largely isolated, or relating to a single feature, the most commonly identified material of archaeological interest are isolated anchors, often of indeterminate age. The difficulties in determining the age of concreted anchors, and the lack of a wider context means these are often classed as of low or medium potential to be of archaeological significance. However, whilst the chances of isolated magnetic anomalies being of archaeological interest is potentially low, this does not reduce the potential of anomalies to be of archaeological significance.

4.4.4.2 As discussed, given the vagaries with positioning, size, etc. it would not be proportional to assign potential, and therefore mitigation of avoidance, to anomalies where there is no correlating seabed feature - the anomalies to which this section pertains. Therefore, a broad statement of potential is provided below.

4.4.4.3 A total of 1,170 magnetic anomalies of between 5.0nT and 1,056.0nT (12.4kg and 14,168.2kg), with no definitive correlation with archaeological anomalies, seabed features or infrastructure, have been identified within the MHPGC Project PEIR Red Line Boundary. Magnetic anomalies are ferrous and thus generally anthropogenic in origin; anthropogenic material has the potential to be of archaeological significance. Therefore, there is broad potential to identify additional material of potential archaeological interest within the extents of the geophysical survey data.

4.4.4.4 At the line spacing of the site-specific surveys of up to 150/300m, the potential for anomalies of a significant mass to lie, either undetected, or underestimated is high. For instance, using Hall's Equation and a minimum reliable detection limit of 5.0nT, the minimum mass that can be identified at 5.0nT at a range of 27.0m is calculated as 10.0 tons (Holt, 2019). Holt also notes that the results of field-testing using divers has demonstrated that Hall's Equation can have errors in the calculation of mass in some instances by a factor of three, potentially due to the magnetism of the anomaly, known as permanent or residual magnetism. Therefore, calculations should be considered as estimations of mass, not precise measurements of mass. However, they remain a more robust indication of archaeological potential than the presentation of amplitude with no supporting distance from the anomaly data.

4.4.4.5 Based on the experience of MSDS Marine within the North Sea, and the visual inspection of a significant number of magnetic anomalies, it is considered that a mass range of 500kg to >1,000kg presents a robust but proportional mass from which mitigation recommendations can be based.

4.5 Baseline environment: coastal and maritime archaeology

4.5.1.1 This section considers the potential for remains relating to coastal and maritime cultural landscapes to be present within the Marine and Intertidal Archaeology Study Area, defined as evidence of "…human utilisation of maritime space by boat, settlement, fishing, hunting, shipping and its attendant subcultures, such as pilotage, lighthouse and seamark maintenance" (Westerdahl, 1992).

4.5.1.2 Remains considered range from shipwrecks or other durable evidence, such as cargo and ballast, to features including navigational aids, sailing marks, ports, harbours and jetties. Navigational hazards, such as shallow reefs or sand banks, influence archaeological potential (particularly for wrecks), as does the preservation environment. All can inform understanding of the archaeological potential.

4.5.1.3 Other coastal remains which do not necessarily relate to boat use are also considered, including fish traps and other evidence of human interaction with the sea. In addition, other coastal features are reported on where they inform the archaeological potential of the Marine and Intertidal Archaeology Study Area, such as eroded remains from nearby coastal features or settlements.

4.5.2 Preservation environment

Seabed characteristics

4.5.2.1 The physical characteristics of an area can determine the rate of preservation of materials and thus archaeological potential. The 'Areas of Maritime Archaeological Potential 2 – Characterising the Potential for Wrecks (AMAP2)' project assessed the environmental factors affecting the preservation of maritime archaeological remains on the seabed (SeaZone Solutions, 2011). These factors included: sediment type, sediment thickness, water depth and sediment transport. The project concluded that the best preservation environment was burial in fine-grained sediments. However, it was also concluded that this environment can cause instability in archaeological materials, as even low-energy sediment transport can cause repeated covering and uncovering of remains by shifting sediment.

4.5.2.2 On the scale provided by the AMAP2 project, 1 represents the best preservation environment (i.e. finest grain sediments) and 19 the least favourable (greater gravel inclusions).

4.5.2.3 The Marine and Intertidal Archaeology Study Area within English waters shows preservation scores of 1-15, with the majority recording a high preservation scores of 1-4. Moderate preservation scores are grouped within two smaller areas. The first is within 12nm, close to MLWS, where scores of 5-14 are recorded. The second is located within the northern part of the Marine and Intertidal Archaeology Study Area within English waters, approximately between KP125 and KP150 where scores of 5-11 are also recorded. However, in both cases, the moderate scores are interrupted by recordings of high 1-4 scoring sections.

4.5.2.4 Although the AMAP2 project data does not include Scottish waters, its model can be applied to seabed sediment mapping and sediment types identified by project-specific survey.

4.5.2.5 Up to the Scottish adjacent waters boundary, the AMAP preservation scores north of *c.* KP150 are consistently high at between 1 and 4, with the sediment described as having a predominance of sand. EMODnet (2026) maps a continuation of sand sediment across most of the Marine and Intertidal Archaeology Study Area in Scottish waters, likely to be equivalent to the AMAP description. Smaller areas of slightly gravelly sand are shown, mainly towards the north of the area, but this still implies a predominance of sand, perhaps equivalent to the more moderate AMAP score of 5-8. This largely correlates with the Holocene marine sediment units identified within the SBP and geotechnical data which are predominantly comprised of sand within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South (Surface Sediment), and the northern part of the MHPGC Project PEIR Red Line Boundary in Scottish waters where there is gravelly sand (Hol 3) and sands with local clay (Hol 2 and Hol 3).

4.5.3 Historic coastline development

4.5.3.1 The National Library of Scotland online historic map viewer was examined for evidence of coastal erosion or remodelling at the landfall (National Library of Scotland, 2026). Ordnance Survey maps dating to the late 19th and early 20th centuries (1856 to 1947) illustrate significant change to the coastline at the landfall from the mid-19th century, particularly in the northern part of the Marine and Intertidal Archaeology Study Area.

4.5.3.2 There is a marked shifting of the MHWS mark to seaward between 1856 and 1895-6 by *c.* 160m along Blast Beach between the higher ground of Noses Point to the north and Chourdon Point to the south. An ironworks, established at some point after 1856, is mapped above Noses Point, but labelled as disused by the time of the 1895-6 survey. Hachures extending from the cliff top adjacent to the ironworks and sloping down to the beach are likely indicative of the beginning of a process of dumping waste material onto the beach in this area. A railway has also been constructed on Noses Point, connecting the ironworks to Seaham Harbour to the north.

4.5.3.3 By 1914, the ironworks site has become 'Dawdon Colliery' and both the site and railway network have expanded beyond those depicted in 1895-6, with the railway line extending along the cliff top to connect with the main railway line that has also been established to the west. The process of waste dumping has also continued, with the hachured slopes expanding towards MHWS from mapped tipping flumes.

4.5.3.4 Two significant studies of historic coastline activity and development comprise the North East Coast Rapid Coastal Zone Assessment and Survey (NERCZA) produced by English Heritage (Archaeological Research Services (ARS), 2008) and the 'Turning the Tide Project', undertaken by the University of Durham. Relevant information contained within the NERCZA has been included within the chronological summaries below. The 'Turning the Tide Project' data is not freely accessible. Access will therefore be requested and will form part of the Environmental Impact Assessment (EIA) Report, if possible.

4.5.4 Historic Seascape Characterisation

4.5.4.1 The HSC of the Marine and Intertidal Archaeology Study Area was assessed using Historic England's Historic Seascape Characterisation data (LUC, 2017; ADS, 2018). The current character types within the Marine and Intertidal Archaeology Study Area are summarised in **Table 4.10**.

4.5.4.2 The HSC data only covers English territorial waters. No data was available for the northern part of the Marine and Intertidal Archaeology Study Area in Scottish waters.

Table 4.10: Historic Seascape Characterisation broad character types within the Marine and Intertidal Archaeology Study Area

Character Area	Broad character types within the RLB	Date
Coastal and Conflated	Communications; cultural topography; fishing; industry; navigation; ports and docks; recreation; settlement; unimproved land; woodland	Post-medieval (AD 1540-1750) Early Modern (AD 1750-1900) Modern (AD 1900-Present) Unknown
Sea Surface	Fishing; industry; navigation; ports and docks; recreation	Post-medieval (AD 1540-1750) Early Modern (AD 1750-1900) Modern (AD 1900-Present) Unknown
Water Column	Fishing; industry; navigation; ports and docks	Post-medieval (AD 1540-1750) Early Modern (AD 1750-1900) Modern (AD 1900-Present) Unknown
Sea Floor	Cultural topography; fishing; industry; navigation	Early Modern (AD 1750-1900) Modern (AD 1900-Present) Unknown
Sub-Sea Floor	Cultural topography; fishing; industry	Modern (AD 1900-Present) Unknown

4.5.4.3 The broad character types for marine parts of the Marine and Intertidal Archaeology Study Area comprise communications, fishing activities, industrial installations and infrastructure, navigation routes and hazards, maritime infrastructure, recreation and cultural topography, contributing to the understanding of archaeological potential within the Marine and Intertidal Archaeology Study Area.

4.5.4.4 It is worth noting that the HSC data extends above MHWS and, in tandem with the Marine and Intertidal Archaeology Study Area, draws in data from the terrestrial heritage landscape adjacent to the marine environment. As such, broad character types including settlement, unimproved land and woodland appear in the HSC for the Marine and Intertidal Archaeology Study Area and may not necessarily contribute to understanding of the historic seascape character of the Marine and Intertidal Archaeology Study Area.

4.5.4.5 The HSC data present 'previous sub-type' characterisation for earlier historic periods, where source data is available. Previous sub-types of the Marine and Intertidal Archaeology Study Area are presented by **Table 4.11**. Previous sub-types can further characterise and enhance understanding of past uses of the present seascape and have contributed to the thematic assessment of potential laid out further in this section.

Table 4.11: Historic Seascape Characterisation previous character sub-types within the Marine and Intertidal Archaeology Study Area

Previous period number	Previous character sub-types within the RLB	Date
1	Fishing ground; fixed netting; longlining; navigation route; pelagic trawling; rock outcrops; seine netting; submerged rocks	Medieval (AD 1066-1540) Post-medieval (AD 1540-1750) Early Modern (AD 1750-1900) Unknown
2	Drift netting; fishing ground; fixed netting; longlining	Post-medieval (AD 1540-1750) Early Modern (AD 1750-1900) Unknown
3	Palaeolandscape component; wreck hazard	Mesolithic (10,000-4,000 BC) Unknown
4	Palaeolandscape component	Mesolithic (10,000-4,000 BC) Unknown

4.5.5 Prehistoric

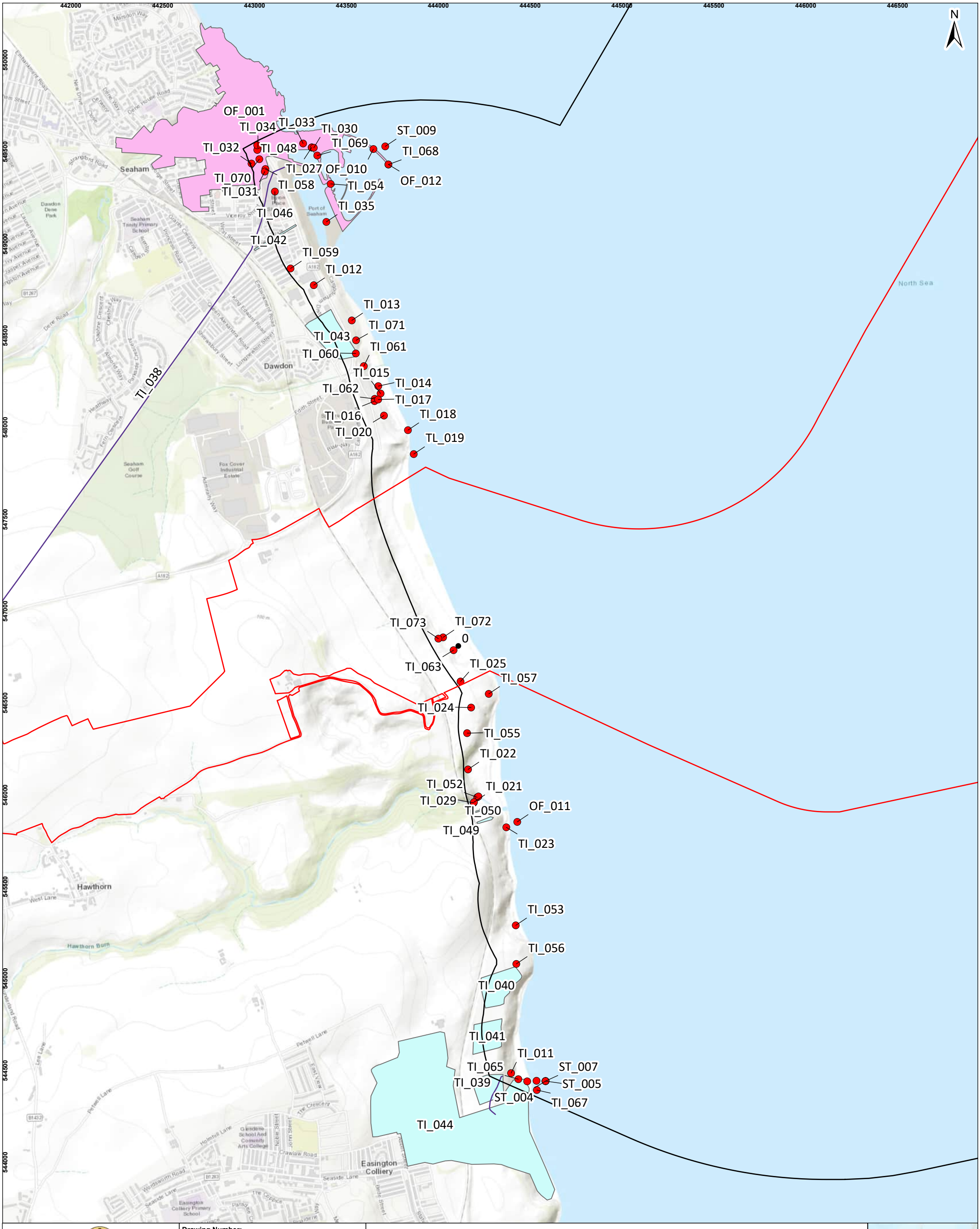
4.5.5.1 While trade networks and maritime travel are evidenced throughout prehistory by the movement of ideas, goods and people, faunal assemblages indicate that maritime activities, such as fishing, took place in coastal areas from the Mesolithic onwards. Maritime transport was also undertaken, as suggested by the Mesolithic and later occupation of offshore islands, such as the Outer Hebrides. Evidence also indicates that some of these activities were not consistently practiced, for example the sharp decrease in marine-sourced food which marked the onset of the Neolithic period (Cramp, 2014; Richards, 2003).

4.5.5.2 Despite the recognition that prehistoric groups likely utilised maritime craft and engaged in maritime activities, physical evidence of vessels and related artefacts is extremely rare. This may be partly attributed to the organic materials used and their poor survivability, including skins, bark and reeds (McGrail, 1981). Prehistoric vessels were likely employed in nearshore activities, such as fishing and transportation, and are unlikely to have traversed deeper water areas of the Marine and Intertidal Archaeology Study Area.

4.5.5.3 Prehistoric groups may have utilised the intertidal zone and saltmarsh for foraging and launching of small craft, however, no evidence is currently available to indicate which activities, if any, were undertaken and during which period. Furthermore, such low impact activities are unlikely to have left traces within the archaeological record at the site of their undertaking.

4.5.5.4 Although there have been no recorded finds of prehistoric vessels within the Marine and Intertidal Archaeology Study Area, Yorkshire and Lincolnshire (both also on the eastern seaboard of England and to the south of the Marine and Intertidal Archaeology Study Area) have an unusually rich record for Bronze Age and Iron Age vessels. This assemblage includes the Bronze Age, sewn-plank boat known as the “Brigg Raft” and the three Bronze Age plank-built boats from North Ferriby. The latter have been credited with being the earliest known seagoing craft in Europe (Hull Museums and Galleries, 2026).

4.5.5.5 Available evidence for prehistoric activity in the Marine and Intertidal Archaeology Study Area comprises nine records totalling over 60 flint artefacts, predominantly blades and flakes. TI_010 is a Mesolithic scatter shown above MHWS (**Figure 4.62**). Whilst it is described as extending to the shore, this is probably due to erosion or translocating from the coal mining site above the cliff as part of waste tipping given that some flints are described as being from the cliff face. This record describes a high quantity of chips, suggestive of industry, which could suggest a clifftop site, subsequently disturbed. A further lithic scatter is assigned a general prehistoric date and is also recorded above MHWS (TI_011; **Figure 4.62**). The description of this asset is a duplication of that for ST_007 and could be indicative of an error in either location or description.



Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0065				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey				
Drawing Title: FIGURE 4.62: DISTRIBUTION OF DURHAM HER RECORDS	**Service Layer Credits:** World Topographic Map: Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS				
0 — 0.5 km Scale@A3:1:18,500	**VER**	**DATE**	**DETAILS**	**BY**	**CHECK**
	00	17/08/2026	Initial Issue	MJ	FLP
	01	17/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Durham HER

- Conservation Area
- Heritage Feature Polygon
- Heritage Feature Line
- Heritage Feature Point



4.5.5.6 Seven other findspots are also of Mesolithic date are located just below MLWS in the sub-tidal zone (ST_002, ST_004-9; **Figure 4.62**). The circumstances of the finds are not clear, other than they were "collected" or "found", which does not imply extensive disturbance into the surface deposits. The likelihood is that they were translocated artefacts not within an original Mesolithic depositional context, potentially from a terrestrial location above the cliffs and brought down as part of industrial activity or erosion. However, the number of finds remains suggestive of activity in this part of the Marine and Intertidal Archaeology Study Area, connected to the site represented by TI_010.

4.5.5.7 As discussed within **Section 4.2.5**, sub-aerial landscapes extended up to 20km below present-day MHWS at *c.* 15,000 BP, with Late Upper Palaeolithic and Early Mesolithic deposits of the Forth Formation possibly being laid down contemporarily. In part, these deposits may represent estuarine or fluvial environments, which would have been an attractive source of resources of human groups. Subsequent marine inundation would have gradually removed this environment as the coastline slowly moved back to its present location, but it would have likely remained accessible and the development of the environment from sub-aerial to saltmarsh, fen or alder carr, for example, may have offered different opportunities and resources.

4.5.5.8 There is some potential that these finds are indicative of further, as-yet unidentified Mesolithic remains, possibly extending below present-day MHWS. None of the findspots are within 1km of the MHPGC Project PEIR Red Line Boundary and the distribution could suggest activity was focused to the south, but this may also be a result of attrition caused by later development impacts elsewhere along the coastline encompassed by the Marine and Intertidal Archaeology Study Area. This is supported by the results of the NERCZA, which notes that most evidence for prehistoric settlement activity is to be found further north within Northumberland and speculates that this is due to the lack of coastal industry and urbanisation (ARS, 2008). However, a much larger scatter of up to 550 flints artefacts is recorded some 3.5km south of the Marine and Intertidal Archaeology Study Area at the base of the cliffs above the beach (approximately 600m north of Castle Eden Dene) (ARS, 2008). The relationship of such scatters to coastal activity is unclear, and the NERCZA notes that "…there is no indication … as to whether they represent activity with a specifically coastal focus" (ARS, 2008).

4.5.5.9 Any interaction with the marine environment during these periods is most likely to have been restricted to localised foraging and fishing in the intertidal and nearshore. Such low-level impacts are unlikely to be represented in the archaeological record, however given the extent of previously sub-aerially exposed landscape, terrestrial remains now lying within the marine zone cannot be discounted for the onset of Mesolithic.

4.5.5.10 On balance, the potential for prehistoric finds to be present within the intertidal and marine zones is considered to be very low for the Palaeolithic and Bronze Age periods, given the lack of known evidence within the Marine and Intertidal Archaeology Study Area. The potential for Neolithic finds is judged to be low, as despite the lack of identified remain there is potential for the inundation geological deposits of the English nearshore in particular to contain *ex situ* Neolithic finds. The potential for Mesolithic finds to be present is considered to be low to locally moderate, with the greater potential being at the intertidal and nearshore areas in English waters where finds have been identified and the Forth Formation deposits suggest some potential for others to be present *in situ*, as well as *ex situ*.

4.5.5.11 This is slightly lower than that for the onshore assessment, where the likelihood of finds being present is greater, based on records from further above MHWS. However, the potential for Bronze Age within the onshore archaeology is currently assessed as high due to the likely presence of funerary barrows. Such monuments, whilst themselves significant, do not currently constitute additional evidence for interaction with the intertidal or marine zones. This is based on a preliminary assessment and integration of the findings contained within **Volume 3, Annex 4.1: Onshore Archaeological Desk-Based Assessment Report**.

4.5.6 Iron Age and Roman

4.5.6.1 Maritime activities in the North Sea during the Iron Age (approximately 800 BC to 43 AD) and the Roman occupation of Britain (43 AD to 410 AD) are well documented, with evidence suggesting regular trade with continental Europe during this period. To facilitate trade and protect the exposed shore of the province, several Roman ports developed along the eastern coast of England, as well as signal stations or watch towers. A chain of watchtowers is known to have been present on the

Durham coast (Dhaeze, 2024). Additionally, the Roman invasion of Scotland during the late 1st century AD included supporting naval activity, but this is likely to have been confined to the nearshore, operating in close support of the land forces and involving marines camping ashore with the army (Lavery, 2001). There is no evidence for such activity in the Marine and INtertidal Archaeology Study Area and in general with the NERCZA also noted a lack of Roman period remains, with the most significant being a 2nd century AD fort at South Shields that formed part Hadrian's Wall (English Heritage, 2008). There is no indication of temporary marching camps or other activity that may pre-date this monument and that might be linked to the earlier campaigns into Scotland.

4.5.6.2 In general, the scale of shipping during this period is poorly represented by remains in the archaeological record although discoveries of artefact concentrations on the seabed point to the survival of lost cargoes of shipwrecks of this period, and it is likely that many more vessels were lost that the available archaeological evidence suggests. The overall likelihood of their survival, however, is limited and ship remains from the Roman period are extremely rare.

4.5.6.3 There are no assets pertaining to the Roman period within the Marine and Intertidal Archaeology Study Area. The evidence identified within **Volume 3, Annex 4.1: Onshore Archaeological Desk-Based Assessment Report** primarily consists of the remains of terrestrial activity, such as settlement and farming from the Iron Age which may have continued into the Roman Period. Therefore, the potential is slightly higher within the onshore zone but remains very low for Marine and Intertidal Archaeology. This based on a preliminary assessment and integration of the findings contained within **Volume 3, Annex 4.1: Onshore Archaeological Desk-Based Assessment Report**. The integration of these findings, where relevant, will be enhanced at the ES stage.

4.5.6.4 Whilst it possible that the intertidal and nearshore were accessed for resources in this period, such activities are very unlikely to be represented within the archaeological record. Based on all of the above, the above potential for Iron Age and Roman archaeology to be present is considered to be very low.

4.5.7 Early medieval and medieval

4.5.7.1 Maritime technology and activity continued to develop in the early medieval and medieval periods. Raiders, invaders and settlers from Ireland, Scandinavia and Northern Europe brought new boat building technologies and opportunities for trade which led to the growth of several major ports on the east coast of Britain (Hutchinson, 1997; Friel, 2003). Improvements in shipbuilding and seafaring technology, coupled with expanding trade, fishing and commercial activity, gave rise to new vessel types, such as cogs, hulks and carracks and the expansion of fisheries (Müldner, 2016).

4.5.7.2 It is probable that Seaham originated in the early medieval period, with the name originating from Old English for a "Sea homestead/village" (University of Nottingham, 2026). However, this settlement is likely to have been focused on the historic village core centred on the parish Church of St Mary, parts of which could date to the 8th century, at least 3km north of the MHPGC Project PEIR Red Line Boundary and 1.2km beyond the Marine and Intertidal Archaeology Study Area. As mapped by the 1st edition OS in *c.* 1856, this area remained a historic village core until the harbour and model town were developed in the post-medieval period (National Library of Scotland, 2026; **Section 4.5.8**). With no harbour, any interaction with the marine environment during these periods is most likely to have been restricted to localised foraging and fishing in the intertidal and nearshore zones north of the RLB and closer to the historic core. Such low-level impacts are unlikely to be represented in the archaeological record.

4.5.7.3 The potential for early medieval archaeological remains to be present is therefore considered to be very low.

4.5.7.4 Following an initial period of stagnation following the Norman conquest, English trade, particularly in wool, prospered during the medieval period. Locally, maritime trade from the Tyne grew in prominence, with the development of coalmines from the late 12th century; a trade that included export to London and abroad. By *c.* 1377, as much as 7,000 tons per year were being shipped out of the Tyne, predominantly to the Low Countries (Hope, 1990).

4.5.7.5 A catalyst for a marked increase in shipping during the medieval period was the establishment of the Hanseatic League around 1169. At its height, the League represented some 84 cities, including ports on the eastern coast of England and Scotland, which developed rapidly to accommodate the

growing trade in cargos such as coal, timber and wine (Hutchinson, 1997). In general, it has been noted that it was the east coast Scottish ports that were predominant in medieval seaborne trade and particularly that emanating from the Firth of Forth with Leith, both a feeder port for the Hanseatic League and the official the port of Edinburgh, described as "the gateway to Scotland and its busiest port" (City of Edinburgh Council, 2002). The economic alliance served to increase the already long-established trade connections between ports such as Leith and Kinghorn in the Firth of Forth and those in northern Europe and the Baltic (Ditchburn, 1988).

4.5.7.6 These examples collectively suggest that the Marine and Intertidal Archaeology Study Area in both English and Scottish waters would have been traversed by shipping both to and from London and across the North Sea from the Tyne, Forth and other east coast ports.

4.5.7.7 There are no assets within the Marine and Intertidal Archaeology Study Area of medieval date, including no direct evidence for interaction with the marine zone. Evidence is confined to speculation in two records of post-medieval ridge and furrow field systems that such agricultural practices have the potential to have medieval origins (TI_024 and TI_025; **Figure 4.62**). These are located above Chourdon Point just within the Marine and Intertidal Archaeology Study Area boundary and well above MHWS.

4.5.7.8 Although this period pre-dates the development of Seaham into a harbour town, there is documentary evidence to suggest that maritime traffic may have passed through the Marine and Intertidal Archaeology Study Area, with medieval trade running between London, the Tyne and the Forth in particular. There is, therefore, some potential for unknown wrecks and cargo to be present within the Marine and Intertidal Archaeology Study Area dating to the medieval period. Perishable materials, such as wooden hulls, are generally less likely to have survived, due to the longevity of deposition and hydrodynamic processes, but some consideration is made for the favourable preservation levels suggested within English waters, and to a lesser extent within Scottish waters (**Section 4.5.2**). In addition, elements of wreck and materials such as metal or ceramics also have a higher chance of survival. No such evidence has yet been discovered within the Marine and Intertidal Archaeology Study Area.

4.5.7.9 In contrast, the potential for early medieval and medieval remains to be present within **Volume 3, Annex 4.1: Onshore Archaeological Desk-Based Assessment Report** has been assessed as slightly higher, due to the proven presence of medieval settlement and agricultural activity at and around Seaham, which has more limited bearing on the Marine and Intertidal Archaeology assessment of potential as the harbour was not developed until the post-medieval period (based on a preliminary assessment and integration of the findings contained within **Volume 3, Annex 4.1: Onshore Archaeological Desk-Based Assessment Report**). Foraging activities associated with nearby settlement are unlikely to leave firm traces within the archaeological record. The NECRZA suggests similar conclusions, noting that, for example, key medieval assets such as the priory and castle at Tynemouth are within a coastal setting, "…their raison *d'etre* was not primarily coastal..." (ARS, 2008: 133).

4.5.7.10 The potential for medieval archaeological remains to be present within the Marine and Intertidal Archaeology Study Area is therefore considered to be low.

4.5.8 Post-medieval to modern

4.5.8.1 On a national scale, the late medieval growth of commercial maritime trade continued and increased into the post-medieval period. From an early date, coal was one of the most important cargoes to pass through the Marine and Intertidal Archaeology Study Area, mostly enroute from the major ports at Newcastle, Aberdeen and in the Firth of Forth to London. The coal trade was perhaps the single largest contributor to the extensive post-medieval expansion in British shipping (Wheatley, 1990; Lavery, 2001). By the end of the 17th century, over 140,000 tons annually were being shipped from Newcastle alone and shipping had become the fourth largest English industry (Hope, 1990). Maritime industrial expansion continued into the 18th and 19th centuries, with activities such as trading, fishing and overseas ventures expanding and increasing the volume of shipping likely to have traversed and exploited the Marine and Intertidal Archaeology Study Area. This is likely to have been higher in the central and southern English waters part of the Marine and Intertidal Archaeology Study Area, than in the Scottish and more northerly English waters situated further from the main coastal routes.

4.5.8.2 In contrast to the medieval period, Scottish trade turned away from Northern Europe and the Baltic following the Act of Union in 1707, towards the American colonies and English ports (Lavery, 2001; Moore, 1998). Whilst subsequent trade increased with the new United States following their secession, as well as with Canada and Ireland, it suggests the focus of trade remained to the west (Lavery, 2001). From the early 18th century, Scottish ports would be able to take advantage of the Forth-Clyde canal or major ports such as Aberdeen, travel north around the coast and away from the Marine and Intertidal Archaeology Study Area. It is therefore possible that the amount of local, national and international trade traversing the more northerly parts of the Marine and Intertidal Archaeology Study Area was slightly lower than that to the south, until the greater expansion of international trade seen in the 19th century. This growth was stimulated by the economic growth of Britian in the wake of the Industrial Revolution and its development into the world's premier manufacturing nation (Moore, 1998).

4.5.8.3 A database of historic ports and coastal routes in England and Wales highlights several key coastal settlements near to the Marine and Intertidal Archaeology Study Area in English waters from the post-medieval period, including Blackhall and Hartlepool to the south, and the major ports of Sunderland and on the Tyne at Newcastle to the north (Alvarez-Palau, 2019). Coastal routes linking these, other small, coastal settlements and regional hubs would have traversed the nearshore part of the Marine and Intertidal Archaeology Study Area and routes overseas would have crossed the offshore parts.

4.5.8.4 The level of local maritime traffic increased significantly by the development of Seaham Harbour between 1828 and 1832. Seaham grew rapidly in the first part of the 19th century, as a result of its redevelopment as a model town accompanying the creation of the harbour to serve as a coal port, which enabled the export of local minerals more cheaply than via the main port at Sunderland (University of Newcastle, 2026; Durham County Council, 2007). There are two Grade II Listed Buildings associated with this phase, both forming part of the original dockyard development (LB ID: 123439 and 1277116; the remaining elements of the docks which are beyond the listed structures are included within the overarching HER records for Seaham Docks and includes parts that extend below MLWS: TI_027, TI_035, OF_003 and OF_019; **Figure 4.1**; **Figure 4.62**). These assets, along with the Grade II Listed Police Station (LB ID: 1232270) are contained within the Seaham Conservation Area (OF_001; **Figure 4.1**), which partly intrudes into the northern part of the Marine and Intertidal Archaeology Study Area, *c.* 1.4km from the MHPGC Project PEIR Red Line Boundary at its closest point (a number of other buildings constructed as part of the new town within the Conservation Area and beyond form non-designated assets and are detailed in full within **Appendix C**).

4.5.8.5 Most assets pertaining to this period are industrial in nature. Eight assets, comprising former buildings and mineral railways, are associated with Dawdon Colliery (TI_006; **Figure 4.62**). The NMHR polygon for this former coal mine extends below MHWS just intruding into the MHPGC Project PEIR Red Line Boundary, due to the discarded waste material that was dumped on the beaches in this area (several large waste banks remain and were observed during the intertidal walkover survey). Two tipping flumes overlooking the beach (but above MHWS) also bear witness to the practise of waste material being dumped along the shoreline (TI_18 and TI_19; **Figure 4.62**), as observed within the historic OS mapping discussed above within **Paragraph 4.5.3.3**. No surviving or demolished structures are shown with the MHPGC Project PEIR Red Line Boundary. The nearby former chemical works (TI_043; **Figure 4.62**) was also responsible for the well-documented contamination of Blast Beach. A study of historic OS maps, as discussed above, **Paragraph 4.5.3.2**, has also noted the presence of a former ironworks, with indications that dumping had already occurred on the beach in this area prior to the creation of Dawdon Mine.

4.5.8.6 Whilst other such industries, such as limekilns and a bottle works, are represented within the records, it is the coal industry which remains the most prominent source of post-medieval assets with links to the marine and intertidal archaeology topic, owing to the importance it had on the volume of maritime trade.

4.5.8.7 This is demonstrated by the site of another coal mine at Easington above MHWS (TI_044; **Figure 4.62**) and former coal drops and wagons on, and mineral lines terminating at, Seaham Harbour (TI_026, TI_028, TI_038 and TI_045; **Figure 4.62**). However, the OS mapping of 1895-6 shows that a railway had already been established from Noses Point to the docks adjacent to the former

ironworks and likely associated with it, which serves as a reminder that other types of maritime trade existed other than coal.

4.5.8.8 Two further post-medieval assets are indicative of the increasing importance of maritime activity during this period, comprising a ropery and sawmill, adjacent to Seaham Harbour (TI_042 and TI_046; **Figure 4.62**) and the creation of a lifeboat station on the North Dock of the harbour (TI_030; **Figure 4.62**). The remaining post-medieval assets are agricultural in nature, consisting of four examples of ridge and furrow, situated above MHWS (TI_025, TI_041-42 and TI_039-40; **Figure 4.62**).

4.5.8.9 The post-medieval assets support the historical assertions for the increased importance of marine zone during this period, largely due to the coal industry. Whist direct remains, such as industrial waste and rubble, exist within the Marine and Intertidal Archaeology Study Area (see **Sections 4.5.3** and **4.5.10**), this is less important than what they represent in terms of the connections to the sea and the increase in maritime activity prompted by their development.

4.5.8.10 This picture remains essentially unchanged into the modern period, with the continuing expansion of terrestrial industry and communication lines. Several assets above MHWS are associated with the urban development of Seaham, the railways and the continuing activity at Dawdon Colliery (this includes the two remaining designated assets, comprising a railway viaduct (TI_004) and statue dedicated to the Marquess of Londonderry (TI_005); see **Figure 4.1** and **Appendix C** for details).

4.5.8.11 The continuing importance of the connection of the town and locality to the sea is demonstrated by several non-designated assets, situated above MHWS. One ruined structure adjacent to Easington Colliery has been describes as a potential boathouse, although it may simply have been another former colliery structure (TI_065; **Figure 4.62**). Meanwhile Seaham Harbour continued to be developed during this period, with the addition of a lighthouse to the North Pier in 1905 (OF_011; **Figure 4.62**). Another improvement to maritime security, prompted by the increased maritime activity since the development of Seaham, is also witnessed by the addition of a maritime rocket station (TI_056; **Figure 4.62**). This site is described as modern, but the record states a possible post-medieval origin. The development of a fish market in Seaham (TI_058), extant between 1908 and 1973, attests to the local importance of fishing and serves as a reminder that the development of the harbour was likely influenced by this activity also and not purely a result of increased industrial activity.

4.5.8.12 One more ambiguous record is that of a possibly ship's boiler recorded just below MLWS (OF_010; **Figure 4.62**). This is described as a 'replacement boiler' suggesting it is not part of a wreck, although it is not clear why if it was not utilised but apparently discarded. The record is situated 800m south of the MHPGC Project PEIR Red Line Boundary.

4.5.8.13 The most significant modern impact on the local littoral was the imposition of wartime defensive measures, such as pillboxes, coastal batteries, barbed wire lines and associated infrastructure. The security of the North Sea coast became an increasing concern in the early 20th century, as Anglo-German rivalry steadily increased prior to the First World War. The local industrial importance of the coastline would have increased these concerns. There are 13 records that pertain to extant or removed defensive sites above MHWS, spanning both World Wars. These were mostly located on the cliffs above the beach, however, one area of pre-Second World War military buildings (TI_073; **Figure 4.62**) is recorded at the base of the cliffs alongside an extent Second World War structures (TI_063 and TI_072). These are within the MHPGC Project PEIR Red Line Boundary but above MHWS. The latter was not observed during the intertidal survey (and lay outside of the survey area) and may be obscured in the base of the cliffs or be a duplicate of TI_063 wrongly located. The extent of such activity near MHWS may have resulted in some interaction with the intertidal and marine zones, although this is unrecorded. Some structural elements observed during the intertidal survey may be from lost defensive structures, however, it is equally possible they originated from lost buildings on the clifftop associated with the local industries (for example, adjacent to Easington Colliery; see **Paragraph 4.5.8.11**).

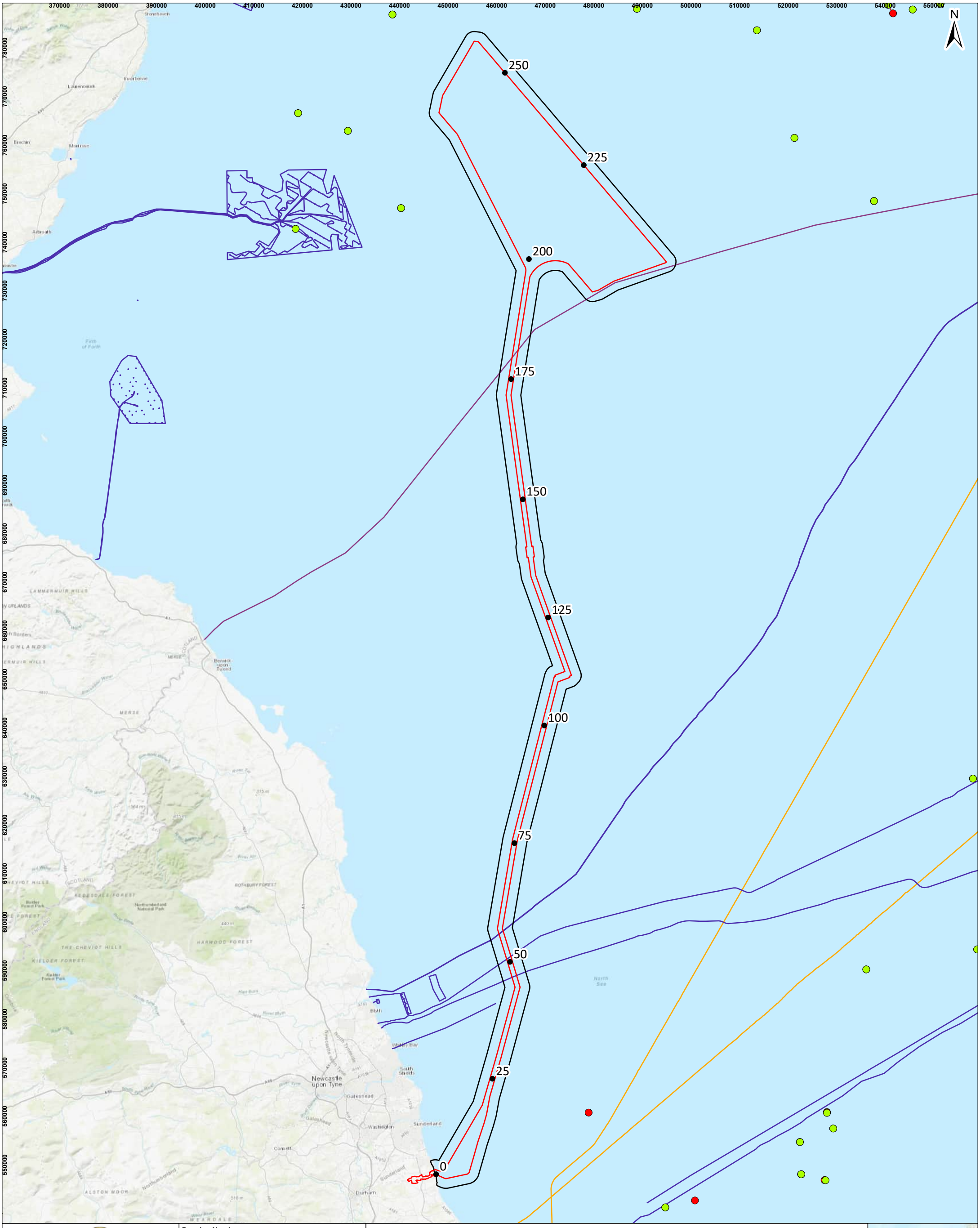
4.5.8.14 The security concern for the North Sea region also led to the development of naval facilities in the Firth of Forth, the Cromarty Firth and eventually at Scapa Flow in the Orkneys (Barclay and Morris, 2019). It is likely that the Marine and Intertidal Archaeology Study Area in both Scottish and English waters witnessed an increase in naval traffic as the North Sea region increased in importance. There

are many wrecks and documented losses attesting to conflict in the North Sea, encompassing the Marine and Intertidal Archaeology Study Area (these are discussed below within **Section 4.5.9**).

4.5.8.15 In general, shipping traffic across the central North Sea increased exponentially during the modern period, making the region one of the busiest shipping areas in the world. Much of the traffic was associated with local and international trade, but a large percentage was linked to the commercial fishing industry and, more recently, oil and gas exploration and linear infrastructure (**Figure 4.63**).

4.5.8.16 Knowledge of historic shipping casualties during this period is enhanced by the development of centralised recording of ship losses from the late post-medieval period onwards, such as the Lloyd's List. The increasing incorporation of metal structural elements into vessel designs during this period means that wrecks from the 19th and early 20th centuries are also often more visible to common detection methods on the seabed than their wooden predecessors. They are more visible in bathymetric and geophysical survey and also can generate strong magnetic anomalies. This greater visibility is reflected in the increased number of located wrecks for the modern period, in contrast to earlier periods.

4.5.8.17 On the basis of the information presented above, there is a moderate to high potential for post-medieval and high potential for modern maritime archaeological sites and material on the seabed of the Marine and Intertidal Archaeology Study Area, with the higher potential being within English waters and increasing nearer to the coast. This is supported by the higher number of wreck and documented loss records within 12nm within English waters (see **Section 4.5.9**). A low potential is considered for earlier post-medieval remains to be present, accounting for their overall rarity and variable preservation conditions within the Marine and Intertidal Archaeology Study Area. A slightly greater potential may be considered for areas exhibiting more favourable preservation environments (see **Section 4.5.2**).



Morven Offshore Wind Farm

MSDS Marine

Drawing Number:
MHPGC-MSD-MA-0066

Project Name:
MORVEN HAWTHORN PIT GRID CONNECTION PROJECT

Data Sources:
BP, Ordnance Survey,

Drawing Title:
FIGURE 4.63: EXISTING INFRASTRUCTURE

Service Layer Credits:
World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA
World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS

0 10 20 30 km

Scale@A3:1:700,000

VER	DATE	DETAILS	BY	CHECK
00	17/08/2026	Initial Issue	MJ	FLP
01	17/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

Geodetic Information:
Datum: European 1950
Projection: ED 1950 UTM Zone 30N

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Infrastructure

- Well bottom holes
- Well top holes
- Cables
- Well connections
- Pipelines



4.5.9 Wreck records and documented losses

4.5.9.1 This sub-section examines the known wreck and documented loss records within the Marine and Intertidal Archaeology Study Area. Data derived from the UKHO, Trove, NMHR and Durham HER databases has provided information for a minimum number of maritime losses within the Study Area from the 17th to the 20th centuries, however, the actual figure is likely higher, due to variation in the quality of sources and record keeping.

4.5.9.2 Where wrecks and/or losses are identifiable across multiple records, these have been condensed into a single entry for the purposes of this assessment. A small number of instances occur where multiple records exist and have been retained for the same wreck or loss, as there remains some doubt as to the true location or multiple parts of the same vessel have been identified.

4.5.9.3 The recording of maritime history became common practice by the 19th century, and our knowledge of contemporary and later maritime activity is therefore much more robust than for earlier periods. It is feasible that vessels were lost within the Marine and Intertidal Archaeology Study Area prior to the 19th century but are not recorded as such. Furthermore, one or more of the wrecks of unknown date may pre-date the 19th century. Documentary evidence of vessels lost during known periods provides evidence of maritime activity in the waters surrounding, and within, the Marine and Intertidal Archaeology Study Area.

4.5.9.4 Many records represent documented losses, derived from written historic written accounts of loss, rather than identified physical remains. Such maritime losses were recorded often from coastguard or witness reports, or even floating or beached wreckage, and attributed a very broad and potentially very inaccurate location (often groups of records are provided with the same location coordinates, as the historic record may simply state that the loss was, for example “off Seaham” of “off Souter point”. Documented losses can be used to glean broad understanding of maritime activity; however, they are unlikely to indicate the location of physical remains or provide definitive loss numbers.

4.5.9.5 The project-specific intertidal walkover survey (see **Section 4.5.5.9**) did not identify any archaeological remains within the survey area.

4.5.9.6 In total, there are 66 UKHO records within the Marine and Intertidal Archaeology Study Area.

4.5.9.7 Of these records, 60 comprise wrecks or possible wrecks within the Marine and Intertidal Archaeology Study Area. Of these 60, 15 are listed as ‘dead’ locations, indicating that they have not been detected by repeat surveys. The UKHO wreck records are distributed as follows (also illustrated by **Figure 4.64**):

- English waters Marine and Intertidal Archaeology Study Area:
  - 37 within 12nm (nine ‘dead’ locations);
  - 11 beyond 12nm (two ‘dead’ locations);
- Scottish waters Marine and Intertidal Archaeology Study Area:
  - 12 (five ‘dead’ locations).

4.5.9.8 Of the total number of UKHO wreck and possible wreck records, 26 are located within the MHPGC Project PEIR Red Line Boundary, of which five are listed as ‘dead’ locations. These are located as follows (also illustrated by **Figure 4.64)**:

- English waters MHPGC Project PEIR Red Line Boundary:
  - 16 within 12nm (three ‘dead’ locations);
  - three beyond 12nm (no ‘dead’ locations);
- Scottish waters MHPGC Project PEIR Red Line Boundary:
  - seven (two ‘dead’ locations).

4.5.9.9 Of the wreck records located within the MHPGC Project PEIR Red Line Boundary within 12nm in English waters, one is designated under the Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2026. These are the remains of the RFA *Creosol* (MSDS ID: W_027; **Figure 4.1**; **Figure 4.64**).

4.5.9.10 The remining six UKHO records are all located within English waters. Three are foul ground records, of which two are within the MHPGC Project PEIR Red Line Boundary inside 12nm (MSDS IDs: W_032 and W_065; **Figure 4.64**), and the third listed as a dead location outside of 12nm (MSDS ID: W_059).

One further record is within the MHPGC Project PEIR Red Line Boundary, which is an obstruction record comprising a sewage diffuser (MSDS ID: W_052; **Figure 4.64**). The remining two records are outside of the MHPGC Project PEIR Red Line Boundary, consisting of discarded drilling equipment (MSDS ID: W_022; **Figure 4.64**) and a possible cylindrical object of unknown origin (MSDS ID: W_066).

4.5.9.11 The Trove database holds (Canmore maritime) records for 35 maritime losses within the Marine and Intertidal Archaeology Study Area. These are illustrated by **Figure 4.65**.

4.5.9.12 Of these, 22 comprise wreck records, 20 of which correlate with UKHO records and two of which form additional wreck records. One of these records is within Scottish waters, within the MHPGC Project PEIR Red Line Boundary (MSDS ID: W_067), and one within English waters beyond 12nm (MSDS ID: W_068).

4.5.9.13 The remaining 13 Canmore maritime records consist of documented losses, four of which correlate with UKHO wreck records.

4.5.9.14 The NMHR holds records for 226 maritime losses within English waters, of which 40 comprise wreck records with 39 correlating with UKHO records (**Figure 4.65**). The additional wreck record (W_069) does correlate with a UKHO record (UKHO ID: 57064), but which is located *c*. 6km outside of the Marine and Intertidal Archaeology Study Area. This is for the hopper barge *Lonclara*, sunk by a mine in 1917. The record is retained here as it is not certain whether there is an error in location or that the wrong wreck details have been inputted. The remining 186 records consist of documented losses records.

4.5.9.15 A further 138 NMHR records comprise unknown obstructions, which could represent furthermost losses but for which no further details are currently known.

4.5.9.16 The Durham HER holds records for 55 maritime losses (not reproduced). Eleven comprise wreck records, of which ten correlate with UKHO records. The remaining 44 records comprise documented loss records, of which 33 correlate with NMHR records.

4.5.9.17 A further 34 Durham HER records are for unidentified obstructions, of which 31 correlate with NMHR records.

4.5.9.18 A total of 554 maritime loss and obstruction records have been identified within the Marine and Intertidal Archaeology Study Area:

- Scottish waters:
  - 13 wrecks and obstructions;
  - five nine documented losses;
- English waters:
  - 286 wrecks and obstructions (252 inside 12nm);
  - 246 documented losses inside and outside of 12nm.[7]

4.5.9.19 Excluding duplicated records, there 204 wrecks and obstructions and 208 documented loss records present within the Marine and Intertidal Archaeology Study Area.

4.5.9.20 In addition, there are 12 documented aviation losses within English waters only (all inside 12nm). These are discussed separately in **Section 4.6**.

4.5.9.21 **Appendix B** presents the full gazetteer for the Marine and Intertidal Archaeology Study Area, correlating all UKHO, Trove, NMHR and Durham HER records for wrecks and obstructions. **Table 4.12**: Vessel types indicated by wreck and documented loss records presents the range of vessel types represented within the dataset, highlighting past activities undertaken within the Marine and Intertidal Archaeology Study Area (excluding multiple records for the same vessel). Vessel types are presented by period of loss, rather construction, where this is recorded.

[7] As noted in **Paragraph 4.5.9.4**, locations of documented losses are not accurate enough for secure determination. It is likely that the majority are within 12nm, but a truly accurate count cannot be made.

Table 4.12: Vessel types indicated by wreck and documented loss records

Vessel type	17th century	18th century	19th century	20th century	21st century	Unknown	Totals
Aircraft	-	-	-	12	-	-	12
Steam ship	-	-	9	31	-	-	40
Fishing vessels	-	-	3	17	1	-	21
Destroyer	-	-	-	1	-	-	1
Tanker (RFA)	-	-	-	1	-	-	1
Paddle steamer (RN)	-	-	-	1	-	-	1
Barge	-	-	1	3	-	-	4
MV	-	-	-	1	-	-	1
Tug	-	-	4	5	-	-	9
Submarine	-	-	-	1	-	-	1
Brig	-	3	15	18	-	-	36
Schooner	-	-	20	8	-	-	28
Sloop	-	2	7	-	-	-	9
Snow	-	-	1	-	-	-	1
Undefined sailing vessel	-	9	33	5	-	-	47
Collier	-	2	2	1	-	-	5
Lugger	-	-	2	-	-	-	2
Lighter	-	-	1	1	-	-	2
Barque	-	-	4	2	-	-	6
Coble	-	-	2	-	-	-	2
Ketch	-	-	1	1	-	-	2
Cutter	-	-	1	1	-	-	2
Packet	-	-	1	-	-	-	1
Galliot	-	-	1	-	-	-	1
Keel	-	6	15	-	-	-	21
Pilot vessel	-	-	4	-	-	-	4
Caper (Privateer)	1	-	-	-	-	-	1
Unknown	-	-	6	-	-	26	32
Total	**1**	**22**	**133**	**110**	**1**	**26**	**293**

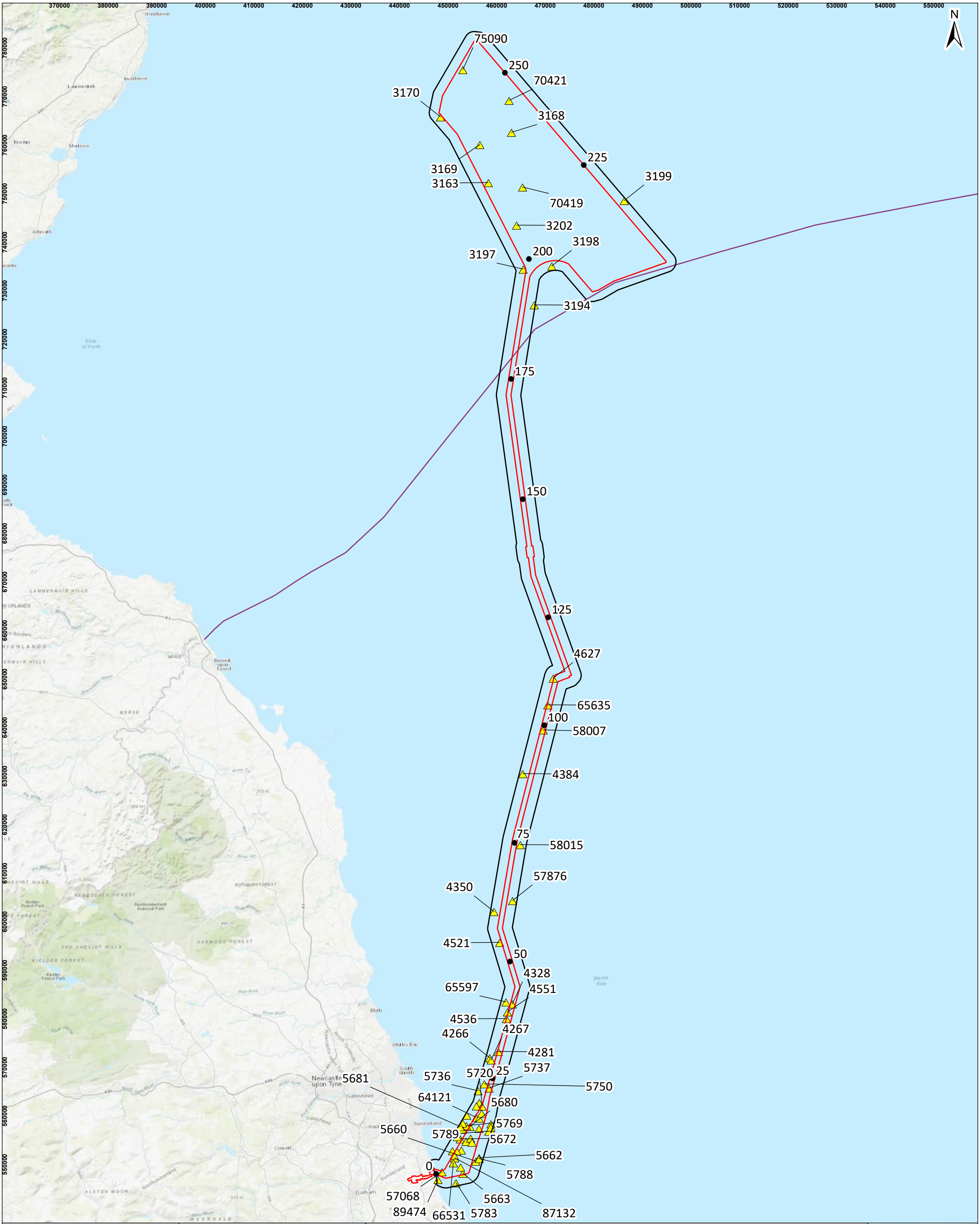
4.5.9.22 Examination of the documented losses can reveal broad patterns of maritime activity within the Marine and Intertidal Archaeology Study Area and surrounding seascape. Whist significantly lower than 19th and 20th century records, the number of pre-19th century earlier records is not in itself insignificant. Of note is the single 17th century record which pertains to the loss of a Dutch privateer (contemporarily known as a 'caper'; NMHR ID: 1051249) and one to a vessel scuttled by a Dutch privateer in 1795 (NMHR ID: 1010403). These records may correlate with the period of the three Anglo-Dutch wars between 1652 and 1784, whilst a third record, dating to 1800, also pertains to a vessel lost to Dutch piracy. This later loss occurred during the French Revolutionary Wars, during which time the Batavian Republic (1796 to 1806), the successor to the Dutch Republic, was aligned with France. In general, records pertaining to these earlier periods within such datasets are low in number, possibly due to undeveloped local maritime administration and record keeping practices.

Recording of the losses pertaining to privateering could be reflective of its more unusual nature, being more newsworthy and concerning to coastal communities.

4.5.9.23 A second major period of conflict was the 20th century and a minimum of 25 records may be ascribed to wartime action, mainly the First World War. This total is hard to define further as several records indicate loss during war years, but do not provide details of cause of loss.

4.5.9.24 In contrast, the majority of 18th and 19th century vessels were lost due to poor weather and collisions in the approaches to Seaham or Sunderland harbours. This is not unexpected, given the development of industry and the associated post-medieval and modern commercial shipping routes that have been identified within the assessment. This high total may be linked to the asset records noted in **Section 4.5.9** that are reflective of maritime safety concerns, such as the establishment of the rocket and lifeboat stations (TI_056 and TI_030), and the lighthouse on Seaham North Dock (OF_011).

4.5.9.25 However, the number of records, often possibly duplicated or ambiguous in nature, could imply the total is less or indeed higher, and in general suggests a busy waterway within English waters, particularly inside 12nm where most wreck and obstruction records are located.



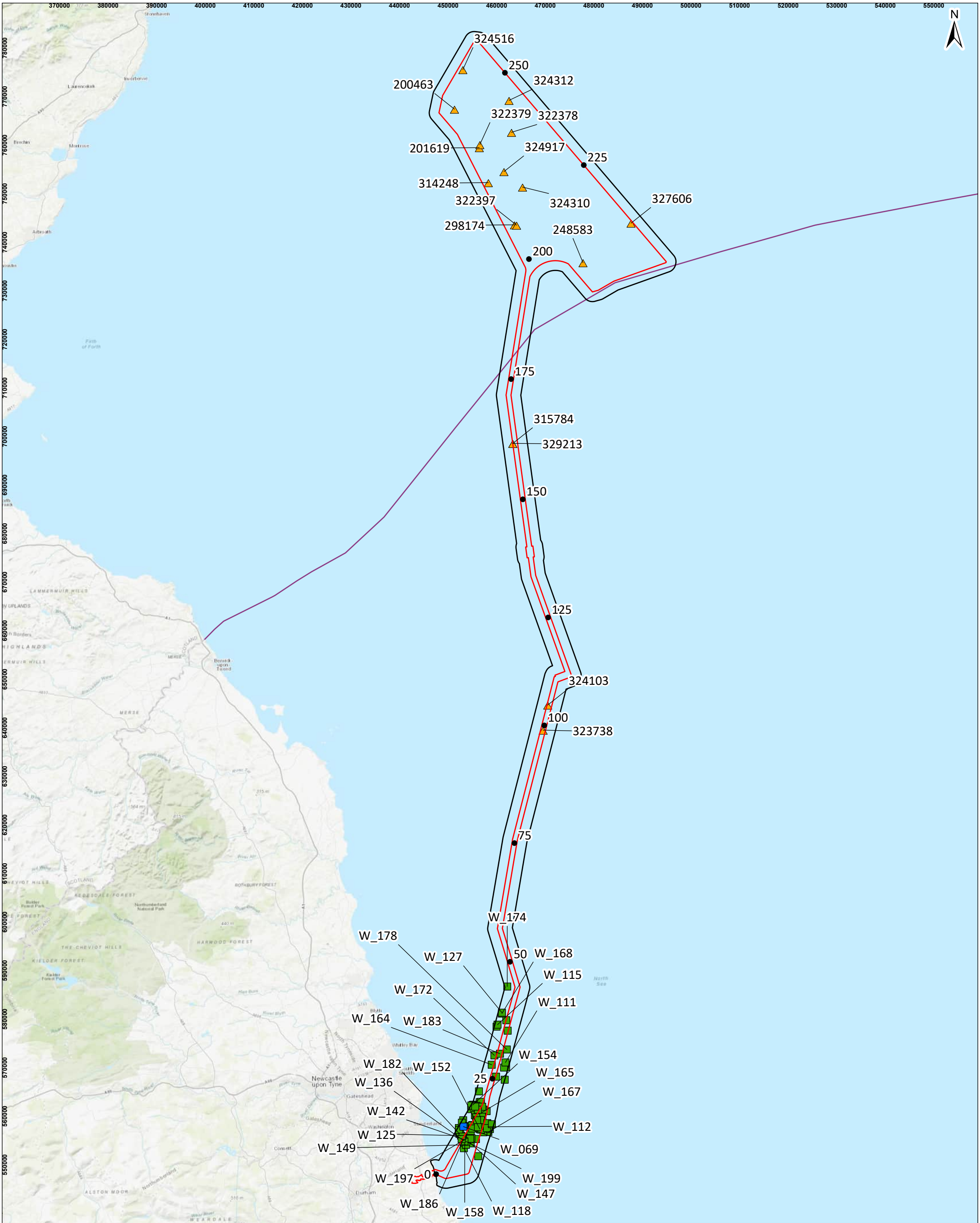
Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0067
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,
Drawing Title: FIGURE 4.64: DISTRIBUTION OF UKHO RECORDS	**Service Layer Credits:** World Topographic Map: Esri, HERE, Garmin, FAO, USGS World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS
0 10 20 30 km Scale@A3:1:700,000	
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	

VER	DATE	DETAILS	BY	CHECK
00	17/08/2026	Initial Issue	MJ	FLP
01	17/08/2026	Final Issue	MJ	FLP
-	-	-	-	-
-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)
- UKHO 2026





Morven Offshore Wind Farm / MSDS Marine	**Drawing Number:** MHPGC-MSD-MA-0068				
Project Name: MORVEN HAWTHORN PIT GRID CONNECTION PROJECT	**Data Sources:** BP, Ordnance Survey,				
Drawing Title: FIGURE 4.65: DISTRIBUTION OF NMHR AND CANMORE MARITIME RECORDS	**Service Layer Credits:** World Topographic Map: DoBH, OS, Esri, HERE, Garmin, USGS, NGA World Topographic Map: Esri, HERE, Garmin, FAO, NOAA, USGS				
0 10 20 30 km Scale@A3:1:700,000	VER	DATE	DETAILS	BY	CHECK
	00	17/08/2026	Initial Issue	MJ	FLP
	01	17/08/2026	Final Issue	MJ	FLP
Geodetic Information: Datum: European 1950 Projection: ED 1950 UTM Zone 30N	-	-	-	-	-
	-	-	-	-	-

LEGEND

- MHPGC Project PEIR Red Line Boundary
- Marine Archaeology Study Area
- National limits
- Kilometer Points (KP)

Trove
- Canmore Maritime

NMHR
- Maritime Vessel
- Monument Point

4.5.10 Intertidal walkover survey

4.5.10.1 An intertidal walkover survey was conducted on 16 July 2026. Whilst the majority of the survey area was surveyed, in some places the high density of seaweed covering the rocks made full observation of the survey area surface impossible. Whilst larger objects would likely extend above the seaweed to be visible, smaller items or deposits would remain unobserved. No archaeological remains were observed within the survey area, which comprises the MHPGC Project Red Line Boundary between MHWS and MLWS at the landfall (see above, **Paragraph 4.5.8.13** for Second World War remains above MHWS).

4.5.10.2 Waste material, such as ceramic building material (CBM) and several large metallic objects, were observed above MHWS, most likely fallen onto the beach from the left-over spoil banks of industrial waste by Noses Point. Several similar objects remained partially exposed high up into the exposed spoil face. These spoil banks were formed during the operation of Dawdon Colliery, with any associated objects being of 19th or 20th century date.

4.5.11 Coastal and maritime archaeological remains and potential

4.5.11.1 The historic asset, wreck and documented loss records and HSC types present a broad view of historic use of the MHPGC Project PEIR Red Line Boundary, and more widely, the North Sea. The predominant vessel class is cargo ships of various types of the 19th and 20th centuries, however what is perhaps surprising (given the increase in more durable metal hulled construction from the 19th century onwards) is that there is an even divide between iron-hulled steam ships and wooden sailing ships, of around 30 vessels each. Fishing vessel records are predominantly 20th century, with only three of 19th century date. This may be reflective of poor record keeping or that fishing was less important than trade at Seaham. It should also be noted that some vessels were lost during the First World War.

4.5.11.2 There are 22 records documenting losses of 18th century date and one of 17th century, which are important as they pre-date the development of Seaham and show that a not insignificant amount of maritime activity was occurring across the Marine and Intertidal Archaeology Study Area prior to the 19th century, as indicated by the documentary evidence discussed in **Section 4.5.8**.

4.5.11.3 Identified remains likely represent only a small percentage of the wider coastal and maritime archaeological resource within the MHPGC Project PEIR Red Line Boundary. Further remains, relating to 19th and 20th century activities, and possibly those of earlier centuries, may be preserved in varying degrees within or beneath seabed sediments and bedforms. Most records are within 12nm in English waters, where preservation levels have been recorded as high (**Section 4.5.2**).

4.5.11.4 The summarised overall potential for coastal and maritime archaeological remains to be present within the Marine and Intertidal Archaeology Study Area is presented by **Table 4.13**: Coastal and maritime archaeological potential within the Marine and Intertidal Archaeology Study Area.

Table 4.13: Coastal and maritime archaeological potential within the Marine and Intertidal Archaeology Study Area

Period	Potential
Palaeolithic	Very low
Mesolithic	Low to locally Moderate
Neolithic	Low
Bronze Age	Very low
Iron Age	Very low
Roman	Very low
Early medieval	Very low
Medieval	Low
Post-medieval	Moderate to High
Modern	High

4.6 Baseline environment: aviation archaeology

4.6.1.1 Aviation technology has been available since the early 20th century, though air travel became more prevalent after the First World War. During the inter-war years, commercial air travel boomed and, during the Second World War, the skies were dominated by military aircraft. After the war, commercial aviation steadily increased and improved. The remains of thousands of aircraft casualties, both civil and military, are present in UK waters.

4.6.1.2 The Marine and Intertidal Archaeology Study Area was flanked by two significant aircraft stations between 1915 and 1984. The closest to the Marine and Intertidal Archaeology Study Area was RAF Usworth (Sunderland), *c.* 12km northwest of the Marine and Intertidal Archaeology Study Area, which originated in 1916 as a Royal Flying Corps station, later serving as a fighter base in the Second World War before closing in 1958. The site continued to operate as Sunderland Airport until 1984.

4.6.1.3 Redcar aerodrome, some 25km to the south of the Marine and Intertidal Archaeology Study Area, originated in 1915 as a Royal Naval Air Service base but only operated until 1919. The limited operational duration of this base and its distance from the Marine and Intertidal Archaeology Study Area make it much less of a consideration than RAF Sunderland.

Aviation remains and potential

4.6.1.4 There are no known aviation remains within the Marine and Intertidal Archaeology Study Area.

4.6.1.5 There are twelve documented loss records for aircraft within the Marine and Intertidal Archaeology Study Area, all within 12nm in English waters and dated to the Second World War. These records relate to broad areas or arbitrary coordinates rather than exact locations pertaining to physical remains. In addition, the traumatic mechanism of aircraft crashes means that any debris may have travelled either on the surface or laterally through the water column before settling on the seabed. As such, physical remains are unlikely to be present at any given location.

4.6.1.6 This is particularly relevant to the recorded loss of an RAF Blenheim bomber (NMHR ID: 1062730), just on the northern edge of the Marine and Intertidal Archaeology Study Area. Any remains, should they exist, could therefore be within the Marine and Intertidal Archaeology Study Area.

4.6.1.7 Six records are grouped within an area centred on Seaham Harbour. Five of these records comprise German aircraft shot down on 15 August 1940, during the well-documented *Luftflotte* 5 raid against the northeast of England during the Battle of Britain. Three records are of HE-111 bombers (NMHR IDs: 1015423; 1015423 and HER ID: H10254) and one for an ME-110D fighter/bomber (NMHR ID: 1011356). One other HER record is for an unknown type of German bomber (H10255 – possibly a duplication of H10254). The remaining record is for an RAF Lockheed Hudson reconnaissance aircraft, lost early in the war on 19 November 1939 (NMHR ID: 1023501).

4.6.1.8 Whilst these are records are shown over 1km from the MHPGC Project PEIR Red Line Boundary, the remaining four aviation documented loss records are located within the approximate centre of the MHPGC Project PEIR Red Line Boundary. These comprise two German bombers (another HE-111 bomber lost on 15 August 1940 and the 1942 loss of a JU-88) and a British Hurricane fighter and Whitley bomber, lost in 1941 and 1942, respectively.

Summary

4.6.1.9 Whilst there are no known aviation remains within the Marine and Intertidal Archaeology Study Area, there are 12 documented loss records all apparently located within 12nm in English waters, including four within the MHPGC Project PEIR Red Line Boundary and, along with the nearby aerodrome at RAF Usworth, are indicative of significant wartime activity in the locality of the 12nm limit. No records exist beyond 12nm in English waters or Scottish waters.

4.6.1.10 The locations of the recorded losses are not based on physical remains and coupled with the tendency for aircraft remains to travel from the point of impact to settling on the seabed make it less likely that physical remains exist at the locations given. The potential for remains cannot, however, be fully discounted given the historic military activity.

4.6.1.11 There is therefore considered to be low to moderate potential for aircraft remains to be present within the Marine and Intertidal Archaeology Study Area, with the greater potential being within the 12nm limit within English waters.

5 Assessment of significance

5.1.1.1 This section summarises the identified archaeological potential within the Marine and Intertidal Archaeology Study Area and examines the likely significance of any remains.

5.2 Submerged prehistory and palaeolandscapes

5.2.1.1 Over 60 Mesolithic flints have been recovered from the terrestrial, intertidal and sub-tidal zones of Marine and Intertidal Archaeology Study Area at the landfall. Whilst these are over 1km from the MHPGC Project PEIR Red Line Boundary and likely translocated, they could be indicative of wider activity in this part of the Marine and Intertidal Archaeology Study Area. Sea level modelling shows that sub-aerially exposed land was present up to 20km from present-day MHWS at around 15,000 BP, before slowly becoming inundated. Units Fth 3 and Fth 2 have been identified as potentially being laid down in part from the Late Upper Palaeolithic into the Mesolithic period, possibly within estuarine/fluvial environments attractive to human activity for resource gathering. There is some potential that these deposits may contain *in situ* and *ex situ* finds, as they extend out to the formerly exposed land, as well as having geoarchaeological/palaeoenvironmental potential. Late Holocene units (Hol 1-3) are marine deposits which may contain translocated material, such as recorded by the Durham HER.

5.2.1.2 Geoarchaeological and palaeoenvironmental remains and *in situ* remains may be of up to moderate significance for their potential to inform understanding of pre-inundation landscapes. Isolated *ex situ* remains would likely be of low significance, however, additional assemblages, such as those identified within the southern extent of the Marine and Intertidal Archaeology Study Area, may be considered of up to moderate significance.

5.2.1.3 Any archaeological or palaeoenvironmental evidence within the Marine and Intertidal Archaeology Study Area may be able to contribute to regional research frameworks. Such frameworks include:

- The North Sea Prehistory Research and Management Framework (Research Frameworks Network 2026a);
- The National Mesolithic Research and Conservation Strategy for England (Research Frameworks Network 2026b);
- North-East Regional Research Framework for the Historic Environment (Research Frameworks Network 2026c).

5.3 Coastal and maritime archaeology

5.3.1 Designated assets

5.3.1.1 There are no designated assets within Scottish waters.

5.3.1.2 There are seven designated heritage assets within the Marine and Intertidal Archaeology Study Area in English waters, only one of which is within the MHPGC Project PEIR Red Line Boundary which is the wreck of the RFA *Creosol* (W_027), which is designated under the Protection of Military Remains Act 1986 Designation of Vessels and Controlled Sites) Order 2026. Designated assets are of the highest significance (i.e. those that warrant protection and recognition under national policy; see above, **Section 4.1.2**).

5.3.2 Non-designated assets

5.3.2.1 Excluding duplicated records within the datasets, the assessment has identified 502 non-designated assets within the Marine and Intertidal Archaeology Study Area:

- 203 wrecks and obstructions (16 listed as ‘dead’ locations);
- 208 documented maritime losses;
- 12 documented aircraft losses (discussed below, **Section 5.3.3**);
- 79 other terrestrial, intertidal and offshore heritage assets.

5.3.2.2 Archaeological review of the project-specific geophysical and hydrographic data conducted within the MHPGC Project PEIR Red Line Boundary identified 262 surface anomalies of potential archaeological interest, comprising:

- 215 low potential anomalies;
- 23 medium potential anomalies;
- 24 high potential anomalies;
- 1,170 magnetic anomalies of between 5.0nT and 1,056.0nT and with no definitive correlation with known or visible features or infrastructure.

5.3.2.3 Twenty-one UKHO records have been actually or potentially correlated with 23 geophysical anomalies.

5.3.2.4 Wreck remains can be of high significance, at times warranting designation as Protected Wrecks. However, this level of significance is dependent on several factors including rarity, age and level of preservation, the latter of which may be influenced by coastal or marine erosion. Further investigation at each identified wreck site would enable further confirmation of this significance. As a precautionary measure all wrecks are therefore considered to be of high significance, until such a time as sufficient detail may be available to inform otherwise. High and medium potential anomalies have been provisionally identified as wrecks or associated wreck material/debris and therefore may hold up to high significance.

5.3.2.5 Low potential anomalies are a mixture of small features, often boulder-like, or likely to represent modern debris such as chain, cable, or rope, or small items of debris with no features indicating archaeological potential.

5.3.2.6 A total of 1,170 magnetic anomalies of between 5.0nT and 1,056.0nT, with no definitive correlation with archaeological anomalies, seabed features, or infrastructure, have been identified within the data extents. Magnetic anomalies are ferrous and thus generally anthropogenic in origin. Anthropogenic material has the potential to be of archaeological significance. Therefore, there is broad potential to identify additional material of potential archaeological interest within the extents of the geophysical survey data following the collection of high resolution (tighter line spacing) data prior to construction. The size of some of the anomalies (>100nT or >1,000kg) may indicate potential to be of archaeological interest, however the line spacing is not sufficient to determine the position.

5.3.2.7 Isolated artefacts dating from the Mesolithic to medieval periods may be present and post-medieval and modern remains are very likely to be present (due to the levels of industrial waste deposited on Blast Beach and dated wreck records). Such isolated finds may relate to past human interaction with the marine environment and typically comprise cultural material which is no longer *in situ*, and therefore, would be of low significance. The key contributors to significance of this material are typically held within its physical fabric, where many other contributors to significance, such as original context, have been lost. While such finds do hold some significance, this is generally limited. Finds relating to the well-documented industrial activity of the later post-medieval and modern periods would be of negligible significance as they would not contribute in any meaningful way to the cultural heritage record as it already stands.

5.3.2.8 Any archaeological evidence within the Marine and Intertidal Archaeology Study Area may be able to contribute to regional and national research frameworks. Such frameworks include:

- A Maritime Archaeological Research Agenda for England (Research Frameworks Network 2026d);
- North-East Regional Research Framework for the Historic Environment (Research Frameworks Network 2026c);
- Scottish Archaeological Research Framework (ScARF) (2026).

5.3.3 Aviation archaeology

5.3.3.1 Whilst there are 12 documented aircraft losses recorded across the Marine and Intertidal Archaeology Study Area, and historical evidence for aviation activity centre in particular at the nearby RAF Sunderland, no physical remains have been identified. The provided locations are essentially arbitrary, and when considered alongside the propensity for aircraft remains to travel from the point

of impact until coming to rest on the seabed, the likelihood of encountering remains within the MHPGC Project PEIR Red Line Boundary is not high but should not be discounted.

5.3.3.2 Whilst this assessment has concluded that the overall potential for aviation remains to be present is low to moderate, any physical remains relating to, or suspected to relate to, military aircraft losses would automatically fall under the Protection of Military Remains Act 1986 and therefore be considered of the highest significance. However, due to the likely dispersed nature of any remains, it may be difficult to determine an aviation origin for them in which case the highest significance may not be possible to assign.

5.3.3.3 Any aviation remains within the Marine and Intertidal Archaeology Study Area may be able to contribute to regional and national research frameworks. Such frameworks include:

- North-East Regional Research Framework for the Historic Environment (Research Frameworks Network 2026c); and
- ScARF (2026).

6 Summary

6.1.1.1 This assessment has considered desk-based sources, geophysical and geotechnical data interpretation, and intertidal walkover survey results to provide a baseline of the known and potential marine archaeological remains within the Marine and Intertidal Archaeology Study Area. The assessment also includes a consideration of the potential significance of these remains.

6.1.1.2 Twelve Quaternary units have been provisionally identified within the MHPGC Project PEIR Red Line Boundary and have been correlated with known geological units. Within the section of the MHPGC Project PEIR Red Line Boundary that overlaps with Morven North and Morven South, a low potential for archaeological remains has been identified for all units.

6.1.1.3 Within the MHPGC Project PEIR Red Line Boundary in English waters, Devensian-age units WB and MB have a low potential for archaeological and geoarchaeological remains. Within English and Scottish waters, the Late Devensian to Holocene deposits Hol 1, Hol 2, Hol 3 and Fth 3 also have a broad, low potential for archaeological remains. A locally moderate potential has been identified for Mesolithic artefacts within the intertidal and immediate sub-tidal areas. Translocated, isolated finds are likely to be considered of low significance.

6.1.1.4 Units Fth 2 and Fth 3 have been identified as having a low to moderate archaeological and geoarchaeological potential, with the greater potential being between *c.* KP0 and KP11 in English waters. These units extend close to areas sub-aerially exposed between the retreat of the LGM glaciers and Holocene marine inundation and may have continued to form during the Late Upper Palaeolithic and Mesolithic periods, possibly in fluvio-estuarine conditions attractive to human groups. Whilst upper parts of the unit have been eroded, potentially associated with the marine transgression, uneroded areas may survive and hold *in-situ*, as well as *ex-situ*, archaeological remains and deposits of geoarchaeological interest. Such deposits could be of up to moderate significance, by contributing to a greater understanding of pre-inundation landscapes.

6.1.1.5 Within the Marine and Intertidal Archaeology Study Area, there are no designated assets within Scottish waters, and seven in English waters. Only one is within the MHPGC Project PEIR Red Line Boundary, which is a wreck designated under the Protection of Military Remains Act, 1986 (RFA *Creosol*; W_027). Designated assets are of the highest significance.

6.1.1.6 Excluding duplicated records, the assessment has identified 502 non-designated assets within the Marine and Intertidal Archaeology Study Area, of which 203 consist of wrecks, possible wrecks or obstructions. The remainder comprise documented maritime and aviation losses and archaeological finds and features of Mesolithic to modern date.

6.1.1.7 Within the MHPGC Project PEIR Red Line Boundary, the assessment of geophysical and hydrographic data identified 215 low potential anomalies, 23 medium potential anomalies and 24 high potential anomalies. Twenty-one UKHO records have been actually or potentially correlated with 23 geophysical anomalies. The assessment also identified 1,170 magnetic anomalies of between 5.0nT and 1,056.0nT also within the MHPGC Project PEIR Red Line Boundary, with no definitive correlation with known or visible features or infrastructure.

6.1.1.8 The overall potential for prehistoric archaeology to be present in general is considered to be very low to low, but raised to locally moderate (i.e. within 12nm in English waters) for the Mesolithic period. This is due to the number of lithic finds identified within the Marine and Intertidal Archaeology Study Area and the potential for Units Fth 3 and 2 to contain *in situ* remains. Such remains could be of up to moderate significance, by contributing to a greater understanding of human activity across pre-inundation landscapes, whilst any *ex-situ* finds would be of low significance.

6.1.1.9 No physical evidence for maritime activity dating to the Roman, early medieval and medieval periods has been identified, despite some historic evidence, particularly for medieval shipping. The potential for remains is considered to be very low for the Roman and early medieval period and low for the medieval period. Isolated finds may be of low significance, but evidence of vessels (such as wreck or cargo) could be of up to high significance, depending on the extent and nature of the remains.

6.1.1.10 Documentary evidence for maritime activity increases in the post-medieval period, particularly because of trade in coal and subsequently by the creation of Seaham Harbour within the Marine and Intertidal Archaeology Study Area. There are a high number of documented losses records pre-dating

the 20th century. This trend continues into the modern period, with all but one wreck or potential wreck record being of 20th or 21st century date. However, the spatial distribution of records suggests a greater emphasis in English waters, particularly within 12nm. There is therefore considered to be a broad moderate to high potential for post-medieval and high for modern period remains to be present within the Marine and Intertidal Archaeology Study Area, with the highest potential being for later remains within 12nm in English waters.

6.1.1.11 Finds associated with non-designated maritime losses, such as cargo or wrecks, could be of up to moderate significance. Finds pertaining to other human activity are unlikely to be *in situ* or be associated with the well-documented industrial activity on Blast Beach. Such finds would most likely be of negligible to low significance, depending on their extent and nature.

6.1.1.12 There are no aircraft remains identified within the Marine and Intertidal Archaeology Study Area, but there is historical evidence for aviation activity and 12 documented losses. The potential for aviation remains to be within the Marine and Intertidal Archaeology Study Area is considered to be low to moderate, being greater within *c.* 12nm in English waters where the records are located and it being closer to documented aerodromes. However, any remains would be automatically protected under the Protection of Military Remains Act 1986 and be of the highest significance.

7 References

Archaeology Data Service. (2018) National Historic Seascape Characterisation Consolidation. Available at: https://archaeologydataservice.ac.uk/data-catalogue/search?nativeSubject=historic%20seascape%20characterisation (Accessed August 2026).

Alvarez-Palau, E. J. and Dunn, O. (2019) Database of historic ports and coastal sailing routes in England and Wales. Data in brief, 25, article number 104188 (no pagination).

Archaeological Research Services Ltd. (2008) North East Rapid Coastal Zone Assessment. Report 2008/81. London, English Heritage.

Barclay, G.J. and Morris, R. 2019. The Fortification of the Firth of Forth 1880-1977. Edinburgh: Society of Antiquities of Scotland, 3-5.

Batchelor, C. M., Margold, M., Krapp, M., Murton, D. K., Dalton, A. S., Gibbard, P. L., Stokes, C. R., Murton, J. B. and Manica, A. (2019). The configuration of Northern Hemisphere ice sheets through the Quaternary. Nature Communications 10(1), article number 3713 (no pagination).

Bradley, S.L., Milne, G.A., Shennan, I. and Edwards, R. (2011). An improved glacial isostatic adjustment model for the British Isles. Journal of Quaternary Science, 26, 541–52.

British Geological Survey (1985) Marr Bank Sheet 56 N – 02 W Quaternary Geology. Available at: https://webapps.bgs.ac.uk/data/MapsPortal?series.html?collection=PMAP&series=OFF250k (Accessed: June 2026).

British Geological Survey (1986) Tyne-Tees Sheet 54 N – 02 W Sea Bed Sediments and Quaternary. Available at: https://webapps.bgs.ac.uk/data/MapsPortal?series.html?collection=PMAP&series=OFF250k (Accessed: June 2026).

British Geological Survey (1988) Farne Sheet 55 N – 02 W Quaternary. Available at: https://webapps.bgs.ac.uk/data/MapsPortal?series.html?collection=PMAP&series=OFF250k (Accessed: June 2026).

British Geological Survey (2026a). GeoIndex Offshore. Available at: https://www.bgs.ac.uk/map-viewers/geoindex-offshore/ (Accessed: June 2026).

Cameron, T.D.J, Crosby, A., Balson, P.S., Jeffery, D.H., Lott, G.K., Bulat, J., and Harrison, D.J. (1992). United Kingdom offshore regional report: the geology of the southern North Sea. London, HMSO for the British Geological Survey.

Catt, J. A. (2007). The Pleistocene glaciations of eastern Yorkshire: a review. Proceedings of the Yorkshire Geological Society 56, 177–207.

Chartered Institute for Archaeologists (CIfA) (2020). Standard and guidance for historic environment desk-based assessment. Reading, CIfA.

Clark, C.D., Ely, J.C., Hindmarsh, R.C.A., Bradley, S., Igneczi, A., Fabel, D., ´O Cofaigh, C., Chiverrell, R.C., Scourse, J., Benetti, S., Bradwell, T., Evans, D.J.A., Roberts, D.H., Burke, M., Callard, S.L., Medialdea, A., Saher, M., Small,D., Smedley, R.K., Gasson, E., Gregoire, L., Gandy,N., Hughes, A.L.C., Ballantyne, C., Bateman, M.D., Bigg, G.R., Doole, J., Dove, D., Duller, G.A.T., Jenkins, G.T.H., Livingstone, S.L., McCarron, S., Moreton, S., Pollard, D.,

Praeg, D., Sejrup, H.P., van Landeghem, K.J.J. and Wilson, P. (2022) Growth and retreat of the last British–Irish Ice Sheet, 31 000 to 15 000 years ago. the BRITICE-CHRONO reconstruction. Boreas, 51, 699–758.

Cramp, L.E. (2014). Neolithic dairy farming at the extreme of agriculture in Northern Europe. Proceedings of the Royal Society, 281.

City of Edinburgh Council (2002). Leith Conservation Area Character Appraisal. Edinburgh, City of Edinburgh Council.

Coastal and Intertidal Zone Archaeology Network (CITiZAN) (2026). Available at: https://citizan.org.uk/ (Accessed: June 2026).

Department for Environment, Food & Rural Affairs (2011). UK Marine Policy Statement. London, HMSO.

Department for Environment, Food and Rural Affairs (2021). North East Inshore and North East Offshore Marine Plan. London, HMSO.

Department for Energy Security & Net Zero (2026a). Overarching National Policy Statement for Energy (EN-1). London, HMSO.

Department for Energy Security & Net Zero (2026b). Overarching National Policy Statement for renewable energy infrastructure (EN-3). London, HMSO.

Department for Energy Security & Net Zero (2026c). National Policy Statement for Electricity Networks Infrastructure (EN-5). London, HMSO.

Dhaeze, W. (2024). The Roman sea frontier along the Channel and North Sea: Development, nature, tactics and strategy. In Enckevort, H. van, Driessen, M., Graafstal, E., Hazenberg, T., Ivleva, T., & Driel, C. van. Supplying the Roman Empire: Proceedings of the 25th International Congress of Roman Frontier Studies. Leiden: Sidestone Press. p. 89-95.

Dinnis, R. (2012). Identification of Longhole (Gower) as an Aurignacian site. Lithics: The Journal of the Lithic Studies Society 33, 17–29.

Ditchburn, D. (1988). Scottish Medieval Towns. Edinburgh, John Donald Publishers Ltd.

Durham County Council (2007). Settlement Character Study. Seaham. Durham, Durham County Council.

Durham County Council (2026). Historic Environment Record. Available at: https://www.durham.gov.uk/article/2012/Historic-Environment-Record (Accessed: June 2026).

English Heritage (2002). Military Aircraft Crash Sites. London, English Heritage.

English Heritage (2008). Conservation Principles, Policies and Guidance. London, English Heritage.

European Marine Observation and Data Network (EMODnet) (2026). EMODnet Map Viewer. Available at: https://emodnet.ec.europa.eu/geoviewer/#!/ (Accessed: June 2026).

Friel, I. (2003). Maritime History of Britain and Ireland. London, British Museum Press.

Gardline Ltd. (2022). Project Morven Integrated Site Survey. Report for bp Alternative Energy Investments Limited. Ref: 11779.

Gatliff, R. W., Richards, P. C., Smith, K., Graham, C. C. McCormac, M., Smith, N. J. P., Long, D., Cameron, T. D. J., Evans, D., Stevenson, A. G., Bulat, J. and Ritchie, J. D. (1994). British Geological Survey United Kingdom Offshore Regional Report. The geology of the central North Sea. London, HMSO.

Gibbard, P. L., West, R. G., Zagwijn, W. H., Balson, P. S., Burger, A. W., Funnell, B. M., Jeffery, D. H., de Jong, j., van Kolfscoten, T., Lister, A. M., Meijer, T., Norton, P. E. P., Preece, R. C., Rose, J., Stuart, A. J., Whiteman, C. A. and Zalasiewicz. (1991). Early and early Middle Pleistocene correlations in the Southern North Sea basin. Quaternary Science Reviews 10(1), 23-52.

Gibbard, P. L. and Clark, C. D. (2011). Pleistocene Glaciation Limits in Great Britain. In Ehlers, J., Gibbard, P. L. and Hughes, P. D. (eds) Developments in Quaternary Science 15, 75-93.

Gribble, J. and Leather, S. (2011). Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector. London, COWRIE Ltd (as part of The Crown Estate).

Hijma, M.P., Cohen, K.M., Roebroeks, W., Westerhoff, W.E., and F.S. Busschers. (2011). Pleistocene-Thames landscapes: geological background for hominin occupation of the southern North Sea region. Journal of Quaternary Science 27(1), 17-39.

Historic England (2015a). Geoarchaeology: Using earth sciences to understand the archaeological record. Swindon, Historic England.

Historic England (2015b). Managing Significance in Decision-Taking in the Historic Environment. Swindon, Historic England.

Historic England (2019). Statements of Heritage Significance: Analysing Significance in Heritage Assets. Historic England Advise Note 12. Swindon, Historic England.

Historic England (2020). Deposit Modelling and Archaeology: Guidance for Mapping Buried Deposits. Swindon, Historic England.

Historic England (2023). Curating the Palaeolithic. Swindon, Historic England.

Historic England (2025a). Marine Geophysics Data Acquisition, Processing and Interpretation, Guidance Notes (2nd edition). Swindon, Historic England.

Historic England (2025b). Scientific Dating of Pleistocene Sites. Swindon, Historic England.

Historic England (2025c). Environmental Archaeology: A Guide to Theory and Practice of methods, from Sampling and recovery to Post-excavation (3rd edition). Swindon, Historic England.

Historic England (2026a). National Marine Heritage Record. Available at: https://historicengland.org.uk/research/support-and-collaboration/heritage-information-access-simplified/national-marine-heritage-record/ (Accessed: June 2026).

Historic England (2026b). Intertidal and Coastal Peat Database. Available: https://historicengland.org.uk/research/current/heritage-science/intertidal-peat-database/ (Accessed: June 2026).

Historic England (2026c). England's Historic Periods. Available at: https://historicengland.org.uk/listing/the-list/historic-periods/ (Accessed: June 2026).

Historic Environment Scotland and NatureScot (2018). Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. Edinburgh, Historic Environment Scotland and Inverness, NatureScot.

Historic Environment Scotland (2019a). Historic Environment Scotland Circular. Regulations and Procedures. Edinburgh, Historic Environment Scotland.

Historic Environment Scotland (2019b). Historic Environment Policy for Scotland. Edinburgh, Historic Environment Scotland.

Historic Environment Scotland (2019c). Designation Policy and Selection Guidance. Edinburgh, Historic England.

Historic Environment Scotland (2025). Managing Change in the Historic Environment: Conserving Our Underwater Heritage. Edinburgh, Historic Environment Scotland.

Historic Environment Scotland (2026a). Trove database. Available at: https://www.trove.scot/explore/download-our-data (Accessed: June 2026).

Historic Environment Scotland (2026b). Scotland's Archaeological Periods and Ages. Available at: https://heritagedata.org/live/schemes/scapa.html (Accessed: June 2026).

HM Government (2026). Marine map portal. Available at: https://environment.data.gov.uk/explore-marine-plans (Accessed: June 2026).

Holloway, L.K., Peacock, J.D., Smith, D. E. and Wood, A.M. (2002). A Windermere Interstadial marine sequence: environmental and relative sea level interpretation for the western Forth valley, Scotland. Scottish Journal of Geology 38, 41–54.

Holt, P. (2019). Marine Magnetometer Processing. Plymouth, 3H Consulting Ltd.

Hosfield, R. (2004). The Archaeological Potential of Secondary Contexts. ALSF Project 3361

Hough, G. (2023). Technical File Note Preliminary Ground Model Morven Windfarm Development Central North Sea. JV EnBW/bp, Document No.: MV_5000080_01-00.

Hull Museums and Gallery. (2026). The Ferriby Boats. Available at: https://www.hullmuseums.co.uk/the-ferriby-boats (Accessed: July 2026).

Hughes, A. G., Gyllencreutx, R., Lohne, O. S., Mangerud, J. and Svendsen, J. I. (2016). The last Eurasian ice sheets – a chronological database and time-slice reconstruction, DATED-1. Boreas 45(1), 1-45.

Hutchinson, G. (1997). Medieval Ships and Shipping. Leicester, Leicester University Press.

International Council on Monuments and Sites (ICOMOS) (2011). Guidance on heritage impact assessments for cultural World Heritage properties. Paris, ICOMOS.

Joint Nautical Archaeology Policy Committee (JNAPC) (2006). JNAPC Code of Practice for Seabed Development. London, The Crown Estate.

Kuchar, J., Milne, G., Hubbard, A., Patton, H., Bradley, S.L., Shennan, I. and Edwards, R. (2012). Evaluation of a numerical model of the British Irish ice sheet using relative sea-level data: implications for the interpretation of trimline observations. Journal of Quaternary Science 27, 597–605.

Lamb, R. H. (2017). The early Quaternary North Sea Basin. Journal of the Geological Society 175(2), 275-290.

Land Use Consultants (LUC). (2018). National Historic Seascape Characterisation Consolidation. Project for Historic England. DOI: https://doi.org/10.5284/1046273

Lauer, T. (2018). Timing of the Saalian and Elsterian glacial cycles and the implications of Middle-Pleistocene hominin presence in central Europe. Scientific Reports 8, 1-12.

Lavery, B. (2001). Maritime Scotland. London, B. T. Batsford Ltd. on behalf of Historic Scotland (now part of Historic Environment Scotland).

Lisiecki, L. E. and Raymo, M. E. (2005). A Pliocene-Pleistocene stack of 57 globally distribution benthic 180 records. Paleoceanography and Paleoclimatology, 20(1), PA1003.

Land Use Consultants (LUC). 2017. Historic Seascape Characterisation (HSC): Consolidating the National HSC Database. Bristol, LUC on behalf of Historic England.

Marine Directorate – Licencing Operations Team (2025) Scoping Opinion - Morven Offshore Wind Farm, Hawthorn Pit Grid Connection. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://marine.gov.scot/sites/default/files/morven_offshore_wind_farm_-_scop-0058_-_hawthorn_pit_grid_connection_-_scoping_opinion.pdf.

Marine Environmental Data and Information Network (MEDIN) (2026). MEDIN marine dataset portal. Available at: https://portal.medin.org.uk/portal/start.php (Accessed: June 2026).

Marine Management Organisation (2025). Scoping request under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 for the proposed Morven Offshore Windfarm Transmission Assets Project by Morven Offshore Wind Limited. MMO Reference: DCO/2025/00005.

McGrail, S. (1981). The Ship: Rafts, Boats and Ships from Prehistoric Times to the Medieval Era. London, HMSO.

Merritt, J.W., Auton, C.A., Connell, E.R., Hall, A.M. and Peacock, J.D. (2003). Cainozoic geology and landscape evolution of north-east Scotland. Memoir of the British Geological Survey, Sheets 66E, 67, 76E, 77, 86E, 87W, 87E, 95, 96W, 96E and 97 (Scotland). Edinburgh: British Geological Survey.

Moore, K. (1998). Developments in trade and marine transport facilities in the northeast of Scotland 1600-1914: a study in historical geography. Unpublished PhD, University of Aberdeen.

MSDS Marine (2025) Morven North Offshore Wind Array Project and Morven South Offshore Wind Array Project. Geoarchaeological Assessment: Stage 1 and 2. Unpublished report for Tetra Tech and MvOWL, document number: 2025/MSDS22209/5.

Müldner, G. (2016). Marine fish consumption in medieval Britain: the isotope perspective from human skeletal remains. In Barrett, J. and Orton, D. (eds) Cod and herring: the archaeology and history of medieval sea fishing. Oxford, Oxbow Books. p. 239-245.

NatureScot (2025). Key Agencies Group national and Major Developments: An Agency Joint Statement on Pre-application Engagement. Inverness, NatureScot.

Norwegian Geotechnical Institute (NGI) (2024). Morven Offshore Wind Farm: Evaluation of Export Cable Routes. DOC.NO. 20230203-17-R.

Oxford Archaeology (2008). Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy. London, COWRIE Ltd (as part of The Crown Estate).

Peacock, J.D. (1999). The Pre-Windermere Interstadial (Late Devensian) raised marine strata of eastern Scotland and their macrofauna: a review. Quaternary Science Reviews 18, 1655–80.

Pike, A.G. (2005). Verification of the age of the Palaeolithic cave art at Creswell Crags, UK. Journal of Archaeological Science 32(11), 1649–1655.

PINS (2025) Scoping Opinion: Proposed Morven Hawthorn Pit Grid Connection Project - EN0210005. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0210005-000005-Scoping%20Opinion%20-%20Morven%20Hawthorn%20Pit%20Grid%20Connection%20Project.pdf.

Research Frameworks Network. (2026a). A Mesolithic Research and Conservation Strategy for England. Available at: https://researchframeworks.org/meso/ (Accessed July 2026).

Research Frameworks Network. (2026b). The North Sea Prehistory Research and Management Framework. Available at: https://researchframeworks.org/nsprmf/ (Accessed July 2026).

Research Frameworks Network. (2026c). North-East Regional Research Framework for the Historic Environment. Available at: https://researchframeworks.org/nerf/ (Accessed July 2026).

Research Frameworks Network. (2026d.)A Maritime Archaeological Research Agenda for England. Available at: https://researchframeworks.org/emherf/ (Accessed July 2026).

Richards, M.S. (2003). Sharp shift in diet at onset of Neolithic. Nature, 425, 366.

RPS (2025) Morven Hawthorn Pit Grid Connection Project Environmental Impact Assessment Scoping Report. Available at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0210005-000004-Morven%20Hawthorn%20Pit%20Grid%20Connection%20Project%20Scoping%20Report.pdf.

Roberts, D.H., Grimoldi, E., Callard, L., Evans, D.J.A., Clark, C.D., Stewart, H.A., Dove, D., Saher, M., O'Cofaigh, C., Chiverrell, R.C., Bateman, M.D., Moreton, S.G., Bradwell, T., Fabel, D. and Medialdea, A. (2019). The mixedbed glacial landform imprint of the North Sea Lobe in the western North Sea. Earth Surface Processes and Landforms, 44(6), 1233-1258.

Scottish Archaeological Framework (ScARF). (2012a). The Iron Age: 700 BC – AD 500. Available at: https://scarf.scot/regional/rarfa/the-iron-age-700-bc-ad-500/7-the-iron-age-700-bc-ad-500/ (Accessed: June 2026).

ScARF. (2012b). Scotland: The Roman Presence. Available at: https://scarf.scot/national/panel-report-chronology-and-downloads/ (Accessed: July 2026).

ScARF. (2026). Available at: https://scarf.scot/ (Accessed: June 2026).

SeaZone Solutions Ltd., University of Southampton (2011). AMAP2 – Characterising the Potential for Wrecks. Available at: https://archaeologydataservice.ac.uk/archives/view/amap2_eh_2011/ (Accessed June 2026).

Shennan, I., Bradley, S.L., and Edwards, R. (2018). Relative sea-level changes and crustal movements in Britain and Ireland since the Last Glacial Maximum. Quaternary Science Reviews, 188, 143-159.

Stoker, M.S., Long, D., and Fyfe, J.A. (1985). A revised Quaternary stratigraphy for the central North Sea. Report of the British Geological Survey, 17(2).

Stoker, M.S., Golledge, N.R., Phillips, E.R., Wilkinson, I.P. and Akhurst, M.C. (2008). Lateglacial–Holocene shoreface progradation offshore eastern Scotland: a response to climatic and coastal hydrographic change. Boreas, 38, 292–314.

The Scottish Government (2011). Planning Advice Note PAN 2/2011: Planning and Archaeology. Edinburgh, The Scottish Government.

The Scottish Government (2013) (amended 2017). Planning Advice Note 1/2013: Environmental Impact Assessment. Edinburgh, The Scottish Government.

The Scottish Government (2014). Scottish Planning Policy. Edinburgh, The Scottish Government.

The Scottish Government (2015). Scotland's National Marine Plan. A Single Framework for Managing Our Seas. Edinburgh, The Scottish Government.

The Scottish Government (2017). Planning Circular 1/2017: Environmental Impact Assessment regulations. Edinburgh, The Scottish Government.

The Scottish Government (2023). National Planning Framework 4. Edinburgh, The Scottish Government.

UKHO (2026). Wrecks & Obstructions data set. Available at: https://datahub.admiralty.co.uk/portal/apps/sites/#/marine-data-portal (Accessed: June 2026).

University of Newcastle (2026). Co-curate, County Durham, Seaham. Available at: https://co-curate.ncl.ac.uk/seaham/ (Accessed: June 2026).

University of Sheffield (2018). BRITICE-CHRONO 2011-2018. Available at: https://britice-chrono.sites.sheffield.ac.uk/ (Accessed: June 2026).

Wenban-Smith, F. B. (2010). Early Devensian (MIS 5d–5b) occupation at Dartford, southeast England. Journal of Quaternary Science, Vol. 25(8), 1193-1199.

Wessex Archaeology (2007). Historic Environment Guidance for the Offshore Renewable Energy Sector. London, COWRIE Ltd (as part of The Crown Estate).

Wessex Archaeology (2008a). Aircraft Crash Sites at Sea: A Scoping Study. Salisbury, Wessex Archaeology.

Wessex Archaeology (2008b). Assessing Boats and Ships 1860-1950. Salisbury, Wessex Archaeology. London and Edinburgh, The Crown Estate.

Wessex Archaeology (2014). Protocol for Archaeological Discoveries: Offshore Renewables Projects. London and Edinburgh, The Crown Estate.

Wessex Archaeology (2021). Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects. London and Edinburgh, The Crown Estate.

Westerdahl, C. (1992). The maritime cultural landscape. The International Journal of Nautical Archaeology, 21(1), 5-14.

XOCEAN Ltd (2023). 00741-BPX-SCO-WIND Morven Cable Route Survey Results Report.

XOCEAN Ltd. (2025). 01139-BPX-SCO-WIND: Morven GC-1 Export Cable Route Geophysical Survey 2024-2025 Survey Results Report.

Appendix A Gazetteer of archaeological anomalies

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MOR23_081	Chain, cable, or rope	Low	40.2	0.4	0.1	001° 4.716' W	56° 53.978' N	6308079.3	617129.3	Scotland
MOR23_082	Fishing gear	Low	56.6	2.2	0.0	001° 3.869' W	56° 53.401' N	6307034.9	618019.6	Scotland
MOR23_073	Potential debris	Low	2.4	0.9	0.1	001° 5.526' W	56° 52.75' N	6305778.8	616370.9	Scotland
MOR23_083	Potential debris	Medium	15.4	2.5	0.6	001° 2.371' W	56° 52.694' N	6305766.5	619578.1	Scotland
MOR23_079	Chain, cable, or rope	Low	73.9	0.3	0.1	001° 4.975' W	56° 52.609' N	6305533.0	616937.2	Scotland
MOR23_084	Potential debris	Low	4.1	3.6	0.6	001° 6.278' W	56° 52.462' N	6305224.5	615622.3	Scotland
MOR23_088	Likely geological	Low	3.9	0.9	0.4	001° 2.054' W	56° 52.287' N	6305020.0	619921.0	Scotland
MOR23_063	Chain, cable, or rope	Low	273.2	0.5	0.1	001° 7.388' W	56° 51.918' N	6304183.0	614522.5	Scotland
MOR23_076	Fishing gear	Low	276.5	0.5	0.0	001° 2.786' W	56° 51.712' N	6303932.8	619208.1	Scotland
MOR23_054	Wreck	High	27.9	9.1	1.7	001° 8.105' W	56° 51.334' N	6303080.4	613823.0	Scotland
MOR23_064	Potential debris	Low	4.5	1.1	0.6	001° 6.031' W	56° 51.004' N	6302527.4	615947.8	Scotland
MOR23_085	Potential debris	Medium	13.8	2.1	1.0	000° 59.219' W	56° 50.611' N	6301996.3	622892.4	Scotland
MOR23_089	Chain, cable, or rope	Low	6.0	5.7	0.1	001° 4.177' W	56° 50.55' N	6301737.4	617856.1	Scotland
MOR23_091	Chain, cable, or rope	Low	160.0	0.2	0.0	001° 2.175' W	56° 50.218' N	6301179.2	619908.8	Scotland
MOR23_058	Potential debris	Medium	16.1	10.9	0.2	001° 5.402' W	56° 50.146' N	6300953.7	616631.0	Scotland
MOR23_074	Chain, cable, or rope	Low	86.3	0.9	0.0	001° 1.481' W	56° 49.979' N	6300755.7	620626.5	Scotland
MOR23_053	Chain, cable, or rope	Low	70.4	0.3	0.0	001° 6.406' W	56° 49.546' N	6299811.8	615641.6	Scotland
MOR23_061	Chain, cable, or rope	Low	78.8	1.0	0.1	001° 3.264' W	56° 49.237' N	6299328.4	618852.8	Scotland
MOR23_062	Potential debris	Low	4.4	3.8	0.1	001° 3.361' W	56° 49.158' N	6299179.7	618759.0	Scotland
MOR23_149	Fishing gear	Low	16.3	1.6	0.1	001° 3.459' W	56° 49.103' N	6299074.8	618662.0	Scotland
MOR23_087	Chain, cable, or rope	Low	101.2	0.3	0.1	001° 11.311' W	56° 49.092' N	6298833.6	610675.4	Scotland
MOR23_023	Potential wreck	High	23.3	11.9	0.6	001° 10.614' W	56° 49.08' N	6298831.5	611384.9	Scotland
MOR23_050	Likely geological	Low	15.6	4.0	0.0	001° 5.934' W	56° 48.893' N	6298614.2	616155.2	Scotland
MOR23_043	Chain, cable, or rope	Low	177.8	0.2	0.1	001° 8.086' W	56° 48.864' N	6298500.0	613967.8	Scotland
MOR23_068	Chain, cable, or rope	Low	75.1	0.2	0.0	001° 1.247' W	56° 48.593' N	6298191.8	620939.3	Scotland

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MOR23_143	Fishing gear	Low	85.4	0.4	0.1	000° 59.6' W	56° 48.559' N	6298177.8	622616.7	Scotland
MOR23_069	Chain, cable, or rope	Low	93.6	0.8	0.0	001° 1.274' W	56° 48.498' N	6298015.1	620916.4	Scotland
MOR23_070	Chain, cable, or rope	Low	226.8	0.4	0.1	001° 0.486' W	56° 48.483' N	6298010.2	621718.9	Scotland
MOR23_140	Chain, cable, or rope	Low	84.7	7.0	0.1	001° 1.266' W	56° 48.377' N	6297791.2	620931.3	Scotland
MOR23_141	Chain, cable, or rope	Low	169.4	6.6	0.1	001° 1.264' W	56° 48.26' N	6297574.2	620939.3	Scotland
MOR23_093	Potential debris	Medium	14.6	10.1	0.2	000° 59.089' W	56° 48.223' N	6297569.6	623154.9	Scotland
MOR23_138	Likely geological	Low	8.4	1.3	0.7	001° 11.343' W	56° 48.141' N	6297070.0	610689.8	Scotland
MOR23_071	Wreck	High	66.4	14.8	7.5	000° 58.934' W	56° 47.776' N	6296746.0	623337.4	Scotland
MOR23_150	Chain, cable, or rope	Low	57.2	0.2	0.0	001° 1.824' W	56° 47.346' N	6295863.3	620418.9	Scotland
MOR23_022	Potential debris	Low	2.7	1.8	1.1	001° 9.264' W	56° 47.309' N	6295582.9	612846.9	Scotland
MOR23_090	Chain, cable, or rope	Low	9.1	9.5	0.1	001° 8.958' W	56° 47.232' N	6295448.2	613162.4	Scotland
MOR23_051	Potential debris	Low	4.4	0.2	0.0	001° 3.018' W	56° 47.099' N	6295370.6	619216.4	Scotland
MOR23_153	Potential debris	Low	0.9	0.4	0.4	001° 11.221' W	56° 47.015' N	6294984.3	610869.3	Scotland
MOR23_099	Chain, cable, or rope	Low	115.4	0.3	0.0	000° 53.68' W	56° 46.455' N	6294456.2	628759.3	Scotland
MOR23_056	Potential debris	Low	8.2	5.3	0.1	001° 1.219' W	56° 46.548' N	6294400.1	621077.2	Scotland
MOR23_004	Chain, cable, or rope	Low	13.2	0.2	0.0	001° 12.378' W	56° 46.563' N	6294115.9	609713.0	Scotland
MOR23_040	Likely geological	Low	7.2	0.8	0.4	001° 4.479' W	56° 46.435' N	6294095.2	617763.4	Scotland
MOR23_001	Likely geological	Low	4.3	1.8	0.6	001° 10.783' W	56° 46.458' N	6293962.5	611342.6	Scotland
MOR23_080	Potential debris	Low	3.8	0.6	0.1	000° 53.022' W	56° 46.125' N	6293864.6	629448.4	Scotland
MOR23_092	Linear feature	Low	10.2	0.1	0.0	000° 53.842' W	56° 45.894' N	6293411.6	628626.5	Scotland
MOR23_021	Potential debris	Medium	10.6	4.4	0.4	001° 7.363' W	56° 46.019' N	6293242.4	614847.6	Scotland
MOR23_012	Seabed disturbance	Low	24.9	6.6	0.2	001° 7.498' W	56° 45.906' N	6293029.8	614715.9	Scotland
MOR23_097	Chain, cable, or rope	Low	93.6	0.2	0.0	000° 56.38' W	56° 45.694' N	6292962.0	626052.6	Scotland
MOR23_100	Likely geological	Low	8.9	1.4	0.0	000° 55.654' W	56° 45.589' N	6292789.1	626797.9	Scotland
MOR23_035	Potential debris	Low	2.9	0.5	0.1	001° 4.206' W	56° 45.692' N	6292724.9	618080.7	Scotland
MOR23_036	Potential debris	Low	8.8	0.3	0.0	001° 4.312' W	56° 45.649' N	6292642.2	617974.4	Scotland
MOR23_027	Potential debris	Low	5.9	2.9	0.1	001° 5.535' W	56° 45.481' N	6292295.7	616737.6	Scotland

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MOR23_095	Chain, cable, or rope	Low	39.8	0.2	0.0	001° 5.05' W	56° 44.723' N	6290905.3	617270.7	Scotland
MOR23_101	Potential debris	Medium	9.1	2.7	0.4	000° 57.99' W	56° 44.549' N	6290788.4	624475.7	Scotland
MOR23_020	Potential debris	Low	5.5	6.1	0.7	001° 5.139' W	56° 44.621' N	6290711.8	617185.9	Scotland
MOR23_010	Potential debris	Low	3.8	0.7	0.3	001° 8.177' W	56° 44.594' N	6290577.3	614090.6	Scotland
MOR23_044	Mound	Medium	8.6	2.6	0.6	001° 1.337' W	56° 44.452' N	6290509.8	621069.8	Scotland
MOR23_102	Chain, cable, or rope	Low	22.4	0.4	0.1	000° 58.456' W	56° 44.279' N	6290275.0	624015.0	Scotland
MOR23_139	Potential debris	Low	3.4	2.4	0.3	001° 5.564' W	56° 44.337' N	6290174.5	616767.3	Scotland
MOR23_052	Wreck	High	33.7	7.6	2.4	000° 58.638' W	56° 44.221' N	6290161.2	623832.8	Scotland
MOR23_019	Potential debris	Low	7.2	1.5	0.7	001° 3.579' W	56° 43.668' N	6288990.3	618825.9	Scotland
MOR23_033	Potential debris	Low	1.8	1.4	0.2	001° 1.404' W	56° 43.581' N	6288892.2	621047.4	Scotland
MOR23_106	Potential debris	Low	2.9	4.3	0.7	000° 53.547' W	56° 43.202' N	6288427.8	629080.6	Scotland
MOR23_156	Potential debris	Low	1.9	0.6	0.2	000° 58.967' W	56° 43.239' N	6288330.3	623551.5	Scotland
MOR23_096	Likely geological	Low	4.1	2.2	0.7	001° 5.86' W	56° 42.684' N	6287098.9	616550.9	Scotland
MOR23_078	Likely geological	Low	7.3	0.9	0.5	000° 48.273' W	56° 42.34' N	6286997.1	634509.9	Scotland
MOR23_005	Potential debris	Low	9.5	1.8	0.7	001° 4.181' W	56° 42.381' N	6286585.7	618278.5	Scotland
MOR23_065	Potential debris	Low	2.8	0.8	0.5	000° 51.943' W	56° 42.114' N	6286461.3	630779.0	Scotland
MOR23_049	Potential debris	Low	7.4	0.3	0.1	000° 55.963' W	56° 42.094' N	6286297.5	626678.8	Scotland
MOR23_105	Potential debris	Low	5.6	0.6	0.1	000° 56.327' W	56° 41.997' N	6286106.3	626312.5	Scotland
MOR23_006	Likely geological	Low	3.1	2.4	0.3	001° 3.289' W	56° 41.494' N	6284966.7	619236.0	Scotland
MOR23_103	Chain, cable, or rope	Low	290.0	0.2	0.0	001° 4.579' W	56° 41.232' N	6284443.0	617932.3	Scotland
MOR23_104	Likely geological	Medium	26.2	6.9	0.0	001° 2.74' W	56° 41.126' N	6284298.9	619815.0	Scotland
MOR23_108	Linear feature	Low	4.6	0.6	0.2	000° 50.173' W	56° 40.898' N	6284261.3	632656	Scotland
MOR23_045	Likely geological	Low	4.0	0.9	0.3	000° 55.875' W	56° 40.985' N	6284244.2	626831.1	Scotland
MOR23_037	Potential debris	Low	3.5	1.6	0.3	000° 56.937' W	56° 40.916' N	6284082.9	625750.5	Scotland
MOR23_075	Linear feature	Low	11.5	0.6	0.1	000° 46.484' W	56° 40.502' N	6283647.3	636445.6	Scotland
MOR23_147	Likely geological	Low	1.7	1.8	0.2	001° 3.081' W	56° 40.446' N	6283027.9	619503.7	Scotland
MOR23_048	Likely geological	Low	11.5	0.6	0.0	000° 52.967' W	56° 40.166' N	6282814.9	629845.7	Scotland

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MOR23_145	Likely geological	Low	3.7	2.5	0.7	000° 46.058' W	56° 39.904' N	6282552.6	636917.4	Scotland
MOR23_066	Potential debris	Low	10.8	0.5	0.0	000° 48.258' W	56° 39.327' N	6281409.6	634704.1	Scotland
MOR23_047	Likely geological	Low	2.1	2.1	0.4	000° 52.297' W	56° 39.298' N	6281226.1	630580.6	Scotland
MOR23_142	Chain, cable, or rope	Low	11.6	6.4	0.1	000° 45.616' W	56° 38.629' N	6280203.1	637446.1	Scotland
MOR23_018	Potential debris	Low	5.3	0.9	0.1	000° 56.817' W	56° 38.819' N	6280197.7	625989.0	Scotland
MOR23_007	Likely geological	Low	2.9	1.1	0.3	000° 58.574' W	56° 38.732' N	6279983.5	624199.4	Scotland
MOR23_098	Likely geological	Low	2.7	4.9	0.8	000° 59.989' W	56° 38.669' N	6279823.4	622756.4	Scotland
MOR23_109	Potential debris	Low	5.2	2.6	0.1	000° 56.434' W	56° 38.197' N	6279054.8	626415.7	Scotland
MOR23_041	Likely geological	Low	6.8	0.8	0.3	000° 52.399' W	56° 38.105' N	6279010.0	630545.2	Scotland
MOR23_015	Wreck	High	35.8	10.1	2.7	000° 56.723' W	56° 38.109' N	6278883.1	626125.1	Scotland
MOR23_152	Potential debris	Low				000° 58.338' W	56° 37.527' N	6277754.6	624505.8	Scotland
MOR23_026	Potential debris	Low	2.9	0.7	0.1	000° 53.117' W	56° 36.984' N	6276908.4	629874.6	Scotland
MOR23_111	Chain, cable, or rope	Low	148.7	0.3	0.0	000° 42.089' W	56° 36.704' N	6276753.0	641169.7	Scotland
MOR23_110	Potential debris	Low	2.7	1.5	0.4	000° 51.145' W	56° 36.786' N	6276604.0	631902.7	Scotland
MOR23_115	Potential debris	Low	6.3	2.2	0.5	000° 40.567' W	56° 36.179' N	6275830.8	642759.2	Scotland
MOR23_029	Potential debris	Low	3.5	1.5	0.4	000° 51.167' W	56° 35.925' N	6275007.3	631930.5	Scotland
MOR23_072	Potential debris	Low	7.4	0.6	0.1	000° 40.663' W	56° 35.422' N	6274423.2	642708.5	Scotland
MOR23_112	Chain, cable, or rope	Low	150.5	0.1	0.0	000° 44.802' W	56° 35.481' N	6274393.0	638468.9	Scotland
MOR23_059	Potential debris	Low	10.3	4.5	0.0	000° 44.809' W	56° 35.441' N	6274317.8	638464.1	Scotland
MOR23_055	Seabed disturbance	Low	15.0	3.9	0.0	000° 45.088' W	56° 35.38' N	6274194.8	638183.1	Scotland
MOR23_157	Potential debris	Low	1.7	1.2	0.2	000° 56.411' W	56° 35.312' N	6273704.6	626599.6	Scotland
MOR23_011	Potential debris	Low	8.8	1.1	0.1	000° 53.229' W	56° 34.875' N	6272993.3	629881.4	Scotland
MOR23_114	Chain, cable, or rope	Low	13.1	0.2	0.1	000° 35.366' W	56° 34.141' N	6272235.3	648211.5	Scotland
MOR23_016	Potential debris	Low	4.3	0.8	0.0	000° 50.69' W	56° 34.327' N	6272058.0	632511.2	Scotland
MOR23_135	Potential debris	Medium	29.0	12.6	0.4	000° 53.687' W	56° 34.269' N	6271855.4	629447.0	Scotland
MOR23_146	Chain, cable, or rope	Low	10.6	6.8	0.0	000° 34.863' W	56° 33.856' N	6271725.8	648744.8	Scotland
MOR23_133	Potential debris	Low	40.6	6.0	0.3	000° 53.715' W	56° 34.061' N	6271468.6	629429.9	Scotland

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MEC25_106	Chain, cable, or rope	Low	43.2	0.4	0.1	000° 55.202' W	56° 33.936' N	6271190.8	627914.4	Scotland
MOR23_118	Mound	Low	63.9	23.8	0.5	000° 41.212' W	56° 33.651' N	6271121.0	642256.6	Scotland
MOR23_137	Chain, cable, or rope	Low	4.4	1.7	0.1	000° 50.248' W	56° 33.784' N	6271065.8	632995.4	Scotland
MEC25_107	Chain, cable, or rope	Low	20.3	0.5	0.1	000° 55.015' W	56° 33.764' N	6270877.9	628115.7	Scotland
MOR23_060	Potential debris	Low	7.1	0.5	0.5	000° 41.166' W	56° 33.475' N	6270796.3	642315.2	Scotland
MOR23_136	Chain, cable, or rope	Low	7.0	6.6	0.1	000° 50.031' W	56° 33.604' N	6270738.1	633228.8	Scotland
MOR23_119	Chain, cable, or rope	Low	8.1	5.6	0.0	000° 42.01' W	56° 33.4' N	6270628.5	641455.9	Scotland
MOR23_124	Chain, cable, or rope	Low	7.5	4.6	0.2	000° 36.541' W	56° 33.243' N	6270528.5	647066.9	Scotland
MEC25_105	Linear feature	Low	28.8	0.6	0.0	000° 55.29' W	56° 33.563' N	6270496.3	627844.8	Scotland
MEC25_096	Chain, cable, or rope	Low	28.0	15.3	0.1	000° 55.466' W	56° 33.34' N	6270077.0	627677.1	Scotland
MOR23_155	Potential debris	Low	3.7	2.9	0.2	000° 35.109' W	56° 32.909' N	6269959.1	648554.8	Scotland
MOR23_038	Linear feature	Low	5.0	0.5	0.0	000° 45.324' W	56° 32.889' N	6269567.9	638092.7	Scotland
MEC25_104	Potential debris	Low	3.9	1.4	0.0	000° 55.243' W	56° 32.922' N	6269309.4	627929.4	Scotland
MOR23_148	Fishing gear	Low	48.9	0.7	0.3	000° 46.044' W	56° 32.753' N	6269291.5	637362.7	Scotland
MOR23_127	Potential debris	Low	4.3	0.5	0.3	000° 36.5' W	56° 32.446' N	6269051.9	647160.2	Scotland
MOR23_024	Potential debris	Low	3.6	1.0	0.3	000° 46.85' W	56° 32.577' N	6268939.1	636548.1	Scotland
MOR23_126	Chain, cable, or rope	Low	26.9	4.7	0.1	000° 37.781' W	56° 32.364' N	6268853.1	645853.1	Scotland
MOR23_144	Potential debris	Low	9.8	3.9	0.1	000° 35.31' W	56° 32.222' N	6268679.2	648393.9	Scotland
MOR23_046	Likely geological	Low	8.7	0.9	0.2	000° 42.75' W	56° 32.295' N	6268553.0	640766.2	Scotland
MOR23_008	Fishing gear	Low	30.1	15.1	0.4	000° 49.266' W	56° 32.067' N	6267913.1	634102.5	Scotland
MOR23_034	Potential debris	Low	2.0	0.6	0.1	000° 44.554' W	56° 31.947' N	6267846.1	638939.0	Scotland
MOR23_123	Likely geological	Low	8.0	2.0	0.3	000° 31.74' W	56° 31.621' N	6267695.2	652092.4	Scotland
MOR23_130	Potential debris	Low	6.9	0.4	0.1	000° 33.101' W	56° 31.473' N	6267370.1	650707.3	Scotland
MOR23_025	Potential debris	Low	7.0	0.8	0.2	000° 44.932' W	56° 31.375' N	6266772.1	638585.7	Scotland
MOR23_120	Potential debris	Low	9.0	0.4	0.0	000° 45.655' W	56° 31.382' N	6266761.9	637844.3	Scotland
MOR23_117	Potential debris	Low	3.9	0.5	0.1	000° 46.896' W	56° 31.193' N	6266370.3	636584.1	Scotland
MOR23_077	Potential debris	Medium	28.0	24.3	1.8	000° 31.875' W	56° 30.693' N	6265968.3	652015.1	Scotland

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MOR23_122	Potential debris	Low	3.0	0.6	0.1	000° 44.242' W	56° 30.756' N	6265647.4	639331.5	Scotland
MOR23_116	Chain, cable, or rope	Low	94.4	0.6	0.1	000° 48.576' W	56° 30.833' N	6265646.8	634882.2	Scotland
MOR23_151	Potential debris	Low	5.2	0.3	0.1	000° 32.025' W	56° 30.512' N	6265626.8	651874.2	Scotland
MOR23_039	Potential debris	Low	5.0	0.6	0.2	000° 41.79' W	56° 30.581' N	6265408.0	641856.5	Scotland
MOR23_121	Chain, cable, or rope	Low	67.4	0.4	0.0	000° 46.712' W	56° 30.486' N	6265064.9	636814.8	Scotland
MOR23_129	Chain, cable, or rope	Low	32.1	0.3	0.1	000° 32.255' W	56° 30.162' N	6264969.6	651661.2	Scotland
MOR23_134	Likely geological	Low	14.6	6.2	0.2	000° 48.162' W	56° 30.315' N	6264700.2	635337.6	Scotland
MEC25_092	Potential debris	Low	5.5	0.7	0.1	000° 56.367' W	56° 30.234' N	6264289.3	626927.4	Scotland
MOR23_009	Potential debris	Low	3.0	0.9	0.1	000° 46.293' W	56° 29.841' N	6263883.0	637283.7	Scotland
MOR23_067	Potential debris	Medium	25.7	4.1	0.3	000° 33.342' W	56° 29.585' N	6263859.3	650584.3	Scotland
MEC25_097	Fishing gear	Low	46.5	1.5	0.4	000° 55.836' W	56° 29.838' N	6263570.7	627494.0	Scotland
MOR23_014	Likely geological	Medium	28.6	17.5	1.3	000° 44.271' W	56° 29.607' N	6263516.0	639371.8	Scotland
MOR23_032	Linear feature	Low	6.3	0.3	0.1	000° 41.897' W	56° 29.516' N	6263429.5	641812.5	Scotland
MOR23_131	Potential debris	Low	8.8	2.7	0.1	000° 33.211' W	56° 29.318' N	6263369.6	650736.2	Scotland
MOR23_042	Likely geological	Low	7.8	0.7	0.2	000° 39.872' W	56° 29.397' N	6263277.6	643898.1	Scotland
MOR23_113	Potential debris	Low	7.1	3.1	0.0	000° 48.018' W	56° 29.538' N	6263262.7	635531.8	Scotland
MOR23_154	Potential debris	Low	0.8	0.4	0.1	000° 42.696' W	56° 29.322' N	6263041.4	641004.9	Scotland
MOR23_128	Chain, cable, or rope	Low	9.7	2.0	0.1	000° 43.634' W	56° 29.302' N	6262972.2	640043.5	Scotland
MOR23_017	Likely geological	Low	2.3	0.6	0.0	000° 42.522' W	56° 28.787' N	6262055.4	641216.2	Scotland
MEC25_055	Chain, cable, or rope	Low	51.1	0.3	0.1	000° 55.946' W	56° 28.964' N	6261946.8	627430.3	Scotland
MOR23_125	Likely geological	Low	6.5	1.0	0.3	000° 32.332' W	56° 28.496' N	6261876.7	651693.2	Scotland
MEC25_103	Linear feature	Low	11.7	0.6	0.1	000° 55.788' W	56° 28.844' N	6261729.3	627598.6	Scotland
MOR23_013	Potential debris	Low	2.5	2.0	0.1	000° 43.486' W	56° 28.326' N	6261167.1	640255.2	Scotland
MEC25_093	Linear feature	Low	15.5	0.5	0.2	000° 56.643' W	56° 28.286' N	6260666.9	626752.2	Scotland
MOR23_028	Chain, cable, or rope	Low	58.6	1.4	0.0	000° 39.964' W	56° 27.955' N	6260600.5	643894.6	Scotland
MOR23_031	Chain, cable, or rope	Low	14.7	0.3	0.0	000° 39.018' W	56° 27.634' N	6260039.3	644885.4	Scotland
MOR23_030	Chain, cable, or rope	Low	33.8	0.3	0.0	000° 38.962' W	56° 27.579' N	6259939.1	644946.7	Scotland

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MOR23_132	Potential debris	Low	16.8	3.1	0.1	000° 41.704' W	56° 27.551' N	6259791.8	642133.4	Scotland
MOR23_002	Potential debris	Low	2.3	0.9	0.1	000° 43.365' W	56° 27.514' N	6259665.8	640429.5	Scotland
MEC25_101	Potential debris	Low	2.8	1.0	0.1	000° 56.47' W	56° 27.316' N	6258874.0	626983.9	Scotland
MEC25_100	Chain, cable, or rope	Low	4.9	2.4	0.1	000° 56.815' W	56° 26.553' N	6257448.9	626671.7	Scotland
MEC25_098	Potential debris	Low	4.3	1.4	0.8	000° 57.313' W	56° 25.641' N	6255741.0	626210.7	Scotland
MEC25_099	Chain, cable, or rope	Low	12.0	0.1	0.1	000° 57.308' W	56° 25.599' N	6255663.9	626217.8	Scotland
MEC25_102	Chain, cable, or rope	Low	9.4	10.2	0.1	000° 56.909' W	56° 25.425' N	6255353.9	626637.7	Scotland
MEC25_094	Chain, cable, or rope	Low	4.9	4.7	0.0	000° 57.691' W	56° 25.223' N	6254954.2	625844.9	Scotland
MEC25_095	Seabed disturbance	Low	5.2	2.7	0.0	000° 57.757' W	56° 24.807' N	6254182.0	625800.6	Scotland
MEC25_108	Chain, cable, or rope	Low	11.6	0.3	0.0	000° 57.252' W	56° 24.215' N	6253098.5	626352.2	Scotland
MEC25_111	Potential debris	Low	3.8	1.8	0.3	000° 57.787' W	56° 23.357' N	6251490.6	625848.7	Scotland
MEC25_015	Likely geological	Low	5.5	3.4	0.3	000° 58.163' W	56° 23.328' N	6251425.3	625463.5	Scotland
MEC25_110	Chain, cable, or rope	Low	17.8	9.7	0.1	000° 57.877' W	56° 22.785' N	6250427.9	625788.0	Scotland
MEC25_016	Linear feature	Low	2.9	0.5	0.1	000° 58.524' W	56° 22.031' N	6249010.1	625163.6	Scotland
MEC25_017	Chain, cable, or rope	Low	99.7	4.1	0.2	000° 58.882' W	56° 21.446' N	6247914.1	624826.4	Scotland
MEC25_112	Potential debris	Low	13.1	10.1	0.1	000° 58.684' W	56° 20.643' N	6246431.0	625074.2	Scotland
MEC25_109	Linear feature	Low	23.8	0.8	0.1	000° 58.787' W	56° 19.701' N	6244680.0	625019.0	England
MEC25_082	Chain, cable, or rope	Low	28.1	4.3	0.2	000° 59.682' W	56° 19.061' N	6243465.4	624132.0	England
MEC25_124	Chain, cable, or rope	Low	22.1	11.9	0.2	000° 59.185' W	56° 18.317' N	6242100.9	624684.4	England
MEC25_013	Potential debris	Low	1.9	1.4	0.1	000° 59.571' W	56° 18.296' N	6242050.4	624287.5	England
MEC25_088	Potential debris	Low	8.6	2.2	0.1	000° 59.381' W	56° 18.193' N	6241864.9	624488.6	England
MEC25_087	Chain, cable, or rope	Low	11.0	2.3	0.1	000° 59.955' W	56° 17.672' N	6240881.8	623925.7	England
MEC25_123	Chain, cable, or rope	Low	30.8	2.6	0.1	001° 0.4' W	56° 16.745' N	6239149.1	623515.8	England
MEC25_089	Chain, cable, or rope	Low	16.9	10.2	0.1	001° 0.203' W	56° 16.239' N	6238217.4	623746.1	England
MEC25_086	Linear feature	Low	24.8	0.7	0.1	001° 0.992' W	56° 14.241' N	6234487.7	623039.1	England
MEC25_076	Potential debris	Low	5.7	1.1	0.1	001° 0.62' W	56° 13.042' N	6232275.7	623487.5	England
MEC25_079	Chain, cable, or rope	Low	8.4	1.1	0.1	001° 0.47' W	56° 12.927' N	6232067.2	623648.4	England

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MEC25_085	Likely geological	Low	2.6	2.2	0.2	001° 0.63' W	56° 12.468' N	6231209.5	623507.7	England
MEC25_081	Likely geological	Low	3.8	3.3	0.2	000° 59.898' W	56° 12.425' N	6231152.6	624267.1	England
MEC25_083	Chain, cable, or rope	Low	6.3	3.2	0.1	000° 59.839' W	56° 12.362' N	6231037.5	624331.0	England
MEC25_078	Potential debris	Low	3.1	0.9	0.1	001° 0.327' W	56° 12.261' N	6230834.6	623832.6	England
MEC25_080	Potential debris	Low	6.6	0.7	0.3	000° 59.672' W	56° 10.549' N	6227679.4	624602.0	England
MEC25_084	Fishing gear	Low	13.1	2.7	0.4	000° 59.956' W	56° 8.999' N	6224796.1	624391.8	England
MEC25_077	Likely geological	Low	2.9	1.1	1.1	000° 59.102' W	56° 8.486' N	6223871.5	625303.4	England
MEC25_072	Chain, cable, or rope	Low	65.9	0.6	0.0	000° 59.943' W	56° 8.263' N	6223431.8	624444.4	England
MEC25_121	Chain, cable, or rope	Low	57.8	1.0	0.1	000° 59.877' W	56° 7.958' N	6222869.1	624529.1	England
MEC25_073	Potential debris	Low	4.8	0.9	0.1	000° 59.565' W	56° 7.718' N	6222432.9	624864.8	England
MEC25_122	Fishing gear	Low	291.0	0.3	0.0	000° 58.872' W	56° 6.418' N	6220042.0	625653.4	England
MEC25_075	Likely geological	Low	4.0	0.6	0.4	000° 58.582' W	56° 6.205' N	6219656.5	625965.9	England
MEC25_074	Linear feature	Low	9.1	0.2	0.0	000° 58.735' W	56° 5.831' N	6218959.1	625827.6	England
MEC25_120	Likely geological	Low	40.0	4.5	0.2	000° 59.437' W	56° 5.717' N	6218726.1	625105.5	England
MEC25_091	Potential debris	Low	4.5	2.6	0.4	000° 58.238' W	56° 2.352' N	6212521.8	626532.7	England
MEC25_142	Potential debris	Low	2.4	2.4	0.9	000° 58.119' W	56° 2.097' N	6212052.9	626669.5	England
MEC25_018	Potential debris	Low	4.8	0.7	0.1	000° 57.296' W	55° 57.448' N	6203455.0	627779.2	England
MEC25_019	Chain, cable, or rope	Low	164.8	0.2	0.0	000° 57.124' W	55° 57.354' N	6203286.1	627963.6	England
MEC25_020	Chain, cable, or rope	Low	21.2	20.5	0.1	000° 56.67' W	55° 56.46' N	6201642.2	628484.9	England
MEC25_056	Potential debris	Low	5.9	4.0	0.1	000° 55.685' W	55° 52.979' N	6195217.7	629704.3	England
MEC25_063	Potential debris	Low	2.4	0.7	0.8	000° 55.546' W	55° 52.875' N	6195029.8	629854.4	England
MEC25_062	Potential debris	Low	1.9	1.5	0.4	000° 55.15' W	55° 52.182' N	6193757.4	630305.6	England
MEC25_061	Chain, cable, or rope	Low	34.9	0.3	0.0	000° 54.539' W	55° 51.56' N	6192622.9	630978.2	England
MEC25_064	Potential debris	Low	2.6	0.7	0.1	000° 54.656' W	55° 51.458' N	6192430.0	630861.8	England
MEC25_065	Chain, cable, or rope	Low	9.8	3.6	0.0	000° 54.344' W	55° 50.93' N	6191460.4	631216.3	England
MEC25_060	Potential debris	Low	1.7	0.4	0.1	000° 53.939' W	55° 50.653' N	6190959.6	631654.3	England
MEC25_059	Chain, cable, or rope	Low	14.8	8.1	0.2	000° 53.958' W	55° 50.643' N	6190939.7	631635.6	England

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MEC25_058	Chain, cable, or rope	Low	6.7	6.4	0.1	000° 53.909' W	55° 50.595' N	6190853.1	631689.3	England
MEC25_067	Potential debris	Low	4.1	3.8	0.1	000° 53.858' W	55° 50.292' N	6190293.4	631759.9	England
MEC25_066	Potential debris	Low	5.5	2.3	0.1	000° 53.856' W	55° 50.284' N	6190277.6	631762.7	England
MEC25_069	Potential debris	Low	5.0	2.8	0.1	000° 53.664' W	55° 49.887' N	6189547.3	631985.1	England
MEC25_068	Chain, cable, or rope	Low	49.7	3.9	0.0	000° 53.756' W	55° 49.843' N	6189463.0	631891.9	England
MEC25_128	Fishing gear	Low	24.8	1.3	0.0	000° 53.552' W	55° 48.947' N	6187808.1	632155.1	England
MEC25_126	Seabed disturbance	Low	19.2	6.7	0.1	000° 52.178' W	55° 46.651' N	6183593.9	633721.0	England
MEC25_127	Potential debris	Low	15.1	4.0	0.4	000° 51.174' W	55° 45.635' N	6181742.8	634828.3	England
MEC25_054	Wreck	High	21.7	7.3	1.2	000° 54.828' W	55° 40.56' N	6172214.2	631290.4	England
MEC25_003	Potential debris	Medium	8.5	4.5	0.5	000° 54.683' W	55° 40.003' N	6171185.4	631473.6	England
MEC25_002	Seabed disturbance	Low	23.7	11.3	0.1	000° 55.273' W	55° 39.34' N	6169938.6	630892.6	England
MEC25_006	Potential debris	Low	3.0	0.7	0.4	000° 56.006' W	55° 38.332' N	6168046.0	630179.6	England
MEC25_005	Wreck	High	45.2	8.6	4.6	000° 55.859' W	55° 37.781' N	6167028.7	630364.7	England
MEC25_010	Mound	Medium	18.4	7.7	1.4	000° 55.424' W	55° 37.685' N	6166865.1	630826.1	England
MEC25_009	Potential wreck	High	10.6	7.4	1.3	000° 56.495' W	55° 37.383' N	6166271.6	629718.6	England
MEC25_007	Potential debris	Low	4.6	0.5	0.1	000° 57.863' W	55° 33.71' N	6159417.4	628482.6	England
MEC25_004	Potential debris	Low	5.5	0.9	0.1	000° 58.313' W	55° 32.67' N	6157474.3	628066.8	England
MEC25_090	Likely geological	Low	4.7	1.0	0.2	001° 1.325' W	55° 26.328' N	6145623.4	625234.4	England
MEC25_011	Mound	Medium	25.4	13.5	0.9	001° 1.847' W	55° 25.351' N	6143795.6	624735.7	England
MEC25_119	Potential debris	Low	4.5	2.4	0.8	001° 3.034' W	55° 23.778' N	6140843.3	623565.4	England
MEC25_008	Mound	Medium	17.1	7.2	1.2	001° 2.639' W	55° 23.602' N	6140528.4	623990.9	England
MEC25_012	Mound	Medium	16.2	12.5	2.1	001° 2.67' W	55° 23.56' N	6140450.3	623960.2	England
MEC25_131	Wreck	High	17.9	7.7	3.3	001° 3.414' W	55° 7.473' N	6110597.2	624007.1	England
MEC25_001	Potential wreck	High	25.9	7.5	1.2	001° 3.255' W	55° 6.724' N	6109212.6	624214.1	England
MEC25_070	Potential wreck	High	19.8	7.6	2.1	001° 4.635' W	55° 5.874' N	6107596.1	622791.6	England
MEC25_130	Mound	Medium	22.2	12.4	1.2	001° 5.371' W	55° 4.078' N	6104243.7	622100.0	England
MEC25_022	Wreck	High	41.8	8.4	5.8	001° 6.365' W	55° 2.243' N	6100812.3	621134.3	England

Anomaly ID	Description	Potential	Length (m)	Width (m)	Height (m)	WGS84		ED50 Z30N		Country
						Longitude	Latitude	Northing	Easting	
MEC25_132	Wreck	High	30.2	7.5	2.6	001° 8.363' W	54° 58.214' N	6093284.3	619205.3	England
MEC25_052	Wreck	High	86.9	14.5	6.1	001° 9.791' W	54° 56.215' N	6089536.0	617779.6	England
MEC25_057	Wreck debris	Medium	11.6	9.1	0.3	001° 9.802' W	54° 55.524' N	6088255.0	617800.5	England
MEC25_053	Wreck	High	81.5	20.5	4.2	001° 9.941' W	54° 55.442' N	6088098.7	617656.4	England
MEC25_118	Mound	Medium	12.2	7.2	2.0	001° 11.514' W	54° 54.617' N	6086525.3	616015.6	England
MEC25_140	Potential wreck	High	5.4	4.1	1.0	001° 12.212' W	54° 53.989' N	6085341.7	615300.5	England
MEC25_139	Potential wreck	High	10.6	9.9	1.8	001° 12.162' W	54° 52.696' N	6082944.9	615415.7	England
MEC25_138	Wreck	High	82.4	18.9	2.2	001° 13.059' W	54° 52.354' N	6082286.4	614472.2	England
MEC25_137	Wreck	High	65.6	11.8	6.5	001° 11.907' W	54° 52.244' N	6082114.3	615709.7	England
MEC25_014	Potential debris	Low	1.9	1.2	0.1	001° 11.16' W	54° 51.648' N	6081030.3	616537.1	England
MEC25_136	Wreck	High	44.6	6.8	2.6	001° 14.871' W	54° 51.318' N	6080316.7	612583.1	England
MEC25_071	Potential debris	Low	2.3	1.1	1.0	001° 12.692' W	54° 51.286' N	6080316.5	614915.2	England
MEC25_135	Wreck debris	Medium	26.8	17.1	0.6	001° 15.351' W	54° 50.925' N	6079575.2	612087.3	England
MEC25_134	Wreck	High	85.8	31.3	3.9	001° 15.402' W	54° 50.878' N	6079486.0	612035.1	England
MEC25_125	Chain, cable, or rope	Low	62.3	2.4	0.1	001° 12.286' W	54° 50.552' N	6078966.9	615384.5	England
MEC25_114	Mound	Medium	10.2	5.7	1.2	001° 13.019' W	54° 50.52' N	6078887.9	614601.2	England
MEC25_141	Potential debris	Medium	12.7	7.2	1.2	001° 14.382' W	54° 50.006' N	6077896.6	613167.3	England
MEC25_133	Potential wreck	High	14.3	4.5	0.6	001° 15.597' W	54° 50.002' N	6077857.9	611866.1	England
MEC25_115	Wreck	High	80.2	23.3	2.6	001° 14.231' W	54° 49.533' N	6077024.7	613351.0	England
MEC25_049	Likely geological	Low	4.7	2.5	0.5	001° 15.076' W	54° 49.11' N	6076217.8	612466.1	England
MEC25_116	Wreck	High	64.3	28.5	4.4	001° 13.77' W	54° 48.863' N	6075793.3	613875.1	England

Appendix B Gazetteer of wrecks, obstructions and documented loss records

B.1.1 Wrecks within the MHPGC Project PEIR Red Line Boundary and with geophysical anomaly correlations

This appendix summarises the wreck and obstruction records within the MHPGC Project PEIR Red Line Boundary and those that have been correlated with geophysical anomalies. The archaeological assessment of geophysical and hydrographic data identified 23 geophysical anomalies that could be correlated 21 wreck records, and our discussed as part of the relevant record below.

W_001

W_001 (UKHO ID: 3163) represents a non-dangerous unknown wreck first record in 1964 in a general water depth of 60m. No further details are record by the UKHO, which now lists this as a dead location.

W_002

W_002 (UKHO ID: 3168) represents a non-dangerous unknown wreck first recorded in 1919 in a general water depth of 68m. The wreck is described as small and degraded, with sonar measurements of 32m long, 7m wide and a shadow height of 2.6m. W_002 has been correlated with high potential anomaly MOR23_052.

W_003

W_003 (UKHO ID: 3169) represents the non-dangerous wreck of the steam ship *Anton*. The *Anton* (ex-*Newbiggin*; ex-*Castanos*, ex-*Ithaca*, ex-*Castanos*) was built in 1882. The ship sank on 06 June 1917 whilst transporting coal after being torpedoed by the German U-boat *UC-77*. The wreck was first recorded in 1917 in a general water depth of 62m. As built dimensions are given as 78.9m long, 11m beam and a draught of 5.5m. No sonar measurements are recorded, and the UKHO now lists this as a dead location.

W_009

W_009 (UKHO ID: 3202) represents the non-dangerous wreck of the fishing vessel *Valiant*. The *Valiant* sank on 13 May 1992 in a general water depth of 67m. The wreck is described as being upright and intact, with sonar measurements of 23m long, 6m wide and a shadow height of 4.6m.

W_112

W_112 (UKHO ID: 4281) represents a non-dangerous wreck, possibly the trawler *John M. Smart*, sunk on 12 October 1917 by gunfire from German torpedo boats. The wreck sits in a general water depth of 82 m. It is described as being possibly in two pieces, with sonar measurements of 40m long, 10m wide and a shadow height of 5.9m. W_012 has been correlated with high potential anomaly MEC25_022.

W_013

W_013 (UKHO ID: 4328) represents a non-dangerous wreck, possibly the German steam ship *Hans Hoth*. The *Hans Hoth* was lost on 10 February 1952 when the cargo shifted whist on passage for Hamburg. The wreck is in a general water depth of 92m. The record describes a probable area of wreckage, with sonar dimensions of 48m long, 20m wide and a shadow height of 3.3m. W_013 has been correlated with high potential anomaly MEC25_131.

W_020

W_020 (UKHO ID: 5658) possibly represents the wreck of the trawler *Helvetia*, captured and scuttled by a German submarine on 08 January 1916. The wreck sits in a general water depth of 44m. It is described as apparently comprising two separate objects lying perpendicular to each other, with sonar dimensions of 10.2m long, 8.3m wide and a shadow height of 5.9m. W_020 has been correlated with high potential anomaly MEC25_139.

W_023

W_023 (UKHO ID: 5663) represents a dangerous wreck, possibly an alternative location for the steam ship *Vianna* for which a main location outside of the MHPGC Project PEIR Red Line Boundary is provided by the

UKHO (see **Appendix BB.1.2**, record W_021). The *Vianna* was torpedoed and sunk by the German submarine *UC-64* on 31 March 1918 whilst transporting coal. The wreck sits in a general water depth of 30m. It is described as being well broken up, and with the bows pointing south. No sonar or as-built dimensions are listed on the UKHO record. W_023 has been correlated with high potential anomaly MEC25_116.

W_024

W_024 (UKHO ID: 5664) represents the dangerous wreck of the steam ship *Carmarthen Coast*. The *Carmarthen Coast* (ex-*Nova*, ex-*Langfjord*) was built in 1921 and sunk on 09 November 1939. As-built dimensions are given as 64.7m long, 10.2m beam and a draught of 3.8m. The wreck is in a general water depth of 26m. Sonar dimensions are given as 70m long, 25m wide and a shadow height of 4.1m. W_024 has been correlated with high potential anomaly MEC25_124 and possibly medium potential anomaly MEC25_135, which may be associated debris.

W_025

W_025 (UKHO ID: 5665) represents a dangerous wreck, and a possible alternative location for *Carmarthen Coast*. The location provided is approximately 995m southwest of that given for record W_024, within a general water depth of 29m. This wreck is described as lying on its starboard side, well broken up and with sonar dimensions of 40m long, 10m wide and a shadow height of 3.4m. W_025 has been correlated with high potential anomaly MEC25_136.

However, the NMHR record suggests this to be the Vianna; formerly the Teal, whilst the HER record still lists this wreck as the Teal.

W_026

W_026 (UKHO ID: 5666) represents an unknown wreck first detected in 1971 in a general water depth of 25m. No other details are recorded, and the UKHO no records this as a dead location.

W_027

W_027 (UKHO ID: 5669) represents the wreck of the RFA *Creosol*. This ship was built in 1918 and was one of 18 built to a standard Admiralty design of harbour tanker. The RFA *Creosol* was torpedoed and sunk by the German submarine UC *17* on 07 February 1918. As built dimensions are given as 67.4m long, 10.7m beam and a draught of 4.6m. The wreck is described as being intact and upright, within a general water depth of 44m. Sonar dimensions are given as 85m long, 12m wide and a shadow height of 7.9m. The wreck of the RFA *Creosol* is designated under the Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2026. W_027 has been correlated with high potential anomaly MEC25_137.

W_028

W_028 (UKHO ID: 5670) represents the dangerous wreck of the steam ship *Intent*. The *Intent* was torpedoed and sunk by the German submarine UC *40* on 08 March 1918. The wreck is described as being well broken up and sits within a general water depth of 41m. Sonar dimensions are given as 84.9m long, 27.9m wide and a shadow height of 11.6m. W_028 has been correlated with high potential anomaly MEC25_138.

W_032

W_032 (UKHO ID: 5677) represents drilling equipment first identified in 1976 that had been abandoned on the seabed by the National Coal Board after borehole investigations. This is categorised by the UKHO as foul ground.

W_034

W_034 (UKHO ID: 5680) represents an unknown non-dangerous wreck first detected in 1940 within a general water depth of 45m. The wreck is described as being intact, lying on one side and with the wheelhouse clearly visible. Sonar dimensions are given as 10.9m long, 4.3m wide and a shadow height of 6.7m. W_034 has been correlated with high potential anomaly MEC25_140.

W_037

W_037 (UKHO ID: 5690) represents an unknown non-dangerous wreck first detected in 1974 within a general water depth of 48m. No other details are recorded by the UKHO.

W_039

W_039 (UKHO ID: 5708) represents the non-dangerous wreck of the steam ship *Hogarth*. The *Hogarth* was built in 1893 and was sunk on 07 June 1918 after being mined whilst transporting general and mixed goods. As built dimensions are given as 77m long, 9.9m beam and a draught of 5.3m. The wreck is described as being broken in two within a general water depth of 4m. Sonar dimensions are given as 70m long, 10m wide and a shadow height of 8.5m. W_039 has been correlated with high potential anomaly MEC25_053 and possibly medium potential anomaly MEC25_057, which may be associated debris.

W_040

W_040 (UKHO ID: 5720) represents a non-dangerous wreck, possibly that of the steam ship *Zealand* sunk on 01 August 1918. As-built dimensions are given as 70.4m long, 10.4m beam and draught of 4.6m. The wreck is described as being probably on its side and is within a general water depth of 51m. Sonar dimensions are given as 92m long, 10m wide and a shadow height of 9.4m. W_040 has been correlated with high potential anomaly MEC25_052.

W_044

W_044 (UKHO ID: 5737) represents an unknown non-dangerous wreck first detected in 1962 within a general water depth of 57m. The wreck is described as being possibly on its side, but no other details are recorded by the UKHO. W_044 has been correlated with high potential anomaly MEC25_132.

W_048

W_048 (UKHO ID: 5785) probably represents the dangerous wreck of the steam ship *Teal*. A separate record also exists for the *Teal* which is located approximately 1.7km to the northwest (see below, W_061; UKHO ID: 66531). The *Teal* was built in 1876 and was sunk on 29 April 1916 whilst transporting general and mixed goods. The dimensions of the ship as built are given as 67.1m long, 8.7m beam and a draught of 4.5m. The wreck is described as being mainly collapsed, but with the stern remaining intact although inverted. The wreck is within a general water depth of 27m. Sonar dimensions are given as 50m long, 7m wide and a shadow height of 4.5m. W_048 has been correlated with high potential anomaly MEC24_115.

W_052

W_052 (UKHO ID: 57068) represents an obstruction caused by a sewage diffuser first detected in 1998. This is within a general water depth of 14m. Sonar dimensions are given as 115.7m long, 20.7m wide and a shadow height of 4.5m.

W_056

W_056 (UKHO ID: 58007) represents an unknown non-dangerous wreck first detected in 1999 within a general water depth of 82m. The wreck is described as being intact, upright and showing a mast or attached trawl. The bows are facing northwest. Sonar dimensions are given as 46m long, 5.6m wide and a shadow height of 5.6m. W_056 has been correlated with high potential anomaly MEC25_005.

W_058

W_058 (UKHO ID: 64121) represents the non-dangerous wreck of the fishing vessel *Blue Dawn*, reported sinking on 13 February 2004. No other details are recorded by the UKHO.

W_060

W_060 (UKHO ID: 65635) represents an unknown non-dangerous wreck first detected in 2005 within a general water depth of 84m. The wreck is described as being intact, with sonar dimensions given as 58m long, 20m wide and a shadow height of 2.2m. W_060 has been correlated with high potential anomaly MEC25_054.

W_061

W_061 (UKHO ID: 66531) represents the reported location of the sinking of the *Teal* (see above, record W_048). It is categorised as non-dangerous, within a general water depth of 21m. It is also now listed by the UKHO as a dead location, however W_061 has been correlated with high potential anomaly MEC25_133.

W_062

W_062 (UKHO ID: 70419) represents an unknown non-dangerous wreck first detected in 2007 in a general water depth of 67m. The wreck is described as being small and upright, with sonar dimensions given as 32m long, 8m wide and a shadow height of 3.1m. W_062 has been correlated with high potential anomaly MOR23_015.

W_063

W_063 (UKHO ID: 70421) represents an unknown non-dangerous wreck first detected in 2007 within a general water depth of 69m. The wreck is described as being upright and intact, with bows facing northeast. Sonar dimensions are given as 70m long, 13m wide and a shadow height of 8.6m. W_063 has been correlated with high potential anomaly MOR23_071.

W_064

W_064 (UKHO ID: 75090) represents an unknown non-dangerous wreck first detected in 2009 within a general water depth of 67m. The wreck is described as being upright and intact, with the bows facing east-northeast. Sonar dimensions are given as 26m long, 9m wide and a shadow height of 1.5m. W_064 has been correlated with high potential anomaly MOR23_054.

W_065

W_065 (UKHO ID: 87132) represents a discarded anchor and chain originally detected in 2017 within a general water depth of 21m. This is categorised by the UKHO as foul ground.

W_067

W_067 (Canmore ID: 298174) represents a wreck identified via charts and tentatively accepted to constitute the wreck of a submarine. It is suggested that this is a possible alternative location for the German submarine *U-40* which is recorded by the UKHO approximately 71km northwest of this location (UKHO ID: 2215; outside of the Marine and Intertidal Archaeology Study Area).

A further 63 NMHR and HER records pertaining to unidentified obstructions (fisherman's fasteners) are within the MHPGC Project PEIR Red Line Boundary, as listed within **Table 7.1** below. These could be indicative of wreck or other submerged feature. None of these have been correlated with geophysical anomalies.

Table 7.1: NMHR and HER unidentified obstruction records with the MHPGC Project PEIR Red Line Boundary

MSDS ID	NMHR ID	HER ID
W_071	1005291	H10027
W_072	1005833 / 1062891	H10019
W_073	1006684 / 1034242	H10031
W_075	1007939	H10279
W_077	1014409	H10025
W_078	1016448	H10006
W_081	1026100	H10056
W_082	1028054 / 1036099	-
W_084	1029364	H10055
W_085	1030497	H10026
W_087	1032723	H10020

MSDS ID	NMHR ID	HER ID
W_088	1037339	H10078
W_089	1044222 / 1037333	H10065
W_093	1048975 / 1010779	H10037
W_099	1059133 / 1024216	H10028
W_100	1060116	H10035
W_101	1061850	H10002
W_102	1062042	H10030
W_103	100486	-
W_104	1001158	-
W_106	1002422	-
W_114	1007624	-
W_118	1010062	-
W_121	1012663	-
W_123	1015069	-
W_124	1015409	-
W_126	1015766	-
W_130	1016741	-
W_131	1017293	-
W_132	1017475	-
W_134	1019607	-
W_136	1020684	-
W_139	1022152	-
W_142	1023697	-
W_144	1024978	-
W_145	1026177	-
W_147	1031062	-
W_149	1031370	-
W_151	1031785	-
W_152	1032333	-
W_155	1037046	-
W_158	1039764	-
W_160	1040632	-
W_161	1041367	-
W_162	1041594	-
W_165	1043885	-
W_170	1045113	-
W_171	1046156	-
W_175	1046718	-
W_180	1049119	-

MSDS ID	NMHR ID	HER ID
W_181	1050674	-
W_184	1052964	-
W_185	1053433	-
W_186	1053623	-
W_190	1057893	-
W_191	1058077	-
W_192	1059276	-
W_194	1060261	-
W_196	1061419	-
W_197	1061516	-
W_199	1063782	-
W_200	1064366	-
W_202	-	H10134

In addition to the above, one UKHO record situated outside of the MHPGC Project PEIR Red Line Boundary has also been correlated with a geophysical anomaly:

W_017

W_017 (UKHO ID: 4536) represents an unknown non-dangerous wreck first detected in 1988 within a general water depth of 88m. It is described as well broken up and possibly mainly buried. Sonar dimensions are given as 34m long, 28m wide and a shadow height of 3.3m. W_017 has been correlated with high potential anomaly MEC25_070.

B.1.2 Table of all wrecks, obstructions and documented losses

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
Wreck and possible wreck records												
Records in green are those within Scottish waters. Records in blue are those in English waters inside 12nm and in white beyond 12nm.												
W_001	Unknown wreck	-	Non-dangerous unknown wreck first record in 1964 in a general water depth of 60m. No further details are record by the UKHO, which now lists this as a dead location.	-	56 38.71 N	1 3.59 W	3163	314248	-	-	-	UKHO
W_002	Unknown wreck	-	Non-dangerous unknown wreck first recorded in 1919 in a general water depth of 68m. The wreck is described as small and degraded, with sonar measurements of 32m long, 7m wide and a shadow height of 2.6m.	-	56 44.219 N	0 58.633 W	3168	322378	-	-	MOR23_052	UKHO
W_003	ANTON	Steam ship	The *Anton* (ex-*Newbiggin*; ex-*Castanos*, ex-*Ithaca*, ex-*Castanos*) was built in 1882 and sank on 06 June 1917. The ship was torpedoed by UC *77* whilst transporting coal. The wreck was first recorded in 1917 in a general water depth of 62m. As built dimensions are given as 78.9m long, 11m beam and a draught of 5.5m. No sonar measurements are recorded, and the UKHO now lists this as a dead location.	20th century	56 42.96 N	1 5.09 W	3169	322379/ 201619	-	-	-	UKHO
W_004	Unknown wreck	-	A non-dangerous wreck first detected in 1980 within a general water depth of 66m. Sonar dimensions are given as 78m long, 13m wide and a shadow height of 7.7m. It is described as being upright but collapsed and with the bow facing north.	-	56 46.151 N	1 12.882 W	3170	322380	-	-	-	UKHO
W_005	OCEANA	Fishing vessel	The *Oceana* was abandoned and left drifting on 23 October 1974. No other details are held by the UKHO. It	20th century	56 24.995 N	0 55.105 W	3194	322389	-	-	-	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			is categorised as a non-dangerous wreck.									
W_006	HMS ROCKINGHAM	Destroyer	Formerly the USS *Swasey* transferred to the Royal Navy in 1940 under the Lend-Lease agreement. Foundered after striking a mine on 27 September 1944. As built dimensions given as 94.8m long, 9.1m beam and draught of 3m. It is categorised as non-dangerous within a general water depth of 68m but is also listed as a dead location.	20th century	56 28.995 N	0 57.105 W	3197	322392 / 201808	-	-	-	UKHO
W_007	TITAN	Trawler	The *Titan* was sunk by a U-boat on 26 October 1916. The wreck is categorised as non-dangerous and within a general water depth of 69m but is listed as a dead location.	20th century	56 29.245 N	0 51.356 W	3198	322393 / 31403	-	-	-	UKHO
W_008	AILSA	Steam ship	The *Ailsa* was captured by a German submarine and scuttled on 18 June 1915. The wreck is categorised as non-dangerous within a general water depth of 67m.	20th century	56 36.244 N	0 36.359 W	3199	322394 / 325117	-	-	-	UKHO
W_009	VALIANT	Fishing vessel	The *Valiant* sank on 13 May 1992 in a general water depth of 67m. The wreck is described as being upright and intact, with sonar measurements of 23m long, 6m wide and a shadow height of 4.6m. It is categorised as non-dangerous.	20th century	56 33.902 N	0 58.162 W	3202	322397	-	-	-	UKHO
W_010	H C FLOOD (possibly)	Steam ship	A non-dangerous wreck, possibly representing the steam ship *H C Flood*. This ship was bult in 1917 and sunk on 15 December 1939. As built dimensions are given as 81.3m long, 12.8m beam and draught of 5.5m. The wreck is described as being upright and intact, and within a general water depth of 75m. Sonar dimensions are given as 90m long, 10m wide and a shadow height of 10m.	20th century	55 1.572 N	1 8.066 W	4266	-	1007486	-	-	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_011	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1988 in a general water depth of 76m. It is described as being probably on its side or inverted. Sonar dimensions are given as 60m long, 6m wide and a shadow height of 10.3m.	-	55 1.322 N	1 7.799 W	4267	323023	1010518	-	-	UKHO
W_012	JOHN M SMART (possibly)	Trawler	A non-dangerous wreck, possibly the trawler *John M. Smart*, sunk on 12 October 1917 by gunfire from German torpedo boats. The wreck sits in a general water depth of 82 m. It is described as being possibly in two pieces, with sonar measurements of 40m long, 10m wide and a shadow height of 5.9m.	20th century	55 2.239 N	1 6.366 W	4281	-	1034245 / 1025219	-	MEC25_022	UKHO
W_013	HANS HOTH (probably)	Steam ship	A non-dangerous wreck, possibly the German steam ship *Hans Hoth*. Sunk on 10 February 1952 when the cargo shifted whist on passage for Hamburg. The wreck is in a general water depth of 92m. The record describes a probable area of wreckage, with sonar dimensions of 48m long, 20m wide and a shadow height of 3.3m.	20th century	55 7.471 N	1 3.417 W	4328	-	1048080 / 1036171	-	MEC25_131	UKHO
W_014	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1974 in a general water depth of 88m. It is described as being upright and intact with sediment build up. Sonar dimensions are given as 51m long, 31m wide and a shadow height of 4.8m.	20th century	55 17.788 N	1 6.49 W	4350	322849	-	-	-	UKHO
W_015	SAN BERNADO	Steam ship	The *San Bernardo* was sunk by a German submarine on 09 August 1916. It is categorised as a non-dangerous wreck but is now listed as a dead location.	20th century	55 33.002 N	1 0.102 W	4384	322883	-	-	-	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_016	QUEST (probably)	Fishing vessel	An area of debris categorised as foul ground, probably representing the fishing vessel *Quest* which was lost on 04 August 1987. The debris is within a general water depth of 93m, and sonar dimensions are given as 14m long, 14m wide and a shadow height of 2.5m.	20th century	55 14.348 N	1 5.532 W	4521	323002	-	-	-	UKHO
W_017	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1988 within a general water depth of 88m. It is described as being well broken up and possibly mainly buried. Sonar dimensions are given as 34m long, 28m wide and a shadow height of 3.3m.	-	55 5.872 N	1 4.633 W	4536	-	-	-	MEC25_070	UKHO
W_018	TRIUMPH	Fishing vessel	The *Triumph* sank following collision with a drifting tree on 23 May 1993. It is within a general water depth of 88m. As built dimensions are given as 16.5m long, 5.2m wide and a draught of 2.1m. No sonar dimensions are given. This wreck is categorised as non-dangerous.	20th century	55 6.605 N	1 4.4 W	4551	-	-	-	-	UKHO
W_019	ANCANTHA	Trawler	The *Acantha* was sunk by a U-boat on 04 May 1915. It is categorised as non-dangerous and within a general water depth of 81m; however, it is now also listed as a dead location.	20th century	55 43.5 N	0 53.603 W	4627	-	-	-	-	UKHO
W_020	HELVETIA (possibly)	Trawler	Possibly represents the wreck of the trawler *Helvetia*, captured and scuttled by a German submarine on 08 January 1916. The wreck sits in a general water depth of 44m. It is described as apparently comprising two separate objects lying perpendicular to each other, with sonar dimensions of 10.2m long, 8.3m wide and a shadow height of 5.9m.	20th century	54 52.695 N	1 12.162 W	5658	-	1035511	H48768	MEC25_139	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_021	VIANNA (probably)	Steam ship	The *Vianna* was torpedoed and sunk by the German submarine UC *64* on 31 March 1918 whilst transporting coal. The wreck is described as being well broken up, within a general water depth of 36m. Sonar dimensions are given as 70m long, 10m wide and a shadow height of 6m. It is categorised as a dangerous wreck.	20th century	54 50.123 N	1 11.265 W	5660	-	1063481 / 1016992	H10063	-	UKHO
W_022	-	-	Borehole drilling equipment abandoned on the seabed by the National Coal Board. Originally detected in 1976. Sonar has provided a shadow height of 2.7m and the remains are within a general water depth of 41m.	20th century	54 50.498 N	1 10.615 W	5662	-	-	-	-	UKHO
W_023	VIANNA (possibly)	Steam ship	A dangerous wreck, possibly an alternative location for the *Vianna* (see above, W_021). The wreck sits in a general water depth of 30m. It is described as being well broken up, and with the bows pointing south. No sonar or built dimensions are listed on the UKHO record.	20th century	54 48.824 N	1 13.814 W	5663	-	1040786	-	MEC25_116	UKHO
W_024	CAMARTHEN COAST	Steam ship	The *Carmarthen Coast* (ex-*Nova*, ex-*Langfjord*) was built in 1921 and sunk on 09 November 1939. As-built dimensions are given as 64.7m long, 10.2m beam and a draught of 3.8m. The wreck is in a general water depth of 26m. Sonar dimensions are given as 70m long, 25m wide and a shadow height of 4.1m. It is categorised as a dangerous wreck.	20th century	54 50.879 N	1 15.4 W	5664	-	1019673 / 1050789	H283	MEC25_134 [MEC25_135 possibly associated debris]	UKHO
W_025	CAMARTHEN COAST (possibly)	Steam ship	A dangerous wreck, and a possible alternative location for *Carmarthen Coast*. The location provided is approximately 995m southwest of that given for record W_024, within a general water depth of 29m. This	20th century	54 51.318 N	1 14.867 W	5665	-	1038602	H48765	MEC25_136	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			wreck is described as lying on its starboard side, well broken up and with sonar dimensions of 40m long, 10m wide and a shadow height of 3.4m. However, the NMHR record suggests this to be the Vianna; formerly the Teal, whilst the HER record still lists this wreck as the Teal.									
W_026	Unknown wreck	-	An unknown wreck first detected in 1971 in a general water depth of 255m. No other details are recorded, and the UKHO no records this as a dead location.	-	54 51.407 N	1 13.998 W	5666	-	-	-	-	UKHO
W_027	RFA CREOSOL	Tanker	Built in 1918 as one of 18 built to a standard Admiralty design of harbour tanker. The RFA *Creosol* was torpedoed and sunk by the German submarine UC *17* on 07 February 1918. As built dimensions are given as 67.4m long, 10.7m beam and a draught of 4.6m. The wreck is described as being intact and upright, within a general water depth of 44m. Sonar dimensions are given as 85m long, 12m wide and a shadow height of 7.9m. The wreck of the RFA *Creosol* is designated under the Protection of Military Remains Act 1986 (Designation of Vessels and Controlled Sites) Order 2026.	20th century	54 52.24 N	1 11.915 W	5669	-	1008187	H50043	MEC25_137	UKHO
W_028	INTENT	Steam ship	The *Intent* was torpedoed and sunk by the German submarine UC *40* on 08 March 1918. The wreck is described as being well broken up and sits within a general water depth of 41m. Sonar dimensions are given as 84.9m long, 27.9m wide and a shadow height of 11.6m. It is categorised as a dangerous wreck.	20th century	54 52.35 N	1 13.057 W	5670	-	1003659	H50021	MEC25_138	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_029	Unknown wreck	-	An unknown possible wreck originally detected in 1971 in a general water depth of 38m. It is now listed as a dead location.	-	54 52.906 N	1 14.968 W	5671	-	-	-	-	UKHO
W_030	SAGA (possibly)	Steam ship	A non-dangerous wreck, possibly representing the steam ship *Saga*. The *Saga* was built in 1901 and sunk by UB *64* on 14 February 1918. It is described as well broken up but with clearly discernible features in a general water depth of 36m. Sonar dimensions are given as 75.8m long, 20.2m wide and a shadow height of 6.3m.	20th century	54 52.65 N	1 14.153 W	5672	-	1064068 / 1029490	H50027		UKHO
W_031	Unknown wreck	-	Possible wreck first detected in 1971 within a general water depth of 42m. This is now recorded as a dead location.	-	54 53.706 N	1 13.698 W	5676	-	-	-	-	UKHO
W_032	-	-	Borehole drilling equipment abandoned on seabed by the National Coal Board. This is categorised as foul ground.	20th century	54 53.756 N	1 10.498 W	5677	-	-	-	-	UKHO
W_033	HMS SNAEFELL (probably)	Paddle steamer	Ex-*Barry*, ex-*Barryfield*, ex-*Waverley*. Built in 1907 and bombed and sunk on 06 July 1941. As built dimensions given are 68.7m long and a draught of 8.1m (no beam provided). The wreck is described as being partly buried, within a general water depth of 50m. Sonar dimensions are given as 22m long, 5m wide and a shadow height of 2.8m. It is categorised as non-dangerous.	20th century	54 53.873 N	1 8.215 W	5679	-	1063328 / 1020648	-	-	UKHO
W_034	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1940 within a general water depth of 45m. The wreck is described as being intact, lying on one side and with the wheelhouse clearly visible. Sonar dimensions are given as 10.9m long,	-	54 53.991 N	1 12.211 W	5680	-	-	-	MEC25_140	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			4.3m wide and a shadow height of 6.7m.									
W_035	Unknown wreck	-	An unknown wreck first detected in 1971 within a general water depth of 42m. This is now recorded as a dead location.	-	54 54.006 N	1 14.098 W	5681	-	-	-	-	UKHO
W_036	Unknown wreck	-	An unknown wreck first detected in 1971 within a general water depth of 44m. This is now recorded as a dead location.	-	54 54.406 N	1 13.598 W	5685	-	-	-	-	UKHO
W_037	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1974 within a general water depth of 48m. No other details are recorded by the UKHO.	-	54 54.906 N	1 10.398 W	5690	-	-	-	-	UKHO
W_038	Unknown wreck	-	An unknown wreck first detected in 1971 within a general water depth of 48m. This is now recorded as a dead location.	-	54 55.256 N	1 12.798 W	5705	-	-	-	-	UKHO
W_039	HOGARTH	Steam ship	The *Hogarth* was built in 1893 and was sunk on 07 June 1918 after being mined whilst transporting general and mixed goods. As built dimensions are given as 77m long, 9.9m beam and a draught of 5.3m. The wreck is described as being broken in two within a general water depth of 4m. Sonar dimensions are given as 70m long, 10m wide and a shadow height of 8.5m. It is categorised as non-dangerous.	20th century	54 55.44 N	1 9.915 W	5708	-	1017394 / 1053894	H50030 Record at same location but lists as *Zeeland*.	MEC25_053 [MEC25_057 possibly associated debris]	UKHO
W_040	ZEELAND	Steam ship	A non-dangerous wreck, possibly that of the steam ship *Zealand* sunk on 01 August 1918. As built dimensions are given as 70.4m long, 10.4m beam and draught of 4.6m. The wreck is described as being probably on its side and is within a general water depth of 51m. Sonar dimensions are given as 92m long,	20th century	54 56.223 N	1 9.782 W	5720	-	1056177 / 1060153	-	MEC25_052	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			10m wide and a shadow height of 9.4m. It is categorised as non-dangerous.									
W_041	STAG 5 (probably)	Tug	A non-dangerous wreck probably representing the tug *Stag 5* (ex-*Welington*). The boat was built in 1897 and sunk on 11 February 1950. As built dimensions are given as 28m long, 6.1m beam and a draught of 3.2m. The wreck is described as being probably partially buried, within a general water depth of 50m. Sonar dimensions are given as 34m long, 5m wide and a shadow height of 8.6m.	20th century	54 56.256 N	1 10.882 W	5721	-	1010931 / 1037188	-	-	UKHO
W_042	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1971 within a general water depth of 52m. The wreck is described as angular shaped, possibly latticed construction. Sonar dimensions are given as 20m long, 6m wide and a shadow height of 1.4m.	-	54 56.623 N	1 10.315 W	5729	-	1009195	-	-	UKHO
W_043	GRIT	Motor vessel	Built in 1934 and sunk on 05 November 1943 whilst transporting grain. As built dimensions are given as 35.7m long, 8.2m beam and a draught of 2.7m. The wreck is described as intact, within a general water depth of 53m. Sonar dimensions are given as 50m long, 8m wide and a shadow height of 6.9m. It is categorised as non-dangerous.	20th century	54 57.939 N	1 10.482 W	5736	-	1007601 / 1060258	-	-	UKHO
W_044	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1962 within a general water depth of 57m. The wreck is described as being possibly on its side, but no other details are recorded by the UKHO.	-	54 58.206 N	1 8.366 W	5737	-	1052376	-	MEC25_132	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_045	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1972 within a general water depth of 56m. The wreck is described as being intact and has sonar dimensions of 40m long, 6m wide and a shadow height of 4.9m.	-	54 58.689 N	1 9.249 W	5750	-	1025086	-	-	UKHO
W_046	JENNY M (possibly)	Fishing vessel	A non-dangerous wreck possibly representing the fishing vessel *Jenny M.* The boat sank on 06 September 1983. The record describes possible wreckage within a general water depth of 45m. Sonar dimensions are given as 8.8m long, 4.4m wide and a shadow height of 2.8m.	20th century	54 54.1 N	1 12.869 W	5769	-	-	-	-	UKHO
W_047	THE STEWARTS COURT (probably)	Steam ship	A dangerous wreck, possibly representing the steam ship *The Stewarts Court.* Built in 1909, the ship was sunk on 21 January 1918. As built dimensions are given as 61m long, 9.1m beam and a draught of 3.7m. The wreck is described as being well broken up, with the bows pointing northwest. The boiler is described as the highest point of the wreck. It is within a general water depth of 19m, and sonar dimensions are given as 74m long, 8m wide and a shadow height of 4.2m.	20th century	54 47.771 N	1 15.181 W	5783	-	1050119	H276	-	UKHO
W_048	TEAL (probably)	Steam ship	The *Teal* was built in 1876 and was sunk on 29 April 1916 whilst transporting general and mixed goods. The dimensions of the ship as built are given as 67.1m long, 8.7m beam and a draught of 4.5m. The wreck is described as being mainly collapsed, but with the stern remaining intact although inverted. The wreck is within a general water depth of 27m. Sonar dimensions are given as 50m long, 7m wide and a	20th century	54 49.524 N	1 14.231 W	5785	-	1053210 / 1054362	-	MEC25_115	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			shadow height of 4.5m. It is categorised as dangerous (see also W_061 below).									
W_049	THAMES (probably)	Steam ship	A non-dangerous wreck, possibly representing the steam ship *Thames*. The ship was built in 1887 and sunk on 26 May 1918. As built dimensions are given as 85.2m long, 9.5m beam and a draught of 4.7m. The wreck is described as being in two parts, with the bow facing west and within a general water depth of 41m. Sonar dimensions are given as 68m long, 11m wide and a shadow height of 5.5m.	20th century	54 50.407 N	1 10.631 W	5788	-	1062933	H48764	-	UKHO
W_050	DENHAM (probably)	Steam ship	A non-dangerous wreck, possibly representing the steam ship *Denham*. The ship was built of iron in 1878 and sunk on 22 February 1894. As built dimensions are given as 64m long, 9.2m beam and a draught of 4.9m. The wreck is described as being probably partially buried, within a general water depth of 48m. Sonar dimensions are given as 64m long, 20m wide and a shadow height of 1.1m..	19th century	54 53.423 N	1 8.649 W	5789	-	1010644	-	-	UKHO
W_051	CLARE (possibly)	Steam ship.	A non-dangerous wreck, possibly representing the steam ship *Clare*. The ship was sunk in 1939. The wreck is described as being intact, within a general water depth of 51m. Sonar dimensions are given as 60m long, 5m wide and a shadow height of 6.5m.	20th century	54 54.24 N	1 8.165 W	5795	-	1036610 / 1037977	-	-	UKHO
W_052	-	-	An obstruction caused by a sewage diffuser first detected in 1998. This is within a general water depth of 14m. Sonar dimensions are given as 115.7m long, 20.7m wide and a shadow height of 4.5m.	20th century	54 49.044 N	1 17.819 W	57068	-	-	-	-	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_053	LOCH-NA-GAR (probably)	Barge	A non-dangerous wreck, probably representing the iron barque barge *Loch-Na-Gar*. The barge was built in 1861 and sank on 14 December 1901. As built dimensions are given as 49.1m long, 7.9m beam and a draught of 4.2m. The wreck is described as being intact, but well buried and netted. The engine is described as the highest point of the wreck, which is within a general water depth of 26m. Sonar dimensions are given as 25m long, 20m wide and a shadow height of 2.2m.	20th century	54 51.35 N	1 15.712 W	57069	-	1008519 / 1021877	-	-	UKHO
W_054	-	Tug	Unnamed tug pulled under on 11 February 1950 whilst assisting the SS *City of Manchester* in a gale. The wreck is described as steal hulled, fully intact and upright, except for the funnel which is missing. It is within a general water depth of 54m. It is categorised as a non-dangerous wreck.	20th century	54 53.526 N	1 8.169 W	57829	-	-	-	-	UKHO
W_055	ADA JEAN (possibly)	Fishing vessel	A non-dangerous wreck, possibly representing the *Ada Jean*. The boat sank on 22 September 1978. The wreck is described as being intact, with nets floating above the wreck, which is within a general water depth of 91m. Sonar dimensions are given as 25m long, 12m wide and a shadow height of 5.7m.	20th century	55 18.947 N	1 2.812 W	57876	323715	-	-		UKHO
W_056	Unknown wreck	-	An unknown non-dangerous wreck first detected in 1999 within a general water depth of 82m. The wreck is described as being intact, upright and showing a mast or attached trawl. The bows are facing northwest. Sonar dimensions are given as 46m long, 5.6m wide and a shadow height of 5.6m.	-	53 37.79 N	0 55.871 W	58007	323738	-	-	MEC25_005	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_057	Unknown wreck	-	An unknown non-dangerous wreck in a general water depth of 95m. It is described as being intact, upright with an intact mast and bows pointing southeast. Sonar dimensions are given as 38m long, 6m wide and a shadow height of 8m.	-	55 25.132 N	1 0.987 W	58015	323743	-	-	-	UKHO
W_058	BLUE DAWN	Fishing vessel	Non-dangerous wreck of the fishing vessel *Blue Dawn* reported sinking on 13 February 2004. No other details are recorded by the UKHO.	21st century	54 55 N	1 11 W	64121	-	-	-	-	UKHO
W_059	-	-	Fisherman's fastener comprising a discarded co-axial cable. This record is categorised as foul ground; but is also listed as a dead location.	-	55 7.72 N	1 4.64 W	65597	-	-	-	-	UKHO
W_060	Unknown wreck	-	An unknown non-dangerous wreck first detected in 2005 within a general water depth of 84m. The wreck is described as being intact, with sonar dimensions given as 58m long, 20m wide and a shadow height of 2.2m.	-	55 40.56 N	0 54.816 W	65635	324103	-	-	MEC25_054	UKHO
W_061	TEAL	Steam ship	The reported location of the sinking of the *Teal* (see above, record W_048). It is categorised as non-dangerous, within a general water depth of 21m, but is also now listed as a dead location.	20th century	54 50.007 N	1 15.597 W	66531	-	-	-	MEC25_133	UKHO
W_062	Unknown wreck	-	An unknown non-dangerous wreck first detected in 2007 in a general water depth of 67m. The wreck is described as being small and upright, with sonar dimensions given as 32m long, 8m wide and a shadow height of 3.1m.	-	56 38.111 N	0 56.738 W	70419	324310	-	-	MOR23_015	UKHO
W_063	Unknown wreck	-	An unknown non-dangerous wreck first detected in 2007 within a general water depth of 69m. The wreck is described as being upright and intact, with bows facing	-	56 47.771 N	0 58.942 W	70421	324312	-	-	MOR23_071	UKHO

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			northeast. Sonar dimensions are given as 70m long, 13m wide and a shadow height of 8.6m.									
W_064	Unknown wreck	-	An unknown non-dangerous wreck first detected in 2009 within a general water depth of 67m. The wreck is described as being upright and intact, with the bows facing east-northeast. Sonar dimensions are given as 26m long, 9m wide and a shadow height of 1.5m.	-	56 51.332 N	1 8.105 W	75090	324516	-	-	MOR23_054	UKHO
W_065	-	-	A discarded anchor and chain originally detected in 2017 within a general water depth of 21m. This is categorised by the UKHO as foul ground.	-	54 50.56 N	1 15.34 W	87132	-	-	-	-	UKHO
W_066	-	-	Cylindrical shaped feature of possible anthropogenic origin. First detected in 2018. Sonar dimensions are given as 5.4m long,4.9m wide and a shadow height of 3.3m.	-	54 48.198 N	1 18.638 W	89474	-	-	-		UKHO
W_067	U 40 (possibly)	Submarine	Tentatively accepted be the location of a submarine wreck based on a chart symbol. Trove speculates this to be an alternative location for the German submarine U *40* sunk 23 June 1915; however, the UKHO has this wreck some 71km northwest of this location (UKHO ID: 2215; outside of the Marine and Intertidal Archaeology Study Area).	20th century	56 34.00 N	0 58.00 W	-	298174	-	-	-	Trove
W_068	-	-	Record originates from a chart wreck symbol near this position. Date of loss given only as 1862.	19th century	56 5.00 N	1 0.00 W	-	315767	-	-	-	Trove
W_069	LONCLARA (ex-(PLA HOPPER 20))	Hopper Barge	Data uses name PLA HOPPER 20, but record is for the LONCLARA, which confirms the barge was converted to carry cargo and renamed LONCLARA. Built in 1911 and sunk by a mine in 1917.	20th century	54.90045 N	1.1738 W	(57064)	-	1026687	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			This record apparently derives from UKHO record 57064 which is located *c.* 6.3km to the west (outside of the Marine and Intertidal Archaeology Study Area). This suggests the wrong location has been entered and that no wreck remains pertaining to this vessel are at the NMHR location.									
W_070	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52580	46350	-	-	100139	H10036	-	NMHR
W_071	-	-	Possible wreck. Fisherman's fastener.	-	50540	50000	-	-	1005291	H10027	-	NMHR
W_072	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	48880	52580	-	-	1005833 / 1062891	H10019	-	NMHR
W_073	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50550	51890	-	-	1006684 / 1034242	H10031	-	NMHR
W_074	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52050	46030	-	-	1066845	H10029	-	NMHR
W_075	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50860	51670	-	-	1007939	H10279	-	NMHR
W_076	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51200	45280	-	-	1009182	H10015	-	NMHR
W_077	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49860	51530	-	-	1014409	H10025	-	NMHR
W_078	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	47860	46690	-	-	1016448	H10006	-	NMHR
W_079	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51150	45040	-	-	1021275	H10013	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_080	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50450	45640	-	-	1024880	H10011	-	NMHR
W_081	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51130	50970	-	-	1026100	H10056	-	NMHR
W_082	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	48880	52584	-	-	1028054 / 1036099	-	-	NMHR
W_083	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51260	45090	-	-	1028610	H10017	-	NMHR
W_084	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50950	51490	-	-	1029364	H10055	-	NMHR
W_085	-	-	Possible wreck. Fisherman's fastener.	-	50500	50060	-	-	1030497	H10026	-	NMHR
W_086	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52960	50990	-	-	1031696	H10079	-	NHMR
W_087	-	-	Possible wreck. Fisherman's fastener.	-	49460	52180	-	-	1032723	H10020	-	NMHR
W_088	-	-	Possible wreck. Fisherman's fastener.	-	52430	52400	-	-	1037339	H10078	-	NMHR
W_089	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51290	52330	-	-	1044222 / 1037333	H10065	-	NMHR
W_090	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52740	50340	-	-	1044649 / 1047562	-	-	NMHR
W_091	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52020	49280	-	-	1046203	H10059	-	NMHR
W_092	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51240	44910	-	-	1046337	H10014	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_093	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50690	52040	-	-	1048975 / 1010779	H10037	-	NMHR
W_094	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51520	46360	-	-	1052103	H10024	-	NMHR
W_095	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52260	48780	-	-	1054970	H10061	-	NMHR
W_096	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51040	45130	-	-	1056057	H10012	-	NMHR
W_097	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51210	45220	-	-	1058156	H10016	-	NMHR
W_098	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52840	48020	-	-	1058628	H10066	-	NMHR
W_099	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49960	52090	-	-	1059133 / 1024216	H10028	-	NMHR
W_100	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50730	51620	-	-	1060116	H10035	-	NMHR
W_101	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	45770	46850	-	-	1061850	H10002	-	NMHR
W_102	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50570	51480	-	-	1062042	H10030	-	NMHR
W_103	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49994	53431	-	-	100486	-	-	NMHR
W_104	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52705	56336	-	-	1001158	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_105	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49101	55214	-	-	1002178	-	-	NMHR
W_106	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	58847	78268	-	-	1002422	-	-	NMHR
W_107	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53010	63697	-	-	1003234	-	-	NMHR
W_108	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	55584	56897	-	-	1003596	-	-	NMHR
W_109	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50155	56555	-	-	1004508	-	-	NMHR
W_110	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	56582	66677	-	-	100704	-	-	NMHR
W_111	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	58553	69577	-	-	1007182	-	-	NMHR
W_112	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54735	56392	-	-	1007571	-	-	NMHR
W_113	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	55110	56303	-	-	1007615	-	-	NMHR
W_114	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50989	53720	-	-	1007624	-	-	NMHR
W_115	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	57032	77378	-	-	1008282	-	-	NMHR
W_116	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51567	60836	-	-	1008406	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_117	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52339	58681	-	-	1009512	-	-	NMHR
W_118	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49850	52030	-	-	1010062	-	-	NMHR
W_119	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54389	57005	-	-	1010571	-	-	NMHR
W_120	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53910	56876	-	-	1011114	-	-	NMHR
W_121	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51200	54001	-	-	1012663	-	-	NMHR
W_122	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53391	61538	-	-	1012928	-	-	NMHR
W_123	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52970	56556	-	-	1015069	-	-	NMHR
W_124	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53635	57522	-	-	1015409	-	-	NMHR
W_125	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49286	54628	-	-	1015696	-	-	NMHR
W_126	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53855	59936	-	-	1015766	-	-	NMHR
W_127	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	57975	79833	-	-	1016030	-	-	NMHR
W_128	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52193	60565	-	-	1016431	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_129	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	58351	66020	-	-	1016473	-	-	NMHR
W_130	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50579	53716	-	-	1016741	-	-	NMHR
W_131	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52252	53889	-	-	1017293	-	-	NMHR
W_132	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52791	56616	-	-	1017475	-	-	NMHR
W_133	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49418	53919	-	-	1019366	-	-	NMHR
W_134	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53323	59775	-	-	1019607	-	-	NMHR
W_135	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54637	57132	-	-	1020574	-	-	NMHR
W_136	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49563	53766	-	-	1020684	-	-	NMHR
W_137	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	48881	55799	-	-	1021165	-	-	NMHR
W_138	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49506	57289	-	-	1022139	-	-	NMHR
W_139	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51162	54217	-	-	1022152	-	-	NMHR
W_140	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	56825	76974	-	-	1022982	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_141	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	59106	76107	-	-	1023697	-	-	NMHR
W_142	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	59106	76107	-	-	1023697	-	-	NMHR
W_143	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53804	55268	-	-	1024398	-	-	NMHR
W_144	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53352	55819	-	-	1024978	-	-	NMHR
W_145	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53545	59097	-	-	1026177	-	-	NMHR
W_146	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52106	58802	-	-	1027830	-	-	NMHR
W_147	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51264	53012	-	-	1031062	-	-	NMHR
W_148	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53125	61473	-	-	1031228	-	-	NMHR
W_149	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50287	52723	-	-	1031370	-	-	NMHR
W_150	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	58247	68522	-	-	1031522	-	-	NMHR
W_151	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51147	53969	-	-	1031785	-	-	NMHR
W_152	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53084	55908	-	-	1032333	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_153	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	55151	55902	-	-	1034513	-	-	NMHR
W_154	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51673	60899	-	-	1036980	-	-	NMHR
W_155	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52361	58373	-	-	1037046	-	-	NMHR
W_156	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	48846	55706	-	-	1037319	-	-	NMHR
W_157	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51362	60061	-	-	1037521	-	-	NMHR
W_158	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50033	53153	-	-	1039764	-	-	NMHR
W_159	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52752	59923	-	-	1040217	-	-	NMHR
W_160	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53440	58942	-	-	1040632	-	-	NMHR
W_161	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51202	55361	-	-	1041367	-	-	NMHR
W_162	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51454	56693	-	-	1041594	-	-	NMHR
W_163	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49609	54416	-	-	1042382	-	-	NMHR
W_164	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	55716	69139	-	-	1042989	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_165	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53542	59345	-	-	1043885	-	-	NMHR
W_166	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51797	60963	-	-	1044026	-	-	NMHR
W_167	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54837	55311	-	-	1044177	-	-	NMHR
W_168	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	57960	79647	-	-	1044206	-	-	NMHR
W_169	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50013	56491	-	-	1044960	-	-	NMHR
W_170	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50369	53373	-	-	1045113	-	-	NMHR
W_171	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54536	59604	-	-	1046156	-	-	NMHR
W_172	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	56296	71063	-	-	1046339	-	-	NMHR
W_173	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49785	57787	-	-	1046418	-	-	NMHR
W_174	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	59145	85196	-	-	1046616	-	-	NMHR
W_175	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53311	57796	-	-	1046718	-	-	NMHR
W_176	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49612	54107	-	-	1046950	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_177	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52740	50340	-	-	1047562	-	-	NMHR
W_178	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	58873	72240	-	-	1048049	-	-	NMHR
W_179	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52440	60723	-	-	1048322	-	-	NMHR
W_180	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52773	58130	-	-	1049119	-	-	NMHR
W_181	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51578	56787	-	-	1050674	-	-	NMHR
W_182	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	78979	54996	-	-	1052047	-	-	NMHR
W_183	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54776	71387	-	-	1052178	-	-	NMHR
W_184	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53294	59280	-	-	1052964	-	-	NMHR
W_185	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53357	59961	-	-	1053433	-	-	NMHR
W_186	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49740	53861	-	-	1053623	-	-	NMHR
W_187	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	58672	68621	-	-	1054221	-	-	NMHR
W_188	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	49995	56553	-	-	1054933	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_189	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	54560	56111	-	-	1055763	-	-	NMHR
W_190	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53635	60520	-	-	1057893	-	-	NMHR
W_191	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51514	56075	-	-	1058077	-	-	NMHR
W_192	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	52528	57756	-	-	1059276	-	-	NMHR
W_193	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	48877	56200	-	-	1059859	-	-	NMHR
W_194	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51377	54096	-	-	1060261	-	-	NMHR
W_195	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	53635	56069	-	-	1060840	-	-	NMHR
W_196	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51703	56696	-	-	1061419	-	-	NMHR
W_197	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50610	54118	-	-	1061516	-	-	NMHR
W_198	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	51389	60803	-	-	1063430	-	-	NMHR
W_199	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50297	53403	-	-	1063782	-	-	NMHR
W_200	-	-	Unidentified obstruction reported by fisherman, possibly indicative of wreckage or submerged feature.	-	50789	54089	-	-	1064366	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
W_201	-	-	Unidentified maritime obstruction.	-	54 48.00 N	1 48.00 W	-	-	-	H10088	-	HER
W_202	-	-	Unidentified maritime obstruction.	-	54 52.00 N	1 14.00 W	-	-	-	H10134	-	HER
W_203	-	-	Unidentified maritime obstruction.	-	54 50.00 N	1 10.00 W	-	-	-	H10135	-	HER
W_204	Unknown	Tug	The site of a large metal cylinder which is visible at low tide, approximately 50m offshore. It is thought to be the boiler of a tug used to remove the *West Hiker* which was shipwrecked in the 1930s.	-	44450	54650	-	-	-	H3854	-	HER
Documented maritime and aviation loss records (with no correlating wreck, possible wreck or obstruction record)												
	WHITWORTH WHITLEY MK V	Bomber	Night bomber, ditched 29 July 1942 returning from a raid on Hamburg.	20th century	NZ 53410	58320	-	-	1049763	-	-	NMHR
	BLENHEIM MK IV V5526	Bomber	Light bomber, ditched 17 April 1941 after engine cut out whilst on convoy escort duty.	20th century	NZ 52290	62950	-	-	1062730	-	-	NMHR
	LOCKHEED HUDSON Mk I N7284	Bomber	Coastal Command reconnaissance aircraft; crashed 19 November 1939.	20th century	NZ 43880	49320	-	-	1023501	-	-	NMHR
	DO217	Bomber	German heavy bomber shot down 16 October 1942.	20th century	NZ 53410	58320	-	-	1038272	-	-	NMHR
	HE111	Bomber	German bomber crashed into the sea 15 August 1940.	20th century	NZ 43880	79320	-	-	1027205	-	-	NMHR
	JUNKERS JU88 (144146) 3X+CB	Bomber	German aircraft shot down 28 November 1942.	20th century	NZ 53410	58320	-	-	1012361	-	-	NMHR
	HURRICANE Mk I W9147	Fighter	RAF fighter ditched 18 September 1941.	20th century	NZ 53410	58320	-	-	1021522	-	-	NMHR
	ME110D	Fighter-bomber	German fighter/bomber. Shot down 15 August 1940.	20th century	NZ 43880	49320	-	-	1011356	-	-	NMHR
	HE111	Bomber	German bomber shot down 15 August 1940.	20th century	NZ 43880	49320	-	-	1015423	-	-	NMHR
	HE111	Bomber	German bomber shot down 15 August 1940.	20th century	NZ 43880	49320	-	-	1027553	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	HE111	Bomber	German bomber shot down off Seaham 15 August 1940. No trace found by lifeboat.	20th century	54 50.00 N	1 19.00 W	-	-	-	H10254	-	HER
	Unknown	Bomber	Unknown German bomber shot down near Seaham 15 August 1940. No trace found by lifeboat (possibly duplication of H10255 but NMHR also has other German bombers shot down on this day)	20th century	54 50.00 N	1 19.00 W	-	-	-	H10255	-	HER
	BOSPHEROUS	Steam trawler	Iron hulled steam trawler built in 1884. As built dimensions given as 34m long, 6m beam and draught of 3m. Foundered. Date of loss cited as 5 May 1905.	20th century	56 47.00 N	1 16.695 W	-	200463	-	-	-	Trove
	FELIX	Brig	Abandoned. Date of loss cited as 8 March 1854.	19th century	56 05.00 N	1 00.00 W	-	249555	-	-	-	Trove
	COMPETITOR	Schooner	Wooden hulled schooner built in 1845. Abandoned 70 miles east of Montrose whilst transporting wheat. Date of loss cited as 28 November 1852.	19th century	56 49.180 N	0 75.106 W	-	248583	-	-	-	Trove
	ZOUAVE	Steam ship	Iron hulled steam ship built in 1855. As built dimensions given as 51m long, and beam 8m. Lost to a collision. Date of loss cited as 10 August 1857.	19th century	56 05.00 N	1 00.00 W	-	273841	-	-	-	Trove
	STANDARD	Steam trawler	Steel hulled steam trawler built in 1899. As built dimensions given as 33m long, 6m beam and draught of 3m. Sank 20 miles east of May Island. Date of loss cited as 22 March 1922.	20th century	56 20.00 N	1 00.00 W	-	307481	-	-	-	Trove
	MARY FELKER	-	Foundered 50 miles east of May Island with a cargo of herring. Date of loss cited only as September 1865.	19th century	56 10.00 N	1 00.00 W	-	315784	-	-	-	Trove
	Unknown 1920	-	Floating wreckage observed at this location on 08 February 1920.	20th century	56 34.00 N	3 5.00 W	-	327606	-	-	-	Trove

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	Unknown 1920	-	Derelict seen floating northeast of the Firth of Forth on 19 July 1920.	20th century	56 40.00 N	1 00.00 W	-	324917	-	-	-	Trove
	HOPE	-	Abandoned east of May Island whilst transporting a cargo of oats and wheat. Date of loss cited as 04 January 1801	19th century	56 10.00 N	1 00.00 W	-	329213	-	-	-	Trove
	ELFI	Steam ship	The *Elfie* (ex-*Johanna*) was built in 1908 and torpedoed by the German submarine *UC*-17. Date of loss cited as 7 February 1918.	20th century	NZ 5	5	-	-	1039963	-	-	NMHR
	LADY	Armed trawler	Steam driven; date of loss cited as 3 September 1916. No circumstances of loss described.	20th century	NZ 5	5	-	-	1056075	-	-	NMHR
	SEVERN	Sailing vessel	Wooden hulled sailing vessel stranded between Sunderland Pier and Hendon Dean. Date of loss cited only as 1830.	19th century	NZ 5	5	-	-	1034156	-	-	NMHR
	ADONA	Sailing vessel	Wrecked south of Seaham. Date of loss cited as 28 May 1860.	19th century	54 00.00 N	1 19.00 W	-	-	1023808	H10044	-	HER
	ALCOR	Schooner	Russian schooner. Wrecked 0.5 miles south of Noses Point. Date of loss cited as 12 November 1901.	20th century	54 00.00 N	1 19.00 W	-	-	1019973	H6569 / H10130	-	HER
	ALICE	Sloop	Built in 1872 and lost due to weather conditions. Date of loss cited as 5 May 1872.	19th century	NZ 4	4	-	-	1047922	-	-	NMHR
	ANN	Sailing vessel	Stranded near Dawdon Field House. Date of loss cited as 4 November 1821.	19th century	NZ 4	4	-	-	1004052	-	-	NMHR
	ANN	Sailing vessel	Ran ashore 3 miles south of Sunderland. Date of loss cited as 15 October 1829.	19th century	54 00.00 N	1 19.00 W	-	-	1010717	H10286	-	HER
	ANN AND MARY	Schooner	Built in 1820. Foundered. Date of loss cited as 02 November 1861.	19th century	NZ 5	6	-	-	1057243	-	-	NMHR
	ARCANA	Sailing vessel	Built in 1869. Date of loss cited only as 1871.	19th century	54 00.00 N	1 19.00 W	-	-	1028512	H10256	-	HER

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	ASIA	Steam tug	Foundered off Seaham Harbour following a collision. Date of loss cited as 26 April 1887.	19th century	54 00.00 N	1 19.00 W	-	-	1031118	H10298	-	HER
	ATLANTIC	Steam ship	Ex-Horace (mistakenly given as primary name on GIS record). Russian cargo vessel built in 1887 and foundered following a collision with the steamer *Twizell*. Date of loss cited as 17 September 1902.	20th century	NZ 5	6	-	-	1016757	-	-	NMHR
	AURORA	Collier	Stranded near Seaham during a gale. Date of loss cited as 11 October 1824.	19th century	NZ 4	4	-	-	1051062	-	-	NMHR
	BAMBRO CASTLE	Trawler	Built in 1897, the vessel foundered following a condition with the SS *Tiger*. Date of loss cited as 30 May 1906.	20th century	NZ 5	6	-	-	1029779	-	-	NMHR
	BEAVER	Sailing vessel	Wooden hulled vessel foundered off Sunderland carrying a cargo of timber. Date of loss cited as 24 December 1818.	19th century	NZ 5	5	-	-	1039162	-	-	NMHR
	BELMONT	Steam tug	Built in 1861. Foundered after colliding with the SS *New Pelton*. Date of loss cited as 11 September 1884.	19th century	NZ 5	6	-	-	1026332	-	-	NMHR
	BETSEY	Sloop	Wooden sailing vessel that sprung a leak and foundered off Sunderland laden with cool. Date of loss cited as 16 March 1791.	18th century	NZ 5	5	-	-	1050327	-	-	NMHR
	BLACK BIRD	Fishing vessel	Date of loss cited as 15 August 1910. No further details held.	20th century	NZ 5	5	-	-	1058302	-	-	NMHR
	BLOSSOM	Schooner	Built in 1848, the vessel developed a heavy leak and sank. Date of loss cited as 02 January 1857.	19th century	NZ 5	5	-	-	1015033	-	-	NMHR
	BOVIC	Trawler (RN hired and operated)	Built in 1896, the trawler was lost after a collision of Souter Point. Date of loss given as 05 August 1917.	20th century	NX 5	6	-	-	1060582	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	BOZ	Schooner	Cargo vessel built in 1841. Date of loss cited as 01 November 1861.	19th century	NZ 4	4	-	-	1013599	-	-	NMHR
	BRITISH ENSIGN	Brig	Wooden vessel built in 1857 and lost in stormy conditions. Date of loss cited as 28 October 1880.	19th century	NZ 4	5	-	-	1054563	-	-	NMHR
	CATHERINE	Sailing vessel	Wrecked at Seaham Harbour. Date of loss cited as 10 October 1865.	19th century	54 50.00 N	1 19.00 W	-	-	1022835	H10046	-	HER
	CHALLENGE	Lugger	Foundered whilst fishing following a collision with the SS *Bucentaur*. Date of loss cited as 21 November 1897.	19th century	NZ 5	5	-	-	1009979	-	-	NMHR
	CHARTER	Sailing vessel	Date of loss cited as 28 May 1860. No other details provided.	19th century	54 50.00 N	1 19.00 W	-	-	1050750	H10043	-	NMHR
	CHARTER	Schooner	Bult in 1861, the vessel thought to have foundered in heavy weather. Date of loss cited only as 1867.	19th century	NZ 5	6	-	-	1016244	-	-	NMHR
	CLEMATIS	Steam ship	Built in 1884, the *Clematis* foundered after colliding with the cargo vessel *Beamish* 6 miles SSE of Souter Point. Date of loss cited as 18 April 1894.	19th century	NZ 5	5	-	-	1041838	-	-	NMHR
	CONQUEROR	Sailing vessel	Built in 1818, the vessel was wrecked at Seaham. Date of loss cited as 09 December 1874.	19th century	54 50.00 N	1 19.00 W	-	-	1003197	H10049	-	HER
	CORDOVA	Barque	Iron sailing vessel that foundered whilst transporting coal after a collision. Date of loss cited as 03 May 1893.	19th century	NZ 5	5	-	-	1039721	-	-	NMHR
	CORNELIUS	Sailing vessel	Wrecked south of Seaham. Date of loss cited as 28 May 1860.	19th century	54 50.00 N	1 19.00 W	-	-	1052894	H10042	-	NMHR
	COUNTESS VANE	Steam tug	Built in 1901, the tug broke away from its moorings and was wrecked ashore. Date of loss cited as 28 November 1901.	20th century	NZ 4	4	-	-	1046733	-	-	NMHR
	D	Barge	Built in 1862, the barge foundered whilst under tow. Date of loss cited as 17 November 1892.	19th century	NZ 5	5	-	-	1013222	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	DENHAM	Steam ship	Cargo vessel built in 1878. Foundered following a collision with the SS *Rolf* whilst transporting coal. Possibly the same ship referred to by W_050 as suggested by the record; however, that wreck site is *c.* 3.2km to the southeast and a different date of loss is cited (although construction year is the same).	19th century	NZ 5	5	-	-	1007932	-	-	NMHR
	DEVONIA	Steam tug	Bult in 1885 and became stranded. Date of loss cited as 28 September 1907.	20th century	NZ 4	4	-	-	1018689	-	-	NMHR
	DINA HENDERIKA	Schooner	Sailing vessel constructed in 1909 and sunk whilst transporting coal by the Germn submarine *UC*-62. Date of loss cited as 12 April 1917.	20th century	NZ 5	6	-	-	1063169	-	-	NMHR
	DON QUIXOTE	Brig	German sailing brig built in 1842 and forced aground. Date of loss cited as 04 January 1857.	19th century	NZ 4	4	-	-	1060771	-	-	NMHR
	DOVE	Sailing vessel	Foundered near Sunderland. Date of loss cited as 11 February 1794.	18th century	NZ 5	5	-	-	1043904	-	-	NMHR
	DURHAM PACKET	Brig	Channel Island brig built in 1857 and foundered in poor weather. Date of loss cited as 17 February 1881.	19th century	NZ 4	4	-	-	1001826	-	-	NMHR
	EARL OF DUMFRIES	Steam tug	Built in 1886, the earl of Dumfries was lost after suffering a boiler explosion. Date of loss cited as 30 June 1904.	20th century	NZ 4	4	-	-	1019247	-	-	NMHR
	EDWARD AND JAMES	Fishing vessel	Foundered after colliding with the *Zephyr*. Date of loss cited as 18 December 1867.	19th century	NZ 5	5	-	-	1017769	-	-	NMHR
	ELIZA	Brig	Built in 1834, the *Eliza* sprang an uncontrollable leak and was abandoned, presumed sunk. Date of loss cited as 26 October 1859.	19th century	NZ 4	4	-	-	1051659	-	-	NMHR
	ELIZA ANN	Schooner	Wooden sailing vessel that foundered following a collision. Date of loss cited as 18 March 1864.	19th century	NZ 5	5	-	-	1064097	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	EMILY	Brig or snow	Sailing vessel built in 1849 and sank after its ballast shifted in rough weather. Date of loss cited as 04 January 1857.	19th century	NZ 4	4	-	-	1029217	-	-	NMHR
	ENA / GAEA	Schooner	Danish sailing vessel foundered after being mined. Date of loss cited as 27 August 1914. The record lists contradictory information regarding the name of the vessel.	20th century	NZ 5	6	-	-	1021071	-	-	NMHR
	ESTREMADURA	Schooner	Foundered after colliding with the SS *Northumberland*. Date of loss cited as 26 October 1892.	19th century	NZ 5	5	-	-	1001838	-	-	NMHR
	EUROPA	Barque	German wooden sailing barque built in 1847. Date of loss cited as 14 August 1877, but no detail regarding the circumstances of the sinking is given.	19th century	NZ 4	4	-	-	1030723	-	-	NMHR
	EXCELSIOR	Barque	Built in 1854 and ran ashore and was wrecked north of Seaham Harbour. Date of loss cited as 21 December 1876.	19th century	54 00.00 N	1 19.00 W	-	-	1011522	H10051	-	HER
	EXPERIMENT	Sailing vessel	Cargo vessel transporting corn which stranded near Seaham during a storm. Date of loss cited as 05 April 1799.	18th century	NZ 4	4	-	-	1035264	-	-	NMHR
	FOLMINA	Steam ship	Dutch cargo vessel built in 1915. Steel hulled, the vessel was sunk by the Germn submarine *UB* 34. Date of loss cited as 25 January 1918.	20th century	NZ 5	5	-	-	1025520	-	-	NMHR
	FOUR	Sailing vessel	Date of loss cited only as 1876. No further details are provided.	19th century	54 00.00 N	1 19.00 W	-	-	1039940	H10257	-	HER
	FREE BRITON	Sailing vessel	Wooden vessel which foundered off Sunderland. Date of loss cited as 13 September 1797.	18th century	NZ 5	5	-	-	1014228	-	-	NMHR
	FRIENDS GOODWILL	Collier	Foundered in a gale off Sunderland transporting coal. Date of loss cited as 10 March 1763.	18th century	NZ 5	5	-	-	1031379	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	GEORGE WILLIAM	Coble	Built in 1860. Date of loss cited as 13 January 1864.	19th century	NZ 5	5	-	-	1015845	-	-	NMHR
	GOOD INTENT	Sailing vessel	Scuttled and foundered off Sunderland after capture by a Dutch-built privateer. Date of loss cited 26 January 1800.	19th century	NZ 5	5	-	-	1009837	-	-	NMHR
	GRANICUS	Sailing vessel	One of three vessels (the other being the *Pilot* and *New Concord*) lost bear to Seaham Harbour during a gale on 01 December 1828.	19th century	NZ 4	4	-	-	1010572	-	-	NMHR
	GRATITUDE	Sailing vessel	Date of loss cited as 10 January 1876. No other details recorded.	19th century	54 50.00 N	1 19.00 W	-	-	1006377	H10050	-	HER
	HAIDEE	Schooner	Sailing vessel built in 1845 and became stranded. Date of loss cited as 26 December 1869.	19th century	NZ 4	4	-	-	1053699	-	-	NMHR
	HANNAH	Schooner	Sailing vessel built in 1841. Foundered following a collision with the SS *Kepier*. Date of loss cited as 04 July 1884.	19th century	NZ 5	6	-	-	1000395	-	-	NMHR
	HENRIETTA	Brig	Wooden sailing brig foundered off Sunderland attempting to reach harbour. Date of loss cited as 07 December 1815.	19th century	NZ 5	5	-	-	1018265	-	-	NMHR
	HILDAWELL	Steam ship	Cargo vessel built in 1892 and sank after denoting a mine whilst transporting iron laid by the German submarine *UC*-32. Date of loss cited as 20 December 1916.	20th century	NZ 5	5	-	-	1037487	-	-	NMHR
	HIRONDELLE	Schooner	French built schooner, completed in 1852. Became stranded near Ryehope in a gale. Date of loss cited as 21 December 1876.	19th century	NZ 4	5	-	-	1041509	-	-	NMHR
	HOLLAND	Sailing vessel	Date of loss cited as 09 February 1838. No other details held.	19th century	54 50.00 N	1 19.00 W	-	-	1065393	H10039	-	HER
	HOPPER No 26	Lighter	Built in 1866 and stranded and lost whilst under tow in a gale. Date of loss cited as 10 January 1903.	20th century	NZ 4	4	-	-	1002233	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	INDUSTRY	Brig	Wooden sailing brig wrecked south of Hawthorne Hive and auctioned *in-situ*. Date of loss cited as 30 September 1795.	18th century	NZ 4	4	-	-	1053416	-	-	NMHR
	INTENT	Steam ship	Cargo vessel built in 1911. Torpedoed by the German submarine *UC* 40. Date of loss cited as 08 March 1918.	20th century	NZ 4	4	-	-	1023760	-	-	NMHR
	IVY	Ketch	Sailing vessel that was stranded. Date of loss cited as 24 July 1858.	19th century	NZ 4	4	-	-	1062015	-	-	NMHR
	JAMES CAMERON	Steam ship	Cargo vessel built in 1882. Abandoned after colliding with the *Vanessa*. Date of loss cited as 27 January 1910.	20th century	NZ 5	6	-	-	1056149	-	-	NMHR
	JANE	Sailing vessel	Wrecked after ice flow broke several ships in the River Wear in Sunderland. Date of loss cited as 18 January 1841.	19th century	NZ 5	5	-	-	1054208	-	-	NMHR
	JANE SINCLAIR	Schooner	Built in 1841, the vessel drove ashore in bad weather. Date of loss cited as 14 July 1853.	19th century	NZ 4	4	-	-	1005002	-	-	NMHR
	JANET AND MARY	Lighter	Built in 1838, the vessel foundered off Souter point whilst under tow. Date of loss cited as 10 December 1880.	19th century	NZ 5	6	-	-	1046626	-	-	NMHR
	JENNY	Collier	Wrecked near Seaham whilst in ballast during a gale. Date of loss cited as 11 October 1824.	19th century	NZ 4	4	-	-	1021318	-	-	NMHR
	JOHN	Collier	Stranded on Dalton Dands during a gale. Date of loss cited as 03 April 1789.	18th century	NZ 4	4	-	-	1052925	-	-	NMHR
	JOHN AND HANNAH	Sailing vessel	Cargo ship foundered near Sunderland after springing a leak. Date of loss cited as 01 April 1813.	19th century	NZ 5	5	-	-	1058665	-	-	NMHR
	JOHN AND JEAN	Schooner	Wrecked 300 yards south of Seaham Harbour piers. Date of loss cited as 02 June 1854.	19th century	NZ 4	4	-	-	1014660	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	JOHNS	Steam ship	Built in 1878, the vessel was stranded and lost. Date of loss cited as 28 April 1878.	19th century	NZ 4	4	-	-	1027175	-	-	NMHR
	KATE	Sailing vessel	Lost in collision with the *Harriet Emma*. Date of loss cited as 30 May 1850.	19th century	54 50.00 N	1 19.00 W	-	-	1055848	H10041	-	HER
	KATRINA	Schooner	Swedish schooner built in 1876. Stranded; date of loss cited as 15 May 1917.	20th century	NZ 4	4	-	-	1050400	-	-	NMHR
	KINGSTON	Brig	Stranded on Seaham Sands during a gale. Date of loss cited as 25 or 27 January 1794.	18th century	NZ 4	4	-	-	1002643	-	-	NMHR
	LADIA VROOME	Cutter	Belgian cutter which foundered. Date of loss cited as 22 July 1900.	20th century	NZ 5	6	-	-	1053750	-	-	NMHR
	LADY ANN	Schooner	Date of loss cited as 29 November 1874.	19th century	54 50.00 N	1 19.00 W	-	-	1061030	-	-	HER
	LILE	Barque	Built in 1844. Date of loss cited as 13 November 1901.	20th century	NZ 5	5	-	-	1033683	-	-	NMHR
	LILIAN	Steam ship	Iron hulled cargo vessel built in 1883. Stranded 1 mile south of Seaham Harbour whilst in ballast. Date of loss cited as 17 February 1904.	20th century	NZ 4	4	-	-	1053007	-	-	NMHR
	LIVINGSTONE	Steam tug	Foundered and lost whilst seeking towage work. Date of loss cited as 26 September 1913.	20th century	NZ 444000	549000	-	-	1044824	H284	-	HER
	LUCINDE	Schooner	Lost following a collision with the *Rose*. Date of loss cited as 10 October 1875.	19th century	54 00.00 N	1 19.00 W	-	-	1064375	H10253	-	HER
	M	Sloop	Built in 1866 and foundered in a gale. Date of loss cited as 09 March 1875.	19th century	NZ 5	6	-	-	1010871	-	-	NMHR
	MAINDY BRIDGE	Collier	Possibly *ex-Begonia*. Built in 1899. Vessel sunk after being torpedoed by the German submarine *UC* 49. Date of loss cited as 08 December 1917.	20th century	NZ 5	5	-	-	1059288	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	MARGARET	Schooner	Built in 1840, the vessel disappeared after leaving Sunderland. Date of loss cited as 11 March 1868.	19th century	NZ 5	6	-	-	1029269	-	-	NMHR
	MARGARET	Schooner	Date of loss cited as 01 February 1838.	19th century	NZ 4	4	-	-	1001506	-	-	NMHR
	MARIA	Sailing vessel	Cargo vessel stranded near Seaham during a storm. Date of loss cited as 05 April 1799.	18th century	NZ 4	4	-	-	1032476	-	-	NMHR
	MARY ANN	Sailing vessel	Lost off Seaham. Date of loss cited as 29 November 1874.	19th century	54 50.00 N	1 19.00 W	-	-	1057637	H10047	-	HER
	MEREDITH	Steam ship	Built in 1871 and lost near Seaham lighthouse after colliding with the *Longnewton*. Date of loss cited as 31 March 1891.	19th century	54 50.00 N	1 19.00 W	-	-	1062590	H10052	-	HER
	MESSENGER	Brig	Run down off of Hartlepool. Date of loss cited as 06 December 1856.	19th century	-	-	-	-	1008983	-	-	NMHR
	MINERVA	Sloop	Cargo vessel built in 1790. Foundered. Date of loss cited as 11 October 1883.	19th century	NZ 4	4	-	-	1040778	-	-	NMHR
	MISS THOMAS	Schooner	Built in 1864 and lost off Seaham during a gale. Date of loss cited as 12 November 1901.	20th century	NZ 444300	546000	-	-	1014219	H6571 / H10129	-	HER
	MYRTLE	Sailing vessel	Cargo ship capsized off Sunderland. Date of loss cited as 30 August 1826.	19th century	NZ 5	5	-	-	1061830	-	-	NMHR
	NAGA	Sailing vessel	Foundered off Seaham with all hands. Date of loss cited as 15 December 1901.	20th century	54 00.00 N	1 19.00 W	-	-	101318	H10133	-	HER
	NARCISSUS	Trawler	Fishing vessel stooped and scuttled by a German submarine. Date of loss cited as 06 August 1917.	20th century	NZ 5	6	-	-	1039709	-	-	NMHR
	NEPTUNIS	Sailing vessel	Dutch cargo vessel stopped and sunk by the German submarine *UC-62*. Date of loss cited as 12 April 1917.	20th century	NZ 5	6	-	-	1007511	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	NEWARK CASTLE	Sailing vessel	Foundered. Date of loss cited as 11 December 1809.	19th century	NZ 5	6	-	-	1029855	-	-	NMHR
	NO 1	Barge	Wooden hopper barge foundered whilst under tow to dump rubbish. Date of loss cited as 14 July 1896.	19th century	NZ 5	5	-	-	1059955	-	-	NMHR
	OPHELIA	Schooner	Built in 1853, the vessel vanished in bad weather after sailing from Sunderland. Date of loss cited as 31 December 1867.	19th century	NZ 5	6	-	-	1060115	-	-	NMHR
	OSPREY	Schooner	Built in 1863, the vessel foundered following a collision with the SS *Spray*. Date of loss cited as 29 January 1895.	19th century	NZ 5	6	-	-	1024423	-	-	NMHR
	PEAK	Sloop	Went ashore near Seaham. Date of loss cited as 18 July 1816.	19th century	NZ 4	4	-	-	1030682	-	-	NMHR
	PERTH	Schooner	Described as being lost near Newcastle. Date of loss cited as 01 November 1861.	19th century	NZ 5	6	-	-	1026052	-	-	NMHR
	PHOENIX	Sailing vessel	Wrecked 3 miles south of Seaham. Date of loss cited as 27 September 1851.	19th century	NZ 4	4	-	-	1014135	-	-	NMHR
	PHOENIX (or *Phoenix Packet*)	Packet	Foundered off Souter Point following a collision. Date of loss cited as 01 March 1826.	19th century	NZ 5	6	-	-	1049297	-	-	NMHR
	PILOT	Sailing vessel	Wooden hulled vessel that was stranded at Seaham Harbour during a gale. Date of loss cited as 01 December 1828.	19th century	NZ 4	4	-	-	1044796	-	-	NMHR
	PINK ROSE	Steam ship	Steel hulled vessel built in 1930. Foundered following a collision. Date of loss cited as 10 March 1937.	20th century	NZ 5	5	-	-	1044420	-	-	NMHR
	PINTA	Brig	Built in 1875, the vessel foundered after colliding with the SS *Picton*. Date of loss cited as 24 January 1896.	19th century	NZ 5	5	-	-	1043887	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	POLTAVA	Steam ship	Ex-*Georg*; ex-*George*. Built in 1889, the vessel struck a mine and sank 3 miles ENE of Souter Point lighthouse. Date of loss cited as 19 April 1917.	20th century	NZ 4	6	-	-	1048152	-	-	NMHR
	PREMIER	Sloop	Built in 1846. Vessel foundered off Souter Point. Date of loss cited as 12 December 1876.	19th century	NZ 5	6	-	-	1019573	-	-	NMHR
	PRESTO	Steam ship	Cargo vessel built in 1905 and lost after striking a min 4 miles east of Roker Point. Date of loss cited as 06 April 1917.	20th century	NZ 5	5	-	-	1040279	-	-	NMHR
	PROVIDENCE	Cutter	Vessel foundered following a collision. Date of loss cited as 30 September 1872.	19th century	NZ 5	5	-	-	1057408	-	-	NMHR
	QUEEN OF THE SIBB	Sailing vessel	Date off loss cited as 09 December 1874.	19th century	54 50.00 N	1 19.00 W	-	-	1020716	H10048	-	HER
	QUICKSTEP	Steam tug	Buit in 1877, the tug foundered following collision with the SS *Brookside*. Date of loss cited as 12 June 1899.	19th century	NZ 5	6	-	-	1036852	-	-	NMHR
	RAINBOW	Brig	Wrecked near Seaham. Date of loss cited as 26 February 1838.	19th century	54 50.00 N	1 19.00 W	-	-	1040904	H10040 / H277	-	HER
	RESCUE	Steam tug	Built in 1897, the tug foundered after colliding with the SS *Trevethick*. Date of loss cited as 02 August 1897.	19th century	54 50.00 N	1 19.00 W	-	-	1032609	H10300	-	HER
	RETRIEVER	Trawler	Built in 1899, the trawler foundered and sunk during a gale. Date of loss cited as 13 November 1901.	20th century	NZ 5	6	-	-	1008117	-	-	NMHR
	RICHARD AND CLEMENTIA	Sailing vessel	Date of loss cited as 05 December 1751.	18th century	NZ 5	5	-	-	1054330	-	-	NMHR
	RISING SUN	Snow	Built in 1859, the vessel became stranded during a gale. Date of loss cited as 09 February 1861.	19th century	NZ 4	4	-	-	1023150	-	-	NMHR
	ROBERT STEPHENSON	Fishing drifter	Built in 1860, Date of loss cited as 05 October 1880.	19th century	NZ 5	5	-	-	1018804	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	SAILOR	Sailing vessel	Date of loss cited as 14 March 1896.	19th century	54 50.00 N	1 19.00 W	-	-	1039332	H10053	-	HER
	SAMSO	Steam ship	Dutch cargo vessel built in 1876. Lost after striking a mine laid by the German submarine *UC*-49. Date of loss cited as 01 May 1918.	20th century	NZ 5	5	-	-	1027793	-	-	NMHR
	SCOTIA	Barque	Wooden hulked sailing barque. Foundered following a collision. Date of loss cited as 11 June 1914.	20th century	NZ 43880	49320	-	-	1041681	H50042	-	HER
	SEVEN SISTERS	Brig	Cargo vessel built in 1862. Lost in poor weather. Date of loss cited as 29 October 1880.	19th century	NZ 4	4	-	-	1052596	-	-	NMHR
	SHIPWRIGHT	Sailing vessel	Wooden hulled cargo ship that foundered after springing a leak. Date of loss cited as 01 March 1817.	19th century	NZ 5	5	-	-	1061049	-	-	NMHR
	SIKEA VARF or SIRIUS	Schooner	Swedish sailing vessel bult in 1875 and stranded at Seaham in bad weather. Date of loss cited as 12 November 1901.	20th century	54 50.00 N	1 19.00 W	-	-	1018606	H10128	-	HER
	ST ANN	Brig	Stranded at Seaham during a gale. Date of loss cited as 25 April 1800.	19th century	NZ 4	4	-	-	1033771	-	-	NMHR
	ST GILDAS	LUGGER	French lugger lost whilst entering Seaham Harbour. Date of loss cited as 14 July 1853.	19th century	NZ 4	4	-	-	1039509	-	-	NMHR
	STERLING	Brig	Vessel built in 1840 and disappeared en-route from Sunderland to Aberdeen. Date of loss cited as being between 01 February and 28 February 1871.	19th century	NZ 5	6	-	-	1042659	-	-	NMHR
	SUNNIVA	Steam ship	Cargo vessel built in 1917 and lost after being torpedoed by the German submarine *UC*-17. Date of loss cited as 28 June 1918.	20th century	NZ 5	5	-	-	1040065	-	-	NMHR
	SUSANNAH	Schooner	Stranded in poor weather. Date of loss cited as 10 February 1853.	19th century	NZ 4	4	-	-	1012110	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	THETIS	Sailing vessel	Stranded heading for Shields from London transporting mahogany. Date of loss cited as 16 December 1815.	19th century	NZ 4	4	-	-	1046948	-	-	NMHR
	THETIS	Sailing vessel	Wooden cargo vessel sailing from Klaipeda to London with a cargo of timber. Sank after springing a leak. Date of loss cited as 29 December 1796.	18th century	NZ 4	5	-	-	1028735	-	-	NMHR
	TIMES	Sailing vessel	Foundered off Seaham. Date of loss cited as 04 May 1867.	19th century	54 50.00 N	1 19.00 W	-	-	1052425	H10275	-	HER
	TOPHILL	Sloop	Run down by the *Widrington* and abandoned. Date of loss cited as 23 June 1852.	19th century	NZ 5	6	-	-	1042671	-	-	NMHR
	TORRIDGE	Brig	Foundered following a collision shortly after leaving Seaham Harbour. Date of loss cited as 17 December 1821.	19th century	NZ 4	4	-	-	1064799	-	-	NMHR
	TRIM	Ketch	Vessel foundered in poor weather conditions. Date of loss cited as 18 March 1907.	20th century	NZ 5	6	-	-	1017579	-	-	NMHR
	VICTORIA	Barque	Built in 1850. Stranded and lost in poor weather. Date of loss cited as 14 April 1877.	19th century	NZ 5	5	-	-	1012325	-	-	NMHR
	VIJF BROEDERS	Galliot	Dutch galliot stranded and lost in bad weather. Date of loss cited as 09 February 1853.	19th century	NZ 4	4	-	-	1016281	-	-	NMHR
	VINE	Lugger	Foundered and sunk after collision with the SS *Vernon*. Date of loss cited as 19 June 1895.	19th century	NZ 5	6	-	-	1029082	-	-	NMHR
	VOLUSIA	Brig	Cargo vessel lost whilst under tow. Date of loss cited as 24 November 1858.	19th century	NZ 4	4	-	-	1027588	-	-	NMHR
	VOORWAARTS	Schooner	Sailing vessel built in 1902. Whilst transporting coal, the vessel was sunk by a submarine ENE of	20th century	NZ 5	6	-	-	1060989	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
			Hartlepool. Date of loss cited as 11 April 1917.									
	VROW ANNEGINA or VROW HENDRICA	Galliot	Dutch galliot foundered of Hendon after a collision whilst transporting coal. Date of loss cited as 15 November 1818.	19th century	NZ 5	5	-	-	1001007	-	-	NMHR
	WAVE	Schooner	Vessel built in 1834 and foundered in bad weather. Date of loss cited as 09 February 1861.	19th century	NX 5	5	-	-	1026717	-	-	NMHR
	WELCOME HOME	Schooner	Ran aground and wrecked in bad weather running for Seaham Harbour. Date of loss cited as 14 March 1859.	19th century	NZ 4	4	-	-	1049284	-	-	NMHR
	WILHELM	Sailing vessel	Wrecked at Seaham Harbour. Date of loss cited as 21 October 1864.	19th century	54 50.00 N	1 19.00 W	-	-	1001620	H10045	-	HER
	WILLIAM AND JANE	Sailing vessel	Wooden cargo vessel which foundered north of Souter Point following a collision. Date of loss cited as 01 June 1793.	18th century	NZ 5	6	-	-	1042795	-	-	NMHR
	Unknown	Keel	Foundered after being driven out of Sunderland Harbour. Date of loss cited as 07 December 1812.	19th century	NZ 5	5	-	-	1017254	-	-	NMHR
	Unknown	Pilot vessel	Capsized on leaving Sunderland Harbour. Date of loss cited as 16 November 1802.	19th century	NZ 5	5	-	-	1064680	-	-	NMHR
	Unknown	Sailing vessel	Unknown vessel lost off Seaham Harbour. Date of loss cited as being between 12 and 14 November 1901.	20th century	NZ 4	4	-	-	1053763	-	-	NMHR
	Unknown	Sailing vessel	Unknown cargo ship which foundered off Souter Point. Date of loss cited as being on either 13 or 14 October 1829.	19th century	NZ 5	6	-	-	1061367	-	-	NMHR
	Unknown	Brig	Scuttled by Dutch privateer. Date of loss cited as being between 17 and 20 October 1795.	18th century	NZ 5	6	-	-	1010403	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	Unknown	Keel	Foundered off Sunderland in bad weather. Date of loss cited as 26 August 1792.	19th century	NZ 5	5	-	-	1024176	-	-	NMHR
	Unknown	Keel	Foundered whilst laden with coal. Date of loss cited as 04 November 1797.	19th century	NZ 5	5	-	-	1049090	-	-	NMHR
	Unknown	Keel	Foundered after being driven from Sunderland Harbour in bad weather. Date of loss cited as 07 December 1813.	19th century	NZ 5	5	-	-	1024121	-	-	NMHR
	Unknown	Keel	Foundered after being driven from Sunderland Harbour in bad weather. Date of loss cited as 07 December 1813.	19th century	NZ 5	5	-	-	1002046	-	-	NMHR
	Unknown	Caper Privateer	Dutch privateer foundered off the River Tyne during a storm. Date of loss cited as 11 June 1667.	17th century	NZ 5	6	-	-	1051249	-	-	NMHR
	Unknown	Coble	Wrecked following a collision. Date of loss cited as 23 October 1812.	19th century	NZ 5	5	-	-	1062657	-	-	NMHR
	Unknown	-	Vessel wrecked in Seaham Harbour during a storm. Date of loss cited as 20 November 1893.	19th century	-	-	-	-	1009726	-	-	NMHR
	Unknown	Sailing vessel	Wooden vessel lost during a storm. Date of loss cited as 03 March 1820.	19th century	NZ 5	5	-	-	1040779	-	-	NMHR
	Unknown	Sailing vessel	Wooden vessel stranded near Seaham; partial remains only came ashore. Date of loss unknown. Record states 09 February 1799 which is the date the wreckage came ashore.	18th century	NZ 4	4	-	-	1044179	-	-	NMHR
	Unknown	Keel	Foundered off Sunderland carrying coal. Date of loss cited as 03 April 1788.	18th century	NZ 5	5	-	-	1056433	-	-	NMHR
	Unknown	Keel	Carried away from moorings whilst laden with coal and wrecked. Date of loss cited as 23 July 1789.	18th century	NZ 5	5	-	-	1003834	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	Unknown	Keel	Driven out of Sunderland Harbour during a storm. Date of loss cited as 07 December 1813.	19th century	NZ 5	5	-	-	1037483	-	-	NMHR
	Unknown	Keel	Foundered after being carried from moorings laden with coal. Date of loss cited as 23 July 1789.	18th century	NZ 5	5	-	-	1020739	-	-	NMHR
	Unknown	Pilot vessel	Capsized off Sunderland (one of two such vessels). Date of loss cited as 16 November 1802.	19th century	NZ 5	5	-	-	1053841	-	-	NMHR
	Unknown	Keel	Coal keel lost during a storm. Date of loss cited as 07 December 1813.	19th century	NZ 5	5	-	-	1053959	-	-	NMHR
	Unknown	Pilot vessel	Foundered off Sunderland. Date of loss cited as 10 November 1800.	19th century	NZ 5	5	-	-	1065124	-	-	NMHR
	Unknown	Keel	Coal lost during a storm. Date of loss cited as 03 April 1788.	18th century	NZ 5	5	-	-	1004209	-	-	NMHR
	Unknown	Sloop	Unknown sloop stranded near Seaham during a storm. Date of loss cited as 05 April 1799.	18th century	NZ 4	4	-	-	1034431	-	-	NMHR
	Unknown	Keel	Coal keel lost after being driven from harbour. Date of loss cited as 07 December 1813.	19th century	NZ 5	5	-	-	1028077	-	-	NMHR
	Unknown	Keel	Lost after being driven from harbour to dump ballast. Date of loss cited as 21 January 1825.	19th century	NZ 5	5	-	-	1062951	-	-	NMHR
	Unknown	Keel	Driven out of the River Wear by ice and sunk whilst laden with stones. Date of loss cited as 11 February 1795.	18th century	NZ 5	5	-	-	1000343	-	-	NMHR
	Unknown	Sailing vessel	Wreck of an unknown craft stranded at Hawthrone. Evidence is an auction advertisement dated 01 October 1785.	18th century	NZ 4	4	-	-	1022508	-	-	NMHR
	Unknown	Sailing vessel	Wooden sailing vessel sunk whilst carrying coal off Sunderland in bad weather. Date of loss cited as 10 March 1763.	19th century	NZ 5	5	-	-	1013014	-	-	NMHR

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	Unknown	Keel	Foundered off Sunderland during a gale after leaving harbour to dump ballast (other lost in similar circumstances). Date of loss cited as 21 January 1825.	19th century	NZ 5	5	-	-	1045481	-	-	NMHR
	Unknown	Keel	Foundered off Sunderland during a gale after leaving harbour to dump ballast (other lost in similar circumstances). Date of loss cited as 21 January 1825.	19th century	NZ 5	5	-	-	1036283	-	-	NMHR
	Unknown	Sloop	Unknown sloop foundered off Sunderland whilst in ballast. Date of loss cited as 13 January 1813.	19th century	NZ 5	5	-	-	1029042	-	-	NMHR
	Unknown	Pilot vessel	Foundered following a collision off Sunderland. Date of loss cited as 11 May 1812.	19th century	NZ 5	5	-	-	1061209	-	-	NMHR
	Unknown	Keel	Foundered off Sunderland in bad weather. Date of loss cited as 26 August 1792.	19th century	NZ 5	5	-	-	1038422	-	-	NMHR
	Unknown	Keel	Foundered off Sunderland during a gale. Date of loss cited as 21 January 1825.	19th century	NZ 5	5	-	-	1051294	-	-	NMHR
	Unknown	Keel	Wrecked after being driven from moorings in bad weather laden with coal. Date of loss 23 July 1789.	19th century	NZ 5	5	-	-	1020092	-	-	NMHR
	Unknown	Keel	Wrecked after being driven from moorings in bad weather laden with coal. Date of loss 04 November 1797.	18th century	NZ 5	5	-	-	1022505	-	-	NMHR
	Unknown	Keel	Wrecked after leaving harbour to dump ballast. Date of loss cited as 21 January 1825.	19th century	NZ 5	5	-	-	1006279	-	-	NMHR
	ILLIOS	Steam ship	Built in 1882, this cargo ship was lost to a collision of Souter Point. Date of loss cited as 16 December 1898.	19th century	NZ 5	6	-	-	1051431	-	-	NMHR
	Unknown	-	Unknown wooden vessel wrecked in Seaham Harbour.	-	NZ 443800	549400	-	-	-	H6573	-	HER

MSDS ID	Description/Name	Vessel Type	Extended description	Period	Latitude / northing	Longitude / easting	UKHO ID	Trove ID	NMHR ID	Durham HER ID	Geophysical ID	Position taken from
	REPUBLICAN	Sailing vessel	Wooden vessel that foundered off Seaham 04 May 1867.	19th century	54 50.00 N	1 19.00 W	-	-	-	H10275	-	HER
	WANDERER	-	Vessel lost with all hands on the Nose Rocks 25 October 1859.	19th century	54 50.00 N	1 19.00 W	-	-	-	H10301	-	HER
	LOGINAGAR	Sailing vessel	Vessel built in 1861 and foundered off Seaham in 1901.	20th century	54 00.00 N	1 19.00 W	-	-	-	H10258	-	HER
	Unknown	Sailing vessel	Wooden vessel wrecked off Seaham between 12 and 14 November 1901.	20th century	54 00.00 N	1 19.00 W	-	-	-	H10131	-	HER
	IMPEL	Sailing vessel	Wooden vessel lost at Easington between 12 and 14 November 1901.	20th century	54 00.00 N	1 19.00 W	-	-	-	H10132	-	HER
	TERLINGS	Steam ship	Whilst loaded with ballast, the vessel was driven onto the rocks just to the south of Seaham 06 May 1889.	19th century	443600 N	548600 W	-	-	-	H278	-	HER
	LILLIAN	Steam ship	Ran aground a mile south of Seaham and was wrecked. Date of loss cited only as 1903.	20th century	443600 N	548600 W	-	-	-	H285	-	HER
	GITANA	Brig	Came ashore in dense fog north of Seaham Harbour. Date of loss cited as 02 March 1874.	19th century	54 00.00 N	1 19.00 W	-	-	-	H10251	-	HER
	RAINBOW	-	Scrapbook account of the loss of a vessel named *Rainbow*. Date of loss cited only as 1837. Possibly duplication of the Rainbow lost in 1838 with confused dates? (H10040).	19th century	54 00.00 N	1 19.00 W	-	-	-	H10282	-	HER
	H. A. BRIGHTMAN	Steam ship	Wreck register states loss of this vessel 17 January 1901.	20th century	54 00.00 N	1 19.00 W	-	-	-	H10296	-	HER
	LENORES	Steam ship	Wreck register states loss of this vessel 14 January 1881.	19th century	54 00.00 N	1 19.00 W	-	-	-	H10297	-	HER
	EUCLID	Steam ship	Wreck register states the loss of this vessel following a collision. Date of loss cited as 17 April 1890.	19th century	54 00.00 N	1 19.00 W	-	-	-	H10299	-	HER

Appendix C Gazetteer of heritage asset records

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
Designated heritage assets									
TI_001	Intertidal (extends into offshore)	Seaham Dock – North and South Inner Piers Adjoining to East of Inner North Dock. Grade II Listed Building. The listing covers two piers of the inner north dock, built in *c.* 1828-1835.	Post-medieval	43508	49475	1232439	-	H36078	HE
TI_002	Intertidal	Seaham Dock – Inner North Dock Walls. Grade II Listed Building. The listing covers the excavated inner north dock walls, built in *c.* 1825-1830.	Post-medieval	43278	49494	1277116	-	-	HE
TI_003	Terrestrial	Seaham – Police Station, North terrace. Former Londonderry offices built in *c.* 1860.	Post-medieval	43051	49539	1232270	-	H36076	HE
TI_004	Terrestrial	Hawthorne Dene Viaduct. Railway viaduct built in 1905 for the North-Eastern Railway Company. Only partly intrudes into the Marine and Intertidal Archaeology Study Area.	Modern	44094	45913	1277271	-	-	HE
TL_005	Terrestrial	Stature of the 6th Marquess of Londonderry in Front of Police Station. Stature to Charles Stewart Vane-Tempest Stewart (1852-1915). Built in 1915.	Modern	43026	49528	1277150	-	H36105	HE
OF_001	Offshore to terrestrial	Seaham Conservation Area. Designated in 1997. Encompasses the 19th century new town and harbour extending out into the offshore zone.	Modern	442879	549566	-	-	CRMID11	HER
Non-designated heritage assets									
0F_002	Offshore	Flints – core and two blades or flakes.	Mesolithic	44400	45500	-	1021428	H94	NMHR
TI_006	Terrestrial	Dawdon Colliery (destroyed monument). A post-medieval quarry visible as earthworks on aerial photography. Apparently levelled as depicted by the time of the 1990-1992 OS mapping production.	Post-medieval	43544	47727	-	1020382	-	NMHR
TI_007	Intertidal	A Second World War pillbox recorded via aerial photography.	Modern	44312	45842	-	1018938	H78649	NMHR

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
TI_008	Terrestrial and Intertidal	Position is the centre point of an area of mapped Second World War defences (pill box and barbed wire obstructions) identified via aerial photography.	Modern	43706	47775	-	1058942	H78650	NMHR
TI_009	Terrestrial	Position is the centre of an area of Second World War pill boxes and connecting trackways recorded via aerial photography.	Modern	44112	46426	-	1014644	H86646	NMHR
OF_003	Offshore	Part of Seaham Dock. Extends beyond Historic England listing.	Modern	43750	494450	-	1047377	H36103	NMHR
TI_010	Terrestrial and (probably) intertidal	Lithic scatter. quantity of chips suggestive of industry. Record states finds were both on cliff top path and within landslide extending 'to shore' which suggests findspot area includes the intertidal zone.	Mesolithic	444400	544400	-	-	H85	HER
OF_004	Offshore	One unretouched flint blade.	Mesolithic	444500	544400	-	-	H83	HER
OF_005	Offshore	Two unretouched blades.	Mesolithic	444500	544400	-	-	H84	HER
OF_006	Offshore	Sixty flints, mainly unretouched blades and flakes.	Mesolithic	444500	544400	-	-	H81	HER
OF_007	Offshore	Seven unretouched blades and flakes, along with two gravers.	Mesolithic	444500	544400	-	-	H80	HER
OF_008	Offshore	Two unretouched blades	Mesolithic	444500	544400	-	-	H82	HER
OF_009	Offshore	Findspot 100m north of the lighthouse. No detail provided.	Mesolithic	443700	549500	-	-	H124	HER
TI_011	Terrestrial	Lithic scatter comprising seven unretouched blades and flakes and two gravers. Possibly duplication of OF_006 but locations are different.	Prehistoric	444313	544446	-	-	H60976	HER
TI_012	Terrestrial	Site of demolished Seaham Bottle Works site, established in 1853. Record includes First World War memorial, also probably lost when structure was demolished.	Post-medieval to Modern	443300	548750	-	-	H8305	HER
TI_013	Terrestrial	Dawdon Colliery Railway Line. Beach railway from Dawdon Beach to Seaham Docks. Some remains survived at time of survey in 1998 (possibly related to TI_045 to the north at Seaham Docks?)	Post-medieval	443505	548555	-	-	H66944	HER

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
TI_014	Terrestrial	Dawdon Colliery concrete structure. Wooden piles visible at the bae of the cliff with some large lumps of concrete.	Post-medieval	443644	548196	-	-	H66952	HER
TI_015	Terrestrial	Dawdon Beach Colliery disused structure of unknown function; some railway track adjacent probably associated.	Post-medieval	443655	5481555	-	-	H66953	HER
TI_016	Terrestrial	Dawdon Beach Noses Point. Remains of structure on cliff top.	Post-medieval	443622	548114	-	-	H66987	HER
TI_017	Terrestrial	Dawdon Noses Point drainage structure.	Post-medieval	443642	548123	-	-	H66988	HER
TI_018	Terrestrial	Dawdon Noses Point Tipping Flumes. Demolished structure with rail tracks attached.	Post-medieval	443802	547954	-	-	H66991	HER
TL_019	Terrestrial	Dawdon Noses Point Tipping Flumes. No further details; structure being demolished at time of recording in 2008.	Post-medieval	443831	547823	-	-	H66992	HER
TI_020	Terrestrial	Dawdon Noses Point drainage structure. Partially demolished, about 3m below cliff top. Iron outlet pipes visible.	Post-medieval	443672	548035	-	-	H66990	HER
TI_021	Terrestrial	Hawthorne Hive limekiln. Shown on 1839 OS map, built onto the cliff face.	Post-medieval	444132	545924	-	-	H67027	HER
TI_022	Terrestrial	Remains of a rectangular building along cliff; speculated to be a boat house.	Post-medieval	444102	546102	-	-	H67024	HER
TI_023	Terrestrial	Hawthorne Hive beach debris. Concrete debris of unknown origin. Probably demolished structure, fallen from cliff face.	Post-medieval	444306	545784	-	-	H67030	HER
TI_024	Terrestrial	Ridge and furrow, Hawthorne. Mainly appears lost by early 1990s; speculated that some part may potentially be of medieval origin.	Post-medieval	444124	546438	-	-	H86061	HER
TI_025	Terrestrial	Ridge and furrow, Hawthorne. Mainly appears lost by early 1990s; speculated that some part may potentially be of medieval origin.	Post-medieval	444068	546581	-	-	H86062	HER
TI_026	Terrestrial	Coal wagons, Seaham Harbour. Some removed; one apparently remains at entrance to the harbour.	Post-medieval	443300	549500	-	-	H857	HER
TI_027	Intertidal	Seaham Harbour. Founded in 1828 by the Marquess of Londonderry to serve his	Post-medieval	443300	549500	-	-	H858	HER

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
		collieries. No earlier port existed. Both town and harbour part of the same planned development.							
TI_028	Terrestrial	Site of a coal drop, Seaham Harbour. Probably constructed in *c.* 1850 and worked until *c.* 1900. Now dismantled.	Post-medieval	443300	549500	-	-	H856	HER
TI_029	Terrestrial	Limekiln, Hawthorne Hive. Possibly of 18th century date as it precedes the coastal railway and no longer appears on the First Edition OS maps. Built partly into cliff face.	Post-medieval	444130	545920	-	-	H3835	HER
TI_030	Terrestrial	Seaham Lifeboat Station, North Dock. Building shown on First Edition OS but not labelled as lifeboat station until the Second Edition maps.	Post-medieval	443311	549498	-	-	H56652	HER
TI_031	Terrestrial	Former Londonderry Arms, Seaham. First building as part of the new town development, with the foundation stone laid on the same date as that of the new harbour in 1828.	Post-medieval	443042	549372	-	-	H66071	HER
TI_032	Terrestrial	Golden Lion Public House, Seaham.	Post-medieval	442970	549417	-	-	H70352	HER
TI_033	Terrestrial	Lime kilns, North Dock, Seaham. Former lime kilns associated with the dock construction.	Post-medieval	443253	549522	-	-	H70360	HER
TI_034	Terrestrial	Harbour View Hotel, North Terrace, Seaham.	Post-medieval	443006	549501	-	-	H70361	HER
TI_035	Terrestrial	South Dock, Seaham Harbour. Opened in 1835.	Post-medieval	443373	549093	-	-	H70712	HER
OF_010	Offshore	Outer Harbour, Seaham. Enclosed between 1828 and 1835.	Post-medieval	443620	549347	-	-	H70713	HER
TI_036	Terrestrial	Londonderry Offices, North Terrace, Seaham.	Post-medieval	442987	549539	-	-	H70716	HER
TI_037	Terrestrial	The Haven, 6, North Terrace, Seaham.	Post-medieval	443003	549516	-	-	H70786	HER
TI_038	Terrestrial	South Hetton Railway. Coal line from South Hetton Colliery to Seaham Harbour.	Post-medieval	441024	547056	-	-	H3473	HER
TI_039	Terrestrial	Ridge and furrow at Easington Quarry. Mostly no longer extent, possibly in part built over.	Post-medieval	444179	544358	-	-	H80472	HER
TI_040	Terrestrial	Ridge and furrow at Easington Quarry. Mostly no longer extent, possibly in part built over.	Post-medieval	444250	544924	-	-	H80478	HER
TI_041	Terrestrial	Ridge and furrow at Easington Quarry. Mostly no longer extent, possibly in part built over.	Post-medieval	444153	544638	-	-	H80479	HER

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
TI_042	Terrestrial	Ropery, Seaham. Rope walk depicted on the First Edition OS.	Post-medieval	443091	549011	-	-	H88995	HER
TI_043	Terrestrial	Site of a chemical works at Seaham, completed in 1862.	Post-medieval	443394	548471	-	-	H8306	HER
TI_044	Terrestrial	Easington Colliery. Started in 1899; remains visible on aerial imagery.	Post-medieval	444050	544201	-	-	H3843	HER
TI_045	Terrestrial	Railway tracks, South Crescent, Seaham. Remaining tracks of Rainton and Seaham Line connecting to South Dock and industries south of the town.	Post-medieval	443050	549418	-	-	H81437	HER
TI_046	Terrestrial	Seaham Harbour sawmill.	Post-medieval	443095	549262	-	-	H89245	HER
TI_047	Terrestrial	Seaham Harbour Approach Gardens (eastern area). Two separated ornamental green spaces marking the entrance to the harbour area.	Modern	443046	549487	-	-	H81338	HER
TI_048	Terrestrial	Seaham Harbour Approach Gardens (western area)	Modern	443046	549487	-	-	H81338	HER
TI_049	Terrestrial	Defensive/practice trench system, Hive Point (south area). Reputedly of First World War date.	Modern	444184	545850	-	-	H3837	HER
TI_050	Terrestrial	Defensive/practice trench system, Hive Point (north area).	Modern	444184	545850	-	-	H3837	HER
TI_051	Terrestrial	Pill box and barbed wire obstruction north of Busiers Holes. Visible on historic aerial imagery.	Modern	444238	544230	-	-	H16264	HER
TI_052	Terrestrial	Pillbox 100m north of Hive Point. Extant structure at bae of the cliff by the mouth of the Hawthorne Dene.	Modern	444150	545950	-	-	H3836	HER
TI_053	Terrestrial	Site of windlass structures mapped in 1939, but no physical remains identified during more recent survey.	Modern	444350	545250	-	-	H3849	HER
TI_054	Intertidal	Seaham Harbour emergency battery. Coastal battery, 1940-1946.	Modern	443200	549550	-	-	H5695	HER

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
TI_055	Terrestrial	Railway halt 950m from Kinley Hill. Site of halt on the Hartlepool and Sunderland Direct Railway, opened in 1905 and closed in 1964.	Modern	444100	546300	-	-	H8286	HER
TI_056	Terrestrial	Maritime rocket point at Shippersea Point.	Modern	444350	545040	-	-	H8310	HER
TI_057	Terrestrial	Second World War pillbox (within NMHR monument TI_009).	Modern	444221	546512	-	-	H10260	HER
TI_058	Terrestrial	Site of fish market, South Crescent, Seaham. Also of a Seaman's Mission Church between 1908 and 1978.	Modern	443046	549386	-	-	H49555	HER
TI_059	Terrestrial	Primitive methodist Chapel until 1969. Suffered bomb damage in 1940.	Modern	443175	548843	-	-	H56270	HER
TI_060	Terrestrial	Dawdon Colliery railway (within NMHR monument TI_006). Ran along the cliff edge.	Modern	443524	548375	-	-	H66946	HER
TI_061	Terrestrial	Dawdon Colliery tipping flumes (within NMHR monument TI_006). Disused railway foundations.	Modern	443566	548306	-	-	H66949	HER
TI_062	Terrestrial	Dawdon Colliery drainage structure (within NMHR monument TI_006). Partly demolished.	Modern	443623	548127	-	-	H66986	HER
TI_063	Terrestrial	Pill box, Blast Beach. Does not conform to MoD guidelines; described as rectangular sea eroded (although shown above MHWS) and rapidly deteriorating.	Modern	444033	546753	-	-	H67021	HER
TI_064	Terrestrial	Pill box, Hawthorne Hive (possibly same as record TI_051).	Modern	444157	545954	-	-	H67026	HER
OF_011	Offshore	Listed as 'Anchorage'.	Modern	444366	545813	-	-	H67029	HER
TI_065	Terrestrial	Remains of a possible boathouse or colliery structure; shown above MHWS but described as being subject to erosion by the sea.	Modern	44352	544412	-	-	H67124	HER
TI_066	Intertidal	Easington Cliffs aerial tower foundations. Partially buried by cliff erosion.	Modern	444451	544402	-	-	H67125	HER
TI_067	Intertidal	Part of same structure as TI_066.	Modern	44452	544352	-	-	H67126	HER
TI_068	Intertidal	Seaham Harbour, north pier.	Post-medieval (built in 1823	443620	549347	-	-	H70713	HER

MSDS ID	Location	Description	Period	Easting	Northing	HE List Entry Number	NMHR ID	Durham HER ID	Position taken from
			but listed as Modern)						
OF_012	Offshore	Seaham Harbour, north pier lighthouse. Built in 1905; had a 10 mile range.	Modern	433715	549401	-	-	H70715	HER
TI_069	Terrestrial	Coxswain sculpture, Seaham harbour. Sculpture in honour of the RNLI.	Modern	443329	549455	-	-	H71951	HER
TI_070	Terrestrial	Barclays Bank, North Terrace, Seaham.	Modern	443013	549440	-	-	H72255	HER
TI_071	Terrestrial	Second World War pill box recorded via aerial photography.	Modern	443526	548446	-	-	H78648	HER
TI_072	Terrestrial	Pill box on Blast Beach. Situated at the base of cliffs. Extant structure but derelict (possible duplication of TI_063 with wrong location?).	Modern	443976	546823	-	-	H6311	HER
TI_073	Terrestrial	Area of military buildings apparently pre-dating 1941 when replaced by pill boxes and barbed wire obstructions (pre-dating TI_008?).	Modern	443951	546816	-	-	H86704	HER

Appendix D Gazetteer of sea level index points

MSDS Location	Sample number	Age (calibrated before BP)	Corrected RSL
A	CAMS111596	21,447	14.82
	CAMS111597	20,577	14.82
	AA68681	13,983	9.82
	SRR869	8,153	1.75
	BIRM823	7,964	2.62
	SRR2120	7,945	2.03
	SRR1149	7,911	3.62
	BIRM867	7,730	2.8
	SRR2119	7,691	2.63
	SRR1148	7,574	4.09
B	SRR1431	8,302	-0.01
	SRR1430	8,272	0.14
C	AA34199	15,744	1.81
	AA25598	13,900	0.39
	AA25597	12,788	0.8
	AA27618	8,427	1.07
	AA23825	8,249	-0.45
	SRR3845	8,046	-1.9
	SRR3843	7,993	-1.65
	AA25601	7,986	1.16
	AA23823	7,790	-0.03
	SRR3842	7,764	-1.13
	AA23824	7,726	-0.11
	SRR3844	7,709	-1.47

MSDS Location	Sample number	Age (calibrated before BP)	Corrected RSL
	AA25596	7,570	0.35
	AA23896	7,409	0.45
	AA24226	7,211	1.49
	AA24225	6,078	2.05
	AA23894	5,947	1.34
	AA23893	5,867	1.19
	AA25595	4,790	1.7
	AA24224	4,635	2.1
	AA24223	3,601	2.57
D	AA27227	11,456	-2.06
	AA27616	8,255	-2.18
	AA27228	8,173	-2.27
	AA27226	8,126	-2.78
	AA27229	7,969	-2.44
	AA23498	4,030	0.44
E	IGS21A	14,693	15.7
	IGS68B	14,261	10.7
	IGS21B	14,237	15.7
	IGS68A	13,597	10.7
	OxA12824	12,289	-5.61
	OxA12825	12,026	-5.53
	OxA11936	11,535	-5.34
	OxA13370	11,511	-5.39
	AA24221	8,745	-4.69
	AA27617	8,719	-3.62
	AA24222	8,711	-5.1

MSDS Location	Sample number	Age (calibrated before BP)	Corrected RSL
	AA24220	8,449	-3.96
	AA24229	8,420	-3.2
	OxA11858	8,107	-3.23
	OxA11833	8,093	-3.25
	OxA11859	7,988	-4.49
	OxA11860	7,980	-4.52
	AA24230	7,960	-3.57
	OxA12953	7,949	-4.02
	AA24219	7,939	-2.01
	OxA12954	7,900	-4.05
	SRR3703	7,871	-1.99
	OxA12952	7,825	-4.02
	SRR3850	7,774	-1.93
	SRR4584	7,764	-2.34
	AA23892	7,708	-1.91
	AA24218	7,520	-1.17
	OxA13029	7,484	-3.55
	SRR3702	7,465	-1.77
	AA24217	7,442	-2.14
	SUERC49871	7,359	-1.15
	SUERC49870	7,236	-1.08
	OxA12950	7,219	-3.07
	OxA12951	7,211	-3.14
	SUERC49869	7,097	-1.03
	SRR3848	7,080	-1.72
	SUERC54086	6,845	-1.46

MSDS Location	Sample number	Age (calibrated before BP)	Corrected RSL
	OxA12949	6,824	-2.76
	SUERC30010	6,765	1.61
	SUERC54087	6,759	-1.54
	OxA22732	6,733	1.61
	OxA12947	6,665	-2.23
	AA24227	6,518	-1.09
	SRR3847	6,073	-1.1
	SRR3701	5,748	-0.62
	SRR1422	5,629	1.61
	SUERC52427	5,517	1.61
	SUERC30008	5,517	1.66
	SUERC49900	5,516	1.61
	SRR1421	5,461	1.65
	SUERC30009	5,400	1.66
	OxA22733	5,398	1.66
	SRR3700	4,984	-0.26
	HAR8977	4,850	2.08
	OxA12946	4,213	-1.39
	SRR3846	3,856	0.13
	UB3907	3,780	1.68
	UB3906	3,655	-0.79
	HAR8975	3,602	2.26
	UB3904	3,601	-0.26
	OxA12967	3,533	-1.26
	HAR8974	3,511	2.37
	AA22663	3,510	-0.91

MSDS Location	Sample number	Age (calibrated before BP)	Corrected RSL
	AA24228	3,330	-0.12
	OxA12944	3,156	-0.63
	SRR3699	2,914	0.5
	SRR1420	2,913	2.7
	UB3905	2,779	-0.69
	SUERC30014	2,588	2.37
	HAR8973	2,355	2.75
F	HAR3711	11,011	-12.45
	AA27192	8,870	-15.46
	AA27201	8,239	-6.34
	AA27203	8,068	-6.3
	SRR3706	7,894	-5.22
	AA27200	7,864	-6.04
	AA27198	7,507	-5.31
	AA27202	7,279	-6.08
	Q2660	7,074	-3.26
	AA27197	7,061	-5.62
	AA27199	7,061	-4.54
	HAR3714	6,912	-4.68
	Q2661	6,823	-3.41
	HV18300	6,637	-2.45
	AA27205	6,518	-5.74
	Beta99222	6,437	-2.54
	Beta99223	6,399	-2.13
	Q2662	6,332	-3.23
	HV4712	6,071	-4.28

MSDS Location	Sample number	Age (calibrated before BP)	Corrected RSL
	HV3459	6,022	-2.97
	SRR3705	6,017	-3.02
	AA27211	5,923	-3.43
	Q2663	5,676	-2.8
	Q2664	5,511	-3.02
	Beta99224	5,314	-2.19
	HV18299	4,899	-1.87
	HV18298	4,656	-0.9
	HV18297	4,156	-0.34
	HV18061	4,026	-1.46
	HV18062	3,775	-1.06
	SRR3704	3,716	-1.36
	HV18063	3,437	-1.28
	AA27210	3,035	-2.21
	HV18064	2,995	-0.78
	AA27196	2,828	-0.84