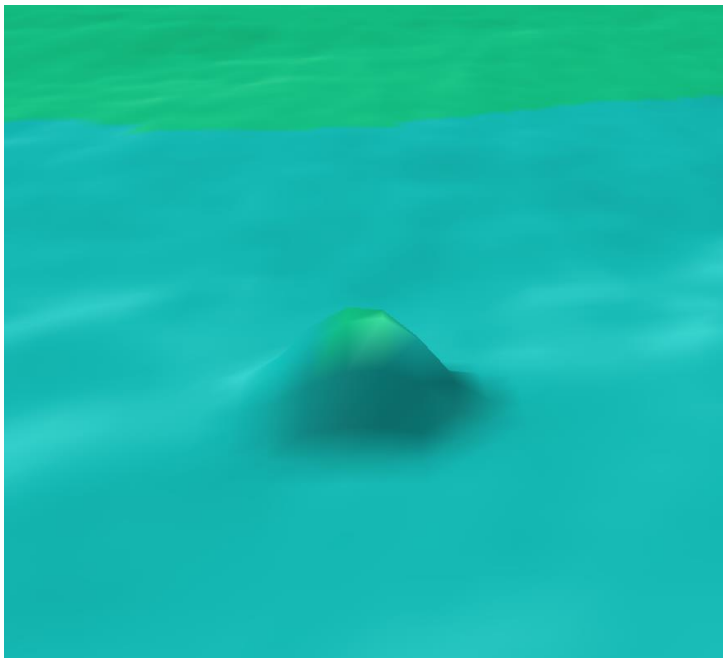
# Brims Tidal Array
# Hoy, Orkney



# Marine Historic Environment
# Technical Baseline Report

## December 2014

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## Table of Contents



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## Plates



## Tables



## Figures



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# Executive Summary

ORCA Marine was commissioned by SSE Renewables (UK) Ltd and OpenHydro to assess the potential impacts of a proposed 200MW Tidal Array off Brims Head, Hoy for Brims Tidal Array Limited (BTAL). The technical baseline assessment will identify any sites of archaeological or historical significance that might be affected by the proposed development.

Fifteen potential shipwreck sites, three inter-tidal maritime infrastructure features, one Non-Sub Contact and one geophysical anomaly were recorded by the desk-based assessment within the Agreement for Lease Area (AfL) and the Cable Corridor Areas of Search (Moodies Eddy, Aith Hope and Sheep Skerry cable routes). The listed positions of all of the shipwreck sites are tentative, being derived from an unverified location of loss. Although the listed positions of six of these sites fall outside the Brims Tidal Array AfL and Cable Corridor Areas of Search, they have been included in this report as the descriptions of their loss indicate they could fall within these areas. One of the shipwrecks is considered to be of **very high importance** (HMS *X-22*), although there is only a **low probability** that the HMS *X-22* may be located within the AfL or Cable Corridor Areas of Search. Two others are considered to be of **high importance** (the *Saxon* and the *Seaton*, which are likely to be the same vessel) if they are found.

Four multi-beam echosounder (MBES), three side scan sonar (SSS) and two magnetic anomalies were noted during the assessment of the geophysical data collected by the survey company Osiris Hydrographic & Geophysical Projects Ltd for the AfL, Moodies Eddy and Aith Hope Cable Corridor Areas of Search. Only one geophysical anomaly (MBES02) was considered to be non-Anthropogenic. MBES04, SSS03 and MAG02 all relate to a single location. It is possible that this feature represents the remains of the *Canadian,* a rigged ship wrecked or foundered on the 26th February 1869, the unverified position of which is 320 m northwest.

No MBES anomalies were identified in the geophysical data collected by Roving Eye Enterprises and Triscom for the Sheep Skerry Cable Corridor Area of Search.

Assessment of the sub-bottom profiler data in the AfL area and the Moodies

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Eddy and Aith Hope Cable Corridor Areas of Search found no evidence of palaeo-landscape features. While it is possible that evidence of periglacial occupation (in the form of submerged prehistoric artefacts and paleo-landscape remains) survives on the seabed, there is considered **negligible** to **low potential** for preservation of such remains due to the nature of the seabed (bedrock and mobile sediments) and the strong tides in the AfL and Cable Corridor Areas of Search. The seabed morphology and tidal regime will also affect the preservation of wrecks and their associated artefacts, thus there is **low potential** for the project to impact on significant unknown, unrecorded wreck remains that may not be visible in the geophysical data.

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# 1.0 Introduction

ORCA Marine was commissioned by to assess the potential impacts of a proposed 200MW Tidal Array off Brims Head, Hoy by Brims Tidal Array Limited (BTAL). The project consists of offshore tidal generators (preferred technology: open-centre turbines (OCT)), inter-array cables, possible offshore hub(s) or substation, export cable to shore, onshore cabling and onshore substation. BTAL plan to build the project in two phases. Phase I consists of up to 60MW with construction expected to begin in 2019 and Phase II with planned delivery of the fully commissioned 200MW Project in 2023 (Scoping Report, LM000037-Rep-SCO-BTAL: 13 – 14).

This assessment will identify any sites of archaeological or historical importance that might be affected by the proposed development. It will feed into an Outline Impact Assessment, which will contain some initial suggestions for managing any identified issues and impacts concerning the marine archaeological and heritage resource. These documents will be used to inform an Environmental Impact Assessment (EIA) and a chapter in the Environmental Statement (ES).

The Agreement for Lease area was initially awarded to Cantick Head Tidal Development Ltd in 2008. The boundary of this area was subsequently revised in 2013, relocating 80% of the original area to the west. As a result the site name has been revised from Cantick Head Tidal Development to Brims Tidal Array, more accurately reflecting the new project location. The **study area** for this report comprises the Brims Tidal Array Agreement for Lease area (AfL) and the Cable Corridor Areas of Search for the Moodies Eddy, Aith Hope and Sheep Skerry cable routes to landfall (**Plate 1**) and the marine geophysical survey area where it extends beyond these (**Figure 1**). Data was also captured for the general area for wrecks with unverified locations that had the possibility of lying within the AfL or cable corridors.

This report incorporates a Desk Based Assessment (DBA) of potential submerged cultural heritage in the study area prepared by Scientific Underwater Logistics and Diving (SULA Diving) on behalf of ORCA Marine. SULA Diving were also commissioned to assist in the evaluation of the remote sensing survey data (multi-beam echosounder (MBES), side scan sonar (SSS), magnetometer and sub-bottom profiler (SBP)) obtained by

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survey company Osiris Hydrographic & Geophysical Projects Ltd (Osiris Projects) on behalf of SSE Renewables and OpenHydro (BTAL report C13007_Vol2c_rev01: 1) covering the Moodies Eddy and Aith Hope Cable Corridor Areas of Search; as well as the MBES data obtained by Roving Eye Enterprises (REE) and Triscom (TE) covering the Sheep Skerry Cable Corridor Area of Search.

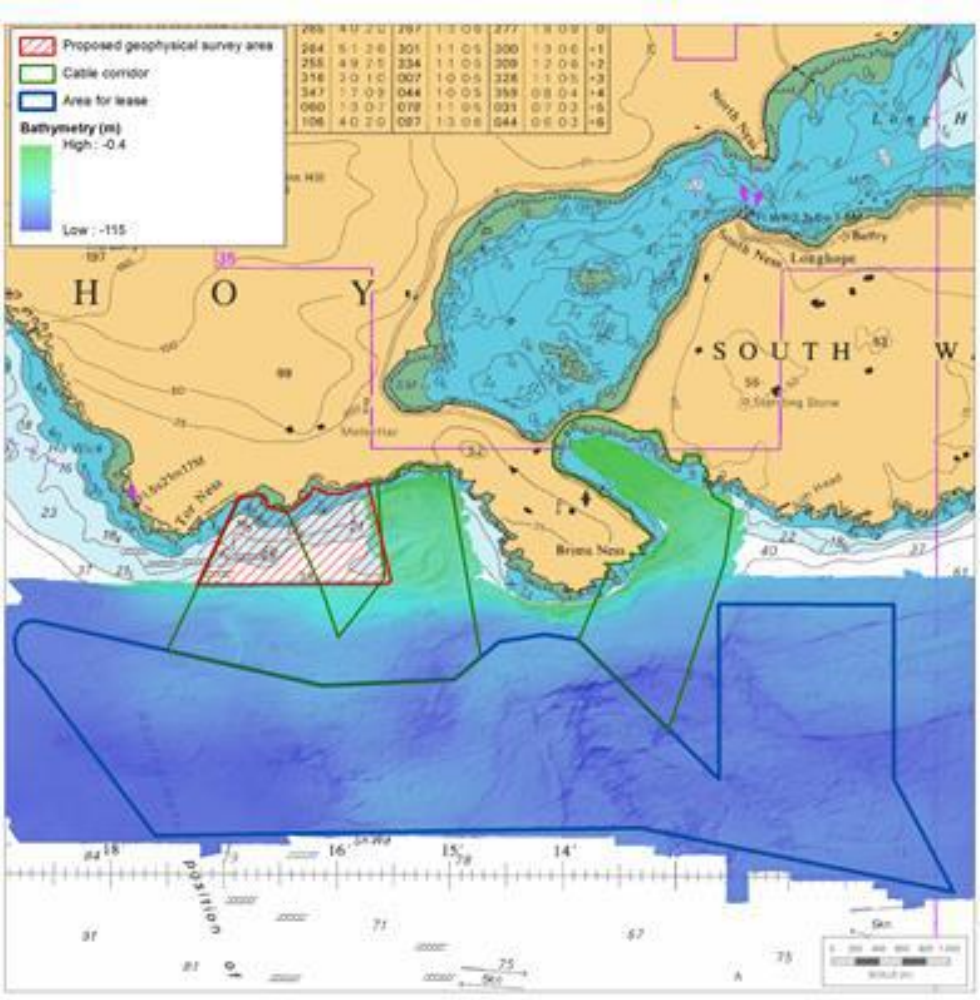


**Plate 1: Map showing extent of AfL and cable corridor areas of search (source: BTAL Scoping Report, LM000037-Rep-SCO-BTAL, Figure 3.1)**

The marine historic environment encompasses not only shipwrecks, but also other evidence of human exploitation of maritime resources, such as shipyards, piers, fish traps, anchor sites and submerged landscapes where human beings and early hominids previously lived or hunted on terrain which was at that time dry land, or where they exploited fish and shellfish on the coast which is now submerged (*Marine (Scotland) Act* 2010, section 73, paragraph 5).

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This report includes:

- A review of existing data sources to identify known sites in the area, and the potential for unidentified marine cultural heritage sites and areas;
- A review of the cultural heritage sites identified during the marine geophysics assessment; and
- A summary of the results of the DBA and marine geophysics, in Appendices 1 – 3.

## 2.0 Aims and Objectives of the Assessment

The technical baseline assessment will be used to inform an Outline Impact Assessment that identifies any potential marine historic environment issues or constraints and comments upon the sensitivity of the proposed development areas This will also help inform the decision-making process for the design layout, potential routes and location of the proposed development prior to the EIA and production of the ES chapter.

This baseline assessment aims to:

- Review existing databases on the marine historic environment in the area, including cultural heritage sites and landscapes, relative sea-level change, submerged cultural remains, wrecks and subsea features; to identify known sites in the area and the potential for unidentified sites and landscapes;
- Analyse the marine geophysical survey data acquired by Osiris Projects, REE and TE on behalf of BTAL, assessing its quality and identifying any evidence of marine cultural material or subsea remains;
- Review available data in respect of seabed and sub-seabed deposits likely to be of palaeo-environmental and archaeological interest;
- Categorise sites in terms of importance (or sensitivity) and local, regional, national or international relative importance; and
- Identify any known or likely sensitive sites or areas and the potential for unknown remains in the development area.

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# 3.0 Assessment Methodology

## 3.1 Desk-Based Assessment

The DBA was conducted to identify potential submerged cultural heritage in the AfL and the Cable Corridor Areas of Search (Moodies Eddy, Aith Hope and Sheep Skerry cable routes). It was completed in accordance with the Institute for Archaeologists (IfA) *Standard and Guidance for historic environment desk-based assessment* (revised November 2012) and reviewed key data sources of known submerged sites within the AfL and the Cable Corridor Areas of Search (**Figure 1**). Any items / sites identified in the study area (as defined in Section 1.0) outside, but close to these areas are also detailed in this report. This is because the listed positions of many of these sites are unverified. Although the positions appear to indicate the sites are located outside of the areas, descriptions of their circumstance of loss indicate they could be located within the AfL or the Cable Corridor Areas of Search and thus be impacted.

The principal reference sources examined for this assessment were:

- The National Monuments Record of Scotland, using the Canmore database website;
- Statutory lists, registers and designated areas, including List of Scheduled Ancient Monuments, Designated Wrecks and Historic Marine Protected Areas;
- UK Hydrographic Office (UKHO) wreck register and relevant nautical charts;
- Heath / Ferguson private wreck database, which contains material not published by Ferguson (see Ferguson 1991) and has been added to by Heath and Ferguson as new discoveries of wreck sites have been made;
- Larn, R & Larn, B 1998 *The Ship Wreck Index of Great Britain & Ireland* Vol.4 Scotland (SIBI);
- Whittaker IG 1998 *Off Scotland: a comprehensive record of maritime and aviation losses in Scottish waters*, Edinburgh.

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Other readily available archaeological and historical reports, databases and publications were consulted for information about the study area and, where used, are cited in the report.

## 3.2 Subsea survey methods

The methods, resolution limitations and results of the subsea survey by Osiris Projects were presented in their accompanying report (C13007_Vol2c_rev01). A method summary is provided below.

Osiris Projects were commissioned by BTAL to conduct a geophysical survey of the Brims AfL area and the Moodies Eddy and Aith Hope Cable Corridor Areas of Search in order to "assess the suitability of the location for the potential installation of tidal energy converters and associated electrical infrastructure" (C13007_Vol2c_rev01: 1).

Survey line spacing was dictated by water depth - 75 m apart in depths greater than 30 m with cross lines every kilometre, and 50 m apart in depths shallower than 30 m, with cross lines every 500 m.

The surveys were conducted from the MV *Lia* from the 17th August 2012 to the 3rd October 2012 and from the 19th May 2013 to the 28th September 2013. MV *Bibby Tethra* was also used from the 12th April 2013 to the 19th May 2013. Specifications of the equipment aboard each vessel are presented in the Operations Report (C13007_Ops_Rep_rev04: 19-20). All survey data was collected on the WGS84 ellipsoid and datum, projected to UTM Zone 30N.

REE and TE were commissioned by BTAL to conduct an MBES survey of the Sheep Skerry Cable Corridor Area of Search to "determine the seabed bathymetry within the Sheep Skerry cable corridor prior to commencement of development activities (P673/July2015/Rev.1.0: 1).

The surveys were conducted from the Mv *Advance* on the 29th June 2015 and the 2nd July 2015. Specifics of the equipment used are presented in the Survey Plan and Risk Assessment document (P673/July2015/Rev.1.0: 2). Survey data was collected on the WGS84 ellipsoid and datum, projected to UTM Zone 30N.

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### 3.2.1 Geographic Information Systems (GIS) data

An ArcGIS *.mxd project was created. All Osiris Projects survey data supplied in ArcGIS geodatabase *.gdb file format were added to the ArcGIS *.mxd project. This included survey track lines and anomalies recorded by Osiris Projects from the marine geophysics, in line and point format. Shapefiles (*.shp) for each marine geophysics method were created with pro-forma attribute fields. All data was inspected systematically by an experienced marine archaeologist. Individual shapefiles were created for each type of anomaly observed in each of the geophysical survey datasets (MBES, SSS, SBP, Magnetometer) in the ArcGIS *.mxd project.

### 3.2.2 Multi-beam echosounder

MBES data was supplied by both Osiris Projects and REE/TE as post processed XYZ data in *.txt file format which gives coordinate and depth information. Digital Terrain Models (DTM) in *.sd file format were created by gridding the XYZ data within Fledermaus.

GIS shapefile data was imported into Fledermaus 7.2.2e and were overlaid onto the DTM with appropriate attribute labels displayed. This included the Osiris Projects survey data and anomalies recorded by ORCA Marine from the SSS and magnetometer data. To enable comparison of supplied bathymetric data alongside all of the GIS data, a GeoTIFF of each individual Fledermaus *.sd DTM was exported at as high a resolution as possible. This was then imported into ArcGIS.

### 3.2.3 Side scan sonar

Osiris Projects supplied the SSS data in mosaicked *.ecw format with associated *.ers files. These were viewed in QGIS, where potential contacts could be added. The data was compared alongside the MBES data and the list of SSS targets observed by Osiris Projects which were provided as an Excel file.

### 3.2.4 Sub-bottom profiling

SBP data from Pinger and Sparker devices were provided as unprocessed SEG-Y files which were examined in SonarWiz 5.

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### *3.2.5 Magnetometer*

The magnetometer data was supplied in *.txt data format by Osiris Projects, which gave location and magnetic strength information. These were split into six smaller files, which could then edited into XYZ fields for gridding as *.SD lines within Fledermaus 7.2.2e following the method detailed for MBES above. This enabled multiple lines to be viewed alongside each other quickly, each line was analysed for spikes and anomalies and these were cross checked against MBES and SSS datasets within the ArcGIS *.mxd project for confirmation and interpretation of anomalies. Osiris Projects survey data and anomalies recorded by ORCA Marine from the SSS and magnetometer data were also imported into Fledermaus 7.2.2e for viewing alongside the *.SD files of the magnetometer data and enable easier cross-comparison of datasets.

## 3.3 Assessment of Importance

The importance attributed to each area, site or feature identified is determined following the criteria outlined in **Table 1**, which incorporate general guidelines used by statutory authorities and agencies such as the Scottish Government and Historic Scotland, outlined in *Scottish Historic Environment Policy* (SHEP) 2011, Planning Advice Note (PAN 2/2011) *Planning and Archaeology*, the *Marine (Scotland) Act* 2010, English Heritage *Designation Selection Guide: Ships and Boats, Prehistory to Present* (2012) and Wessex Archaeology's three-part *Assessing Boats and Ships 1860-1950* (2011). It should be noted that a site that has not been statutorily designated can still be of high importance. Features for which further information is unavailable are recorded as of uncertain importance. The weight given to historic environment considerations will depend on a number of factors (PAN 2/2011 paragraph 6) including:

- The relative rarity of the feature concerned;
- The completeness of the feature / whether it is a particularly good example of its type;
- The historical or cultural associations of the feature;
- The value given to the feature by the local community;

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- The potential value of the feature as an in situ educational or research resource; and
- The potential value of retaining the feature for tourism or place-making.

| Level of importance (sensitivity) | Criteria |
|---|---|
| Very High | Archaeological and historical sites or areas, submerged prehistoric landscapes and deposits, wrecks, or cargos of international importance, such as World Heritage Sites, and may also include some Designated Wrecks or Historic Marine Protected Areas that are not only of national but of international importance. Shipwrecks dating to the prehistoric, Norse and medieval periods are rare and therefore of very high importance. This may also include vessels and aircraft lost in international conflicts, which may have involved large losses in life. Cargos with very high intrinsic, contextual or associative characteristics. |
| High | Archaeological and historical site or areas, wrecks and cargos of national importance, Designated Wrecks and Historic MPAs. Vessels and aircraft lost in conflict, or which may have involved loss of life. Up to 1913 the shipping industry was a major element in Britain's world influence and wrecks up to this period may (though not necessarily) be of high importance if involved in national and international trade; wrecks and cargos with high intrinsic, contextual or associative characteristics (e.g. rarity, evidence of technological change). |
| Medium | Archaeological and historical sites or areas, wrecks and cargos of regional importance. This would involve shipwrecks, anchorages and fishing areas prior to 1913 involved in regional industry and trade; wrecks and cargos with moderate intrinsic, contextual or associative characteristics. |
| Low | Locally important sites or areas, wrecks and cargos. Shipwrecks dating from after 1913 relating to fishing, ferrying or local coastwise trade. Wrecks and cargos with low intrinsic, contextual or associative characteristics. |
| Negligible | Features that have been recorded but assessed as of no archaeological or historical interest, such as recent wrecks, or have been so damaged they no longer have any historic merit. |

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| Level of importance (sensitivity) | Criteria |
|---|---|
| Uncertain | Features that cannot be identified without detailed work, but potentially of some interest. Also, for example, if the date of construction and rarity of a vessel is not known, but potentially of some interest. Find spots, which may represent an isolated find, or could represent the location of a hitherto unknown site. Unidentified geophysical anomalies are also of uncertain importance and have been assessed further in Table 2. |

**Table 1: Definitions of importance of archaeological and historical sites**

Most of the anomalies recorded in the analysis of the geophysical datasets could not be assigned a level of importance based on the criteria outlined in Table 1 as very little is known about them. The potential for these anomalies to be anthropogenic is therefore outlined in Table 2. Note that though classed as 'high', 'medium' and 'low', levels of geophysical potential do not imply a historical value to the anomalies – an anomaly may be of high geophysical potential (i.e. it looks anthropogenic) but may not be of historical importance.

| Level of geophysical potential | Description |
|---|---|
| Low | Anomaly is likely to be a natural formation such as a sand dune or bedrock formation. It could also be a processing error of the geophysical data. |
| Medium | Anomaly lies in an area of intensive human activity such as near ports or areas of peat and other features relating to submerged landscapes. It would also be considered for an anomaly that is possibly anthropogenic but has no definite identification. |
| High | Anomaly looks anthropogenic; or there is identifiable cultural material; or it is in the area of a known archaeological site, or another anomaly identified to be high potential. |

**Table 2: Definitions of level of potential of geophysical anomalies**

## 3.4 Study Limitations

All key data sources were reviewed for this report, although there remains the low possibility that there may be sites or features of archaeological significance that have not been identified.

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RCHAMS, the Royal Commission for Ancient and Historical Monuments for Scotland, runs the Maritime Project of the National Monuments Record of Scotland (NMRS), which seeks to document maritime sites, defined as ships, boats and crashed aircraft, but not built structures or prehistoric sites (unpublished paper issued by MP of NMRS, 2002). The information in the archive record is largely drawn from Whittaker (1998) and Larn and Larn (1998). These books contain some inaccuracies in the locations of wreck sites, which have been duplicated into the NMRS. If any of these are relevant to the report (e.g. the SS *Aase* and the *Seaton*), they are noted and are corrected as far as possible.

The resolution limitations of the subsea survey data provided by Osiris Projects in relation to their applicability for identifying marine historic environment features within the AfL area and the Moodies Eddy and Aith Hope Cable Corridor Areas of Search are summarised below:

- The geophysical surveys completed by Osiris Projects do not go all the way to the shore, leaving a 100 – 200m shallow water zone with no survey data around the edge of both the Moodies Eddy and Aith Hope Cable Corridor Areas of Search.
- Although the general quality of the MBES data was suitable for detecting anomalies, with little banding, rippling or other survey artefacts caused by swell and tidal effects, the resolution of the MBES data is, on its own, not suitable to provide a positive identification of a feature – i.e. confirming that an anomaly is a shipwreck;
- The resolution of the SSS mosaics was sufficient for detecting anomalies larger than 2 m. The mosaics had a lower resolution than the raw data assessed by Osiris Projects, as several features (under 2m in size) identified by their assessment were not visible on the mosaic tracks observed.
- While the majority of the SPB survey tracks were of sufficient quality to identify features, several were not considered of high enough resolution to identify potential cultural features. These are summarised in **Appendix 1**.

The resolution limitations of the subsea survey data provided by REE/TE in relation to their applicability for identifying marine historic environment features within the

Sheep Skerry Cable Corridor Area of Search are summarised below:

- The geophysical surveys by REE/TE do not go all the way to the shore, leaving a 100 – 200m wide shallow water zone with no survey data.
- The general quality of the MBES data was not as high as the data supplied by Osiris Projects for the rest of the study area. It is therefore possible that there may be anomalies that are not visible due to poor resolution.
- No SSS, Magnetometer or SBP surveys were conducted in the Sheep Skerry Cable Corridor Area of Search. Instead, further geophysical survey work will be conducted in advance of cable works to inform detailed design prior to construction.

Despite the above limitations to the study, the DBA sources and geophysical data analysed were sufficient to be able to provide an adequate baseline assessment on which to base a robust EIA and ES.

# 4.0 DBA and Geophysical Assessment Results

The locations of all sites and anomalies identified by the DBA and the geophysical data assessment are shown in **Figure 1.** These are discussed below.

## 4.1 Shipwrecks

UKHO report five shipwrecks in the study area; one of these, the steamship SS *Aase,* is listed as being wrecked "off Brims" on 16th March 1928. Subsequent research has confirmed this vessel was actually wrecked off Brims Ness in Caithness, not Hoy (Caithness Sub Aqua Club, pers. comm.). Thus this is not in the study area and not included in any further total numbers of shipwrecks or described below.

A further eleven shipwreck sites are listed on the Canmore database, giving fifteen potential shipwreck sites in total. These are summarised in **Appendix 2** and are shown in **Figure 2**. Of the fifteen shipwrecks identified, two (the *Admiral* and MFV *Challenger*) are thought to have sunk or have positions in the AfL, one (the *Canadian*) is thought to have sunk and has a position listed

as being in the Moodies Eddy Cable Corridor Area of Search, four (the *George,* the *Alexander Forbes,* the *Seaton* and the *Rapid*) are thought to have sunk or washed ashore in the Aith Hope Cable Corridor Area of Search and four (*Breaconmoor (A767), Dorbie (H261), Agnes* and *William*) are thought to have sunk or washed ashore in, or close to, the Sheep Skerry Cable Corridor Area of Search. Although the listed positions of the remaining four shipwreck sites (the HMS *X-22,* the *Saxon*, the *Silanion* and the *Neptunia*) fall outside these areas, they have been included in the DBA because the precise locations of their sinking are unknown and descriptions included within details of their circumstance of loss indicate they could be within the AfL or Cable Corridor Areas of Search. Vessels with unconfirmed positions are indicated in **Figure 2** as U/V (unverified).

Of the fifteen wrecks identified, one is considered of **very high importance** if present, as it is a rare vessel and a war grave:

- The *HMS X-22* (Canmore 101984) – a Second World War midget submarine, lost on the 7th February 1944, the *X-22* was being towed by the submarine *HMS Syrtis* to a position off the southern entrances to Scapa Flow to test the Scapa defences against midget submarine attack. The weather was poor and while passing over the Merry Men of Mey the officer of the watch was washed overboard. When the submarine *HMS Syrtis* turned to search for him the *HMS X-22* was rammed and sank with a loss of four crew.

Two wrecks are considered of **high importance** because there was a high loss of life and there is the potential that some of the crew went down with the ship:

- The *Saxon* (Canmore 226839), a barque built in Scarborough and mastered by Harrison, carrying a cargo of coal to Jamaica, was stranded on the East side of Duncans Geo, Brims Ness, on the 22nd December 1873. This stranding resulted in the loss of 12 crew (PP Abstracts Returns of Wrecks and Casualties on Coasts of the UK 1873 - 74 (1875 [C.1260] LXX.161)).

- The *Seaton* (Canmore 260614), a barque, was reported lost and “a lifebuoy, marked "JAMES HARRISON, Scarborough", had been washed ashore, 22nd Dec., in the vicinity of the wreck of the barque at


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> Hoy island, Orkney: the crew supposed to have been drowned: the hull of the vessel had gone to pieces" in the Shipping Intelligence reports (LL, No. 18,622 London, Friday December 26 1873 and LL, No. 18,622, London, Saturday December 27 1873). A subsequent report (LL, No. 18,624, London, Tuesday December 30 1873) for the vessel "washed ashore on the island of Hoy" on the 22nd December 1873, states the wreckage was marked "SEATON, Scarborough".

In the Lloyds register of loss for 1873–1874, there are two vessels listed as *Seaton,* both were made of iron, both were steamships, neither are recorded as wrecked and neither were registered in Scarborough (**Plate 2**) *contra* Shipping Intelligence Report LL, No. 18,624 quoted above. In contrast, there are four records for *Saxon*. One of them, registered in Scarborough, is listed as having been wrecked (**Plate 3**).

As both vessels are recorded as being linked to Harrison and built in Scarborough, it is likely that the vessel listed as the *Seaton* is actually the *Saxon*, mis-recorded by clerical error in the third Shipping Intelligence entry (18,624), which is the first time the name of *Seaton* is associated with the loss.

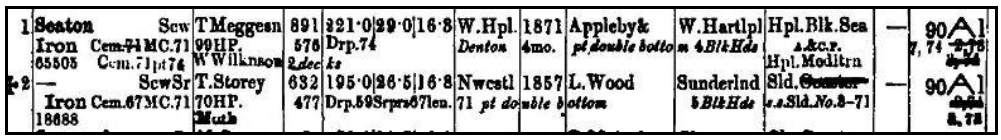

**Plate 2: Extract from 1873-1874 Lloyds Register - 'Seaton'**

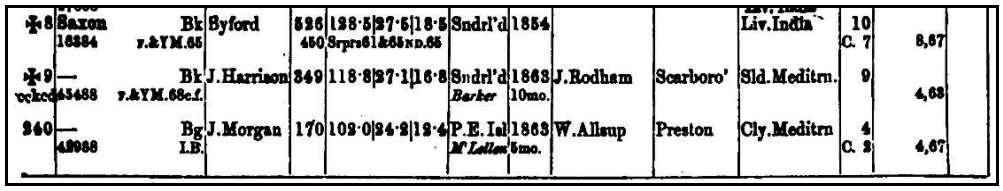

**Plate 3: Extract from 1873-1874 Lloyds Register - 'Saxon'**

Seven wrecks are considered of **medium importance** if the remains are well preserved as they could provide insight into fishing, ferrying and other coastwise trade:

- The *Canadian* (Canmore 250114)*,* a rigged ship wrecked or foundered on the 26th February 1869. The details of loss indicate this vessel may be present in the Moodies Eddy Cable Corridor Area of Search;

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- The *Admiral* (Canmore 252229), a smack, foundered half a mile East of Brims Ness on the 18th September 1888. This vessel has an unconfirmed position within the AfL;

- The *George* (Canmore 224379), a schooner, lost at Brims Ness on the 30th September 1817. The exact location of this wreck is unknown, but details of loss indicate this vessel may be present in the Aith Hope Cable Corridor Area of Search;

- The *Alexander Forbes* (Canmore 276765), a schooner which caught fire and was run aground at Aith Hope on 14th September 1846. The position listed in Canmore places this wreck in the middle of the Aith Hope Cable Corridor Area of Search. This is because Canmore uses the south-west (lower left) corner of the nearest grid square in situations where the precise coordinates are unknown. There may still be some wreckage from this vessel along the shoreline in the Aith Hope Cable Corridor Landfall Area of Search;

- The *Rapid* (Canmore 265725), a fishing smack which parted from her anchor in Aith Hope and was washed ashore on the 21st October 1875. The position listed in Canmore places this wreck in the middle of the Aith Hope Cable Corridor Area of Search. This is because Canmore uses the south-west (lower left) corner of the nearest grid square in situations where the precise coordinates are unknown. There may still be some wreckage from this vessel along the shoreline in the Aith Hope Cable Corridor Landfall Area of Search;

- The *Agnes* (Canmore 288007), a Sloop which went aground on Tor Ness on the 31st December 1850; and

- The *William* (Canmore 227984) a wooden fishing vessel which foundered off Tor Ness on the 29th March 1884.

Four wrecks are considered of **low importance** as they were all lost after 1913. Their listed cargos are only considered to be of local importance, and there are good historical records for their various methods of construction. Two of these vessels have unconfirmed positions outside the AfL and Cable Corridor Areas of Search:

- The *Silanion* (Canmore 224010), a steam trawler wrecked off Tor


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Ness on 23rd February 1933;

- The *Neptunia* (Canmore 102205), a steam trawler wrecks off Brims Ness by Kippoch Tock on 3rd March 1936.

The remaining two vessels are reported to have been wrecked on or near Tor Point, and may be within the Sheep Skerry Cable Corridor Area of Search.

- The *Braconmoor* (*A767*) (Camore 224011), a steam trawler which ran aground on Tor Ness on the 5th January 1930; and
- The *Dorbie* (*H361)* (Canmore 224009), a steam trawler which stranded on Tor Ness close to the wreck of the Braconmoor on 9th January 1932.

One wreck is considered of **negligible importance** as it is a modern vessel of no historical interest:

- The MFV *Challenger* (Canmore 330832), a fiberglass fishing vessel lost on 2nd January 2000. The vessel has a confirmed position within the AfL.

As a maritime nation with a reliance on marine based trade and exchange, there have been countless shipwrecks around UK waters from all periods – many of which remain unreported. The Pentland Firth has a well-deserved reputation as a channel to be navigated with care. Tide surges through the Firth between the Atlantic and the North Sea and can reach up to 12 knots (22km/h) (Dacre et al. n.d: 2). Throughout history it has been an important and well-used seaway, both through and across the Firth.

The embayment of Aith Hope has been used as a harbour (Peterkin 1822: 14). The placename itself, derived from Old Norse, indicates maritime usage perhaps at least as far back as the Norse period. ‘Aith’ is derived from the word for isthmus, often used as a portage, and ‘Hope’ is derived from the word for a small bay, possibly used as a harbour (Marwick 1927: 78).

As such there is a **high probability** for unknown, unrecorded vessels to have sunk in the project area. Remains of such vessels and their associated artefacts may not be visible in geophysical data – constructed from materials that do not provide strong geophysical or magnetic returns or buried beneath

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the surface of the seabed. However, the likelihood for the project to encounter such remains is reduced by the nature of the seabed and the tidal conditions within the development area.

The seabed across most of the AfL Area and within the Cable Corridor Areas of Search comprises primarily outcropping bedrock and shallow, mobile sediment cover (C13007_Vol2c_re01: 9, 14, 18), which are not conducive to good preservation, though some cultural material may survive trapped in gullies. The survival of wrecks, wreckage and associated artefacts, particularly in shallower waters, is also affected by the strong tides and severe winter storms that frequent the area. There are sandy deposits in the shallow waters at the head of Aith Hope and on the west side of Sheep Skerry, merging with the dunes onshore at each location, where material could be buried. However, the sand deposits are not extensive and broken up by outcrops of bedrock, indicating that they are not very thick. Thus there is considered to be **low potential** for the project to impact on significant unknown wrecks or their associated artefacts.

## 4.2 Maritime Infrastructure

There are three slipways on the intertidal zone in the Aith Hope Cable Corridor Landfall Area of Search. One slipway which dates to 1906 is associated with the Longhope Lifeboat Museum and is considered of **high importance.** The other two (Inner Haven and Salwick Slipways) date to the early 20$^{th}$ century and are considered of **low importance**.

## 4.3 Non-sub Contacts

A Non-sub Contact is a sonar contact detected during wartime submarine searches that are not submarines. The identity of these contacts is unclear – they have the potential to be shipwrecks or other anthropogenic features, or they can be natural.

One Non-sub Contact was identified by the DBA as being within the AfL (**Figure 2**). It is considered of **negligible importance** as subsequent assessment indicated that it is likely to have been a natural rather than anthropogenic feature:

- A Non-sub Contact (UKHO 958), reported by HMS Woolwich in 1940. The position was resurveyed by BUE SUBSEA on behalf of the UKHO


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in 1985. The UKHO report indicates the surveys found nothing "other than a 10m deep, steep sided trench, which may have given a SONAR reflection" (UKHO Report 958).

## 4.4 Geophysical anomalies from other studies

One geophysical anomaly (Canmore ID: 330970) was identified by the DBA as being within the AfL Area (Unknown Feature, **Figure 2**). The anomaly, recorded as part of the Adair Project (Pollard et al. 2012) was listed as being of **medium geophysical potential.** It is considered here to be of **uncertain importance**.

- The linear feature measures 17 m x 13m aligned southwest – northeast, with a height of 16 m.

## 4.5 Aviation Losses

There are no known aircraft losses within the AfL and the Cable Corridor Areas of Search. However, there are seven aircraft recorded as having crashed into this area of the Pentland Firth and it remains a possibility that one or more could be within the AfL or Cable Corridor Areas of Search (**Table 3**). These would be considered of **high importance** as they were all lost during World War II and thus automatically protected under the Protection of Military Remains Act.

| Aircraft | Crash Date | Circumstance of Loss | Source |
|---|---|---|---|
| Junkers Ju88 of Kg 30 | 17 October 1939 | Shot down and crashed into the sea' "between Hoy and Stroma'' | Whittaker 1998 |
| Avro Tutor I K3305 | 31 May 1940 | Ditched into the Pentland Firth | Whittaker 1998 |
| Fairey Swordfish W5924. 782 squadron (sqdn.) | 26 June 1942 | Crashed into the Pentland Firth, cause unknown. S/Lt H Shaw and two soldier passengers killed. | Whittaker 1998 |
| Blackburn Roc L3177 771 sqdn. | 18 September 1942 | "Ditched in the sea on the Pentland Firth side of Hoy." Engine failure, S/Lt Larkins, LA B Bassett & L/Ph MH Spiller all lost. | Whittaker 1998 |
| Fairey Albacore I | 13 January | Crashed into the Pentland Firth. Lt E.S. | Whittaker 1998 |

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| Aircraft | Crash Date | Circumstance of Loss | Source |
|---|---|---|---|
| X9174 831 sqdn. | 1943 | Morrell saved | |
| Supermarine Walrus X9481, 700 sqdn Fleet Air Arm | 24 September 1942 | Collided over the Pentland Firth. Lt NS Mackenzie, S/L PJ Wheatley & LA FJP Payne all lost | Sturtivant 1995; ADM 358/989 |
| Supermarine Walrus L2329 700 sqdn Fleet Air Arm | 24 September 1942 | S/Lt M G Clyde RNZN, S/Lt EH Hardwick & LA C P Penn-Simkins all lost | Sturtivant 1995; ADM 358/989 |

**Table 3: Potential Aviation Losses in Study Area**

## 4.6 Unexploded Ordinance

There are no reports of any unexploded ordinance within the AfL or Cable Corridor Areas of Search from either World War I or II. None of the Bi Monthly minesweeping reports show any mine laying activity within the Pentland Firth probably due to the extreme tidal conditions. In both WWI and WWII, U Boats were ordered not to transit the Pentland Firth due to the tide.

## 4.7 Multi-beam echosounder anomalies

The MBES data shows the survey area to be predominantly exposed bedrock with some smaller areas of megaripples and sand waves that tend to be concentrated along the Cable Corridor Areas of Search and in areas more sheltered from the tide. The inshore section of the Cable Corridor Areas of Search comprises exposed bedrock with some small patches of sediment.

Four MBES anomalies were observed in the geophysical assessment. MBES01 and MBES03 fall within the AfL; MBES02 is positioned 350 m to the North of the AfL while MBES04 is located within the Moodies Eddy Cable Corridor Area of Search. No anomalies were identified within the Aith Hope or Sheep Skerry Cable Corridor Areas of Search. The distribution of these anomalies is shown in **Figure 3**. Two anomalies (MBES01 and MBES04) were considered of **high geophysical potential**, one anomaly (MBES03) was considered of **medium geophysical potential** and one (MBES02) of **low geophysical potential**.

MBES01 and MBES04 are considered of **high geophysical potential** as

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these both correspond to magnetic anomalies observed by Osiris Projects (M0001 and M028 respectively). MBES004 also corresponds to a side scan anomaly observed during our assessment that was also noted by Osiris Projects (ORCA ID SSS003, Osiris Projects ID S214). It is possible that this feature represents the remains of the *Canadian*, the unverified position of which is 320m northwest.

MBES01, MBES02 and MBES04 are all low ovular mounds, associated with slight scouring, which stand 1.3 m – 1.4 m proud of the seabed. These anomalies are less than 10m long or wide. MBES03 is a larger (>10m long) linear mound that stands 3.2 m proud of the seabed. Images, measurements and descriptions of each anomaly are provided in **Appendix 3**.

## 4.8 Side scan sonar anomalies

No additional SSS anomalies were identified during the assessment of the SSS mosaics by ORCA Marine.

Three of the SSS anomalies recorded by Osiris Projects were considered to be of potential archaeological interest and these have been assigned ORCA ID numbers. These are all located within the Moodies Eddy Cable Corridor Area of Search (**Figure 3**).

Two of these anomalies (SSS002 and SSS003) are considered to be of **high geophysical potential**. These correspond to Osiris Projects side scan anomalies S043 and S214 respectively. The remaining anomaly (ORCA ID SSS01) was considered to be of **medium geophysical potential**. This corresponds to Osiris Projects anomaly S019.

SSS003 has a distinct shadow and correlates with MBES anomaly MBES04 and Osiris Projects magnetic anomaly M028. It is possible that this feature represents the remains of the *Canadian*, the unverified position of which is 320m northwest.

Images, measurements and descriptions of the anomalies assigned ORCA IDs are provided in **Appendix 4**.

## 4.9 Magnetic anomalies

No additional magnetic anomalies were identified during the assessment of the magnetometer data by ORCA Marine.

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Of the anomalies recorded by Osiris Projects, M001 and M028 are considered to be of **high geophysical potential**. These are shown on **Figure 4** as MAG01 and MAG02 respectively.

M001 correlates with MBES anomaly MBES01, while M028 correlates with MBES anomaly MBES04 and SSS anomaly SS003. It is possible that M028 represents the remains of the *Canadian*, the unverified position of which is 320m northwest.

The remaining magnetic anomalies recorded by Osiris Projects appear to correlate with natural geology and are considered of **low geophysical potential** (C13007_Vol2c_rev01 2014: 11, 15 and 19).

## 4.10 Potential for submerged landscapes and cultural remains

Hominids and humans have occupied the UK continental shelf (UKCS) at various times for more than 700,000 years, but finds showing this are incredibly rare. Although in general terms, the potential for submerged prehistoric archaeology and landscapes across wide areas of the UKCS is high (Wessex Archaeology 2009, 9), the potential for site preservation in areas of the shelf deeper than 80m is low (Flemming 2003: 16).

Areas of the seabed in the Pentland Firth and Orkney Waters have been exposed at various periods in the past dating back to as early as 18000BP (Flemming 2003: 9). Therefore, it is possible that evidence of periglacial occupation (in the form of submerged prehistoric artefacts and paleo-landscape remains) survives on the seabed. Such evidence may have been trapped in cracks and gullies in areas where the bedrock has been exposed after the erosion and removal of late Quaternary deposits or post-Devensian material (Flemming 2003: 20). The gullies and sediments in the bedrock outcrops around the nearshore section, where there may be thicker sediments, is the most likely area.

The survey data indicate that the AfL, Moodies Eddy and Aith Hope Cable Corridor Areas of Search comprises “exposed and occasionally fragmented bedrock… and areas of gravelly sands/sandy gravels close to its northern boundary. Megaripples are evident across these areas” (C13007_Vol2c_rev01 2014: 8). Osiris Projects report that within the AfL and around the inshore edges of these Cable Corridor Areas of Search

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"sediment cover within the rock gullies that cut through the rock head is generally less than 1.0m." (C13007_Vol2c_rev01 2014: 9). Although there is a greater depth of sediment within some areas of these Cable Corridor Areas of Search, these areas comprise sand waves and megaripples. These are formed when "waves and currents combined are moving modern sediments rapidly on the seabed" (Flemming 2004: 18). Similar patterns were observed in the Sheep Skerry MBES data.

Therefore in areas of exposed bedrock and in areas associated with mobile sediments there is **low potential** for preservation of submerged prehistoric artefacts and palaeo-landscape remains due to the nature of the seabed and the strong tides.

### *4.10.1 Sub-bottom profiler anomalies*

No evidence of submerged cultural-historical material or palaeo-landscape features was identified in analysis of the available processed SBP images.

# 5.0 DBA and Geophysical Survey results by area

## 5.1 AfL

There is one shipwreck of **medium importance** (the *Admiral*) with an unconfirmed position and one geophysical anomaly (Unknown Feature) of **unknown importance** within the AfL.

Two MBES anomalies (MBES01 and MBES03), and one magnetic anomaly (Osiris Projects ID M001) considered of **high or medium geophysical potential** were recorded within the AfL.

There was one shipwreck of **negligible importance** (MFV *Challenger*), a modern vessel of no historic interest. A Non-sub Contact of **negligible importance** falls within this area, considered to be a non-anthropogenic feature.

As noted in section 4.10 there is a **low probability** for the preservation of submerged landscapes, palaeoenvironmental evidence and prehistoric cultural remains in the AfL as the area predominantly comprises exposed bedrock and shallow (>1m) thick sediment accumulations.

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## 5.2 Moodies Eddy Cable Corridor Area of Search

There is one shipwreck of **medium importance** (the *Canadian*) with an unconfirmed position within the Moodies Eddy Cable Corridor Area of Search.

One MBES anomaly (MBES04), three SSS anomalies (SSS001 – SSS003) and one magnetic anomaly (Osiris ID M028) considered of **medium or high geophysical potential** were recorded in the Moodies Eddy Cable Corridor Area of Search. MBES04, SSS03 and M028 are all from the same anomaly on the seabed. It is possible that this feature represents the remains of the *Canadian*, the unverified position of which is 320m northwest.

As noted in Section 4.10, there is a **low probability** for the preservation of submerged landscapes, palaeo-environmental evidence and prehistoric cultural remains in the Moodies Eddy Cable Corridor Area of Search. However, these may present in the gullies and sediments around the bedrock outcrops around the nearshore section, where there may be thicker sediments.

## 5.3 Aith Hope Cable Corridor Area of Search

There is one shipwreck of **high importance** (the *Seaton*) and one shipwreck of **medium importance** (the *George*) with unconfirmed positions within the Aith Hope Cable Corridor Area of Search. A further two shipwrecks of **medium importance** (the *Alexander Forbes* and the *Rapid*) with unconfirmed positions are reported to have been washed ashore along the shoreline in the Aith Hope Cable Corridor Landfall Area of Search.

There is one slipway of **high importance** (associated with the Longhope Lifeboat Museum) and two slipways of **low importance** on the intertidal zone of the Aith Hope Cable Corridor Landfall Area of Search.

No MBES, SSS or Magnetometer anomalies were recorded within the Aith Hope Cable Corridor Area of Search.

As noted in Section 4.10, there is a **low probability** for the preservation of submerged landscapes, palaeo-environmental evidence and prehistoric cultural remains in the Aith Hope Cable Corridor Area of Search. However, these may present in the gullies and sediments around the bedrock outcrops

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in the nearshore section and the sand deposits close to the isthmus, where there may be thicker sediments.

### 5.4 Sheep Skerry Cable Corridor Area of Search

There are two shipwrecks of **medium importance** (*Agnes* and *William*) and two shipwrecks of **low importance** (*Braconmoor* (A767) and *Dorbie* (H631)) with unconfirmed positions which are reported to have stranded or foundered within or on the shoreline of the Sheep Skerry Cable Corridor Area of Search.

No MBES anomalies were identified within the Sheep Skerry Cable Corridor Area of Search.

As noted in Section 4.10, there is a **low probability** for the preservation of submerged landscapes, palaeo-environmental evidence and prehistoric cultural remains in the Sheep Skerry Cable Corridor Area of Search. However, these may present in the gullies and sediments around the bedrock outcrops around the nearshore section, where there may be thicker sediments.

### 5.5 Vicinity of AfL and Cable Corridor Areas of Search

Four shipwreck sites, identified as part of the DBA have unverified positions in the vicinity of the AfL and both Cable Corridor Areas of Search. Although their listed locations as depicted on **Figures 1 and 2** shows them outside the AfL and both Cable Corridor Areas of Search, these coordinates are unverified – their positions are based on locations of loss cited in Whittaker (1998). Two of these shipwrecks (the HMS *X-22* and *Saxon*) are considered of **very high and high importance** respectively. The remaining two shipwrecks (the *Silanion* and the *Neptunia*) are both considered of **low importance**.

One MBES anomaly considered of **low geophysical potential** (MBES02) lies to the North of the western part of the AfL and is considered to be a non-anthropogenic feature.

## 6.0 Summary

Fifteen potential shipwreck sites were identified during the DBA. The

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positions of 14 of these wrecks are tentative, derived from the unverified location of loss indicated in Whittaker (1998). Thus although the position of four of these sites are depicted as outside the AfL or Cable Corridor Areas of Search, there is the potential that some remains could be within these areas.

One shipwreck site (HMS *X-22*) is considered of **very high importance** as it is a rare vessel and a war grave (lost during World War II).

Two shipwreck sites (the *Saxon* and the *Seaton*) are considered of **high importance** as these had a high loss of life and there is the potential that some of the crew went down with the ship. It is likely however that the *Saxon* and the *Seaton* are both the same vessel and that the records of two separate vessels have been created as a result of clerical error.

Seven shipwreck sites (the *Canadian, Admiral, George, Alexander Forbes*, *Rapid*, *Agnes* and *William*) are considered of **medium importance**. If preserved they could provide insight into fishing, ferrying and other coastwise trade.

Four shipwreck sites (the *Silanion*, *Neptunia, Braconmoor (A767)* and *Dorbie (H361)*) are considered of **low importance** because we have good historical records for the construction of the vessels and they were not carrying cargo of any importance. One shipwreck (MFV *Challenger*) is considered of **negligible importance** as it is a modern vessel of no historical interest.

One slipway considered of **high importance** and two slipways considered of **low importance** were observed on the inter-tidal zone along the Aith Hope Cable Corridor Landfall Area of Search.

One Non-sub Contact of **negligible importance** and one geophysical anomaly (Unknown Feature) of **medium geophysical potential** but **uncertain importance**, and were also recorded during the DBA.

There is a **high probability** for unknown, unrecorded vessels to have sunk in the project area that may not be visible in geophysical data – constructed from materials that do not provide strong geophysical or magnetic returns or buried beneath the surface of the seabed. However, the likelihood for encountering such remains is reduced by the nature of the seabed and the tidal conditions within the development area. Bedrock, mobile sediments and

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strong tides are not conducive to the good preservation of wrecks, wreckage and associated artefacts therefore there is considered to be **low potential** for the project to impact on unknown significant remains.

Although there are no aircraft known to have crashed within the AfL or Cable Corridor Areas of Search, there are seven aircraft listed as having crashed in the Pentland Firth that have yet to be found. It remains a possibility that one or more of these could have come down within the development area. If identified these remains would be considered of **high importance** as these were all lost in World War II and are protected under the Protection of Military Remains Act.

Four MBES, three SSS and two magnetic anomalies were noted in the assessment of the geophysical data. Of these two MBES anomalies (MBES01 and MBES04), two SSS anomalies (SSS002 and SSS003) and two magnetic anomalies (M01 and M028) were considered to be anthropogenic (**high geophysical potential**). One MBES anomaly (MBES03), and one SSS anomaly (SS001) were considered to be possibly anthropogenic (**medium geophysical potential**). The remaining MBES anomaly (MBES02) was considered to be of **low geophysical potential.**

It is possible that the feature marked by MBES04, SSS03 and M028 represents the remains of the *Canadian* which is listed as having wrecked or foundered in an approximate position 320m northwest of the feature.

It is possible that evidence of periglacial occupation (in the form of submerged prehistoric artefacts and palaeo-landscape remains) survives on the seabed. The gullies and sediments in the bedrock outcrops around the nearshore section where there may be thicker sediments being the most likely area. However, no palaeo-landscape features were observed in the assessment of the SBP survey data and no submerged landscapes of archaeological interest were identified. Moreover, the MBES and SSS data indicate the area is predominantly exposed bedrock, thin sediment deposits and mobile sediments which are not conducive to the preservation of submerged landscape remains. Thus it is considered that there is a **low probability** that any submerged prehistoric artefacts and palaeo-landscape remains will survive.

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- ADM116-1518
- ADM 1/16893
- ADM 358/989

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# Appendix 1: Summary of low resolution SBP tracks

| SBP Transit ID | Comment (if applicable) |
|---|---|
| 050913.112616_Brims_SPK.sgy | |
| 080913.120608_Brims_SPK.sgy | |
| 160513.135533_Brims_SPK.sgy | |
| 160513.180145_Brims_SPK.sgy | Blank |
| 170513.045936_Brims_SPK.sgy | |
| 170513.163522_Brims_SPK.sgy | |
| 240513.161203_Brims_SPK.sgy | Nearshore edge of cable routes |
| 240513.180052_Brims_SPK.sgy | |
| 250513.114558_Brims_SPK.sgy | Nearshore edge of cable routes |
| 250513.135042_Brims_SPK.sgy | Nearshore edge of cable routes |
| 250812.133804_Brims_SPK.sgy | Nearshore edge of cable routes |
| 260513.102043_Brims_SPK.sgy | |
| 260812.105831_Brims_SPK.sgy | |
| 260812.143105_Brims_SPK.sgy | |
| 260813.140824_Brims_SPK.sgy | |
| 290713.102858_Brims_SPK.sgy | |
| 290812.133332_Brims_SPK.sgy | |
| 310713.150900_Brims_SPK.sgy | |
| 060513.185455_Brims_PNG.sgy | No data |
| 160513.135533_Brims_PNG.sgy | No data |
| 160513.193527_Brims_PMG.sgy | Faint no data |
| 170513.184440_Brims_PNG.sgy | |
| 240513.155354_Brims_PNG.sgy | |
| 240513.164219_Brims_PNG.sgy | Nearshore edge of cable routes |
| 240513.173252_Brims_PNG.sgy | Nearshore edge of cable routes |
| 240813.122004_Brims_PNG.sgy | |
| 250513.105216_Brims_PNG.sgy | Nearshore edge of cable routes |

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| | |
|---|---|
| 250513.115404_Brims_PNG.sgy | |
| 250513.130822_Brims_PNG.sgy | |
| 250513.135813_Brims_PNG.sgy | |
| 250812.125719_Brims_PNG.sgy | Nearshore edge of cable routes |
| 250812.140726_Brims_PNG.sgy | Nearshore edge of cable routes |
| 250813.141130_Brims_PNG.sgy | |
| 260513.105733_Brims_PNG.sgy | |
| 260513.131029_Brims_PNG.sgy | |
| 260812.110012_Brims_PNG.sgy | |
| 260812.151706_Brims_PNG.sgy | |
| 280713.092130_brims_PNG.sgy | |
| 290713.131214_Brims_PNG.sgy | |
| 290812.165729_Brims_PNG.sgy | |
| 310713.174836_Brims_PNG.sgy | |

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## Appendix 2: Potential sites identified by DBA

| Name | UKHO Wreck Number | Canmore Number | Description | Circumstance of loss | Date Lost | Date Reported | Position From | U/V or PA | Latitude (WGS84) | Longitude (WGS84) | Proximity to development | Source | Importance | Reason |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HMS *X-22* | 949 | 101984 | Midget Submarine | Rammed by towing submarine | 07/02/1944 | | UKHO | U/V | 58 43.657N | 003 18.093W | Unknown | 1,2,3,5, 12,13,14,15 | Very High | Loss of life; wartime remains |
| *Saxon* | | 226839 | Barque | Stranded on the east side of Duncans Geo, Brims Ness. | 22/12/1873 | | Canmore | U/V | 58 46.5N | 003 13.67W | Unknown | 1,2,4,10 | High | Loss of life and if preserved, remains could provide insight into fishing, ferrying or coastwise trade |
| *Seaton* (see above) | | 260614 | Barque | Totally wrecked at Brims Ness, all crew lost | 23/12/1873 | | Canmore | U/V | 58 46.6N | 003 13.2N | Aith Hope Cable Corridor | 10, | High | Loss of life and if preserved, remains could provide insight into fishing, ferrying or coastwise trade<br><br>N/B likely that this is a Clerical Error – and that the Seaton and the Saxon (above) are the same vessel |
| *Canadian* | | 250114 | Ship | Anchored between Turns Ness and Brims Ness, Hoy then wrecked or founded in 30 ft. | 26/02/1869 | | Canmore | U/V | 58 46.30N | 003 15.00W | Moodies Eddy Cable Corridor | 1,10 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| *Admiral* | | 252229 | Smack | Foundered ½ mile east of Brims Ness | 18/09/1888 | | Canmore | U/V | 58 46.00N | 003 12.00W | AfL | 1,4,10 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| *George* | | 224379 | Schooner | Transporting cargo from Miramichi to Blyth, is lost on Brims Ness | 30/09/1817 | | Canmore | U/V | 58 46 30N | 003 13.00W | Aith Hope Cable Corridor | 1.2.10 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| *Alexander Forbes* | | 276765 | Schooner | Vessel caught fire, was run ashore at Aith Hope, and burnt to the waterline. | 14/09/1846 | | Canmore | U/V | 58 46.8N | 003 13.2W | Aith Hope Cable Corridor | 1, 4 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| *Rapid* | | 265725 | Fishing Smack | Parted from anchor in Aith Hope, went ashore, and became a total wreck | 21/10/1875 | | Canmore | U/V | 58 46.8N | 003 13.2W | Aith Hope Cable Corridor | 1, 4 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| *Agnes* | | 288007 | Sloop | Stranded at Tor Ness, Hoy | 31/12/1850 | | Canmore | U/V | 58 46.50N | 003 18.0W | Unknown/ Sheep Skerry Cable Corridor | 1, 2, 7 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| *William* | | 227984 | Fishing vessel | Foundered while fishing at Tor Ness, Hoy | 29/03/1884 | | Canmore | U/V | 58 46.00N | 003.18.0W | Unknown/ Sheep Skerry Cable Corridor | 1, 2 7 | Medium | If preserved, remains could provide insight into fishing, ferrying or coastwise trade. |
| SS *Aase* | 960 (Dead) | 102995 (also see 114834) | Steamship | Wrecked off Brims Ness, Caithness | 16/03/1928 | | UKHO | U/V | 58 45.976 N | 003 14.093 W | AfL (by Hydro Report) | 1,5,9 | Low | Ship and cargo of local importance; post-date 1913; good historical records of construction methods |
| *Silanion* | 962<br><br>(Dead) | 224010 | Grimsby Steam trawler | Wrecked off Tor Ness | 23/02/1933 | | UKHO | U/V | 58 46,475N | 003 17,592W | Unknown | 1,2,5,12 | Low | Ship and cargo of local importance; post-date 1913; good historical records of construction methods |
| *Neptunia* | 961<br><br>(Dead) | 102205 | Steam Trawler | Wrecked off Brims Ness, Stranded at Kippoch Rock | 03/03/1936 | | UKHO | U/V | 58 46.308N | 003 14,176 W | Unknown | 1,2,5,10 | Low | Ship and cargo of local importance; post-date 1913; good historical records of construction methods |
| *Braconmoor (A767)* | | 224011 | Steam Trawler | Ran aground on Tor Ness | 05/01/1930 | | Canmore | U/V | 58.47.00N | 003 18.00W | Unknown/ Sheep Skerry Cable Corridor | 1, 2 3, 4, 7, 9, 10 | Low | Ship and cargo of local importance; post-date 1913; good historical records of construction methods |

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| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Dorbie (H361)* | | 224009 | Steam Trawler | Stranded on Tor Ness 'Close to the wreck of the Braconmoor' | 09/01/1932 | | Canmore | U/V | 58.47.00N | 003.18.00W | Unknown/ Sheep Skerry Cable Corridor | 1, 2, 6, 7 | Low | Ship and cargo of local importance; post-date 1913; good historical records of construction methods |
| MFV *Challenger* | 58827 | 330832 | Fiberglass fishing vessel | Collision with another fishing vessel. | 02/10/2000 | | UKHO | | 58 45.610 N | 003 13.380 W | AfL | 5 | Negligible | Modern fishing vessel. No historical interest |
| Non-sub Contact | 958 (Dead) | | Sonar Contact | Sonar Contact reported by HMS *Woolwich.* BUE SUBSEA survey found this could be a 10m deep trench | N/A | 1940 | UKHO | | 58 45,275N | 003 13,894W | AfL | 5 | Negligible | Natural Feature |
| Unknown Feature | | 330970 | Geophysical Anomaly | Linear feature 17 m x 13 m aligned southwest - northeast, height of 16m. | N/A | | ADAIR | | 58 45.802N | 003 13.822W | AfL | 11 | Medium Geophysical Potential. Uncertain. | Unknown medium potential geophysical anomaly reported by Project ADAIR |

**Sources**

**1 = Whittaker (1998); 2 = Larn & Larn (1998); 3 = Baird (2003); 4 = Lloyds Register; 5 = UKHO 6= Hepper (2006) 7=Toghill (2004) 8= Lloyds War Losses WWII 9 = Ridley 1990 Dive NW Scotland. 10 = Canmore 11= Adair 12= Ridley (1992) Dive Scotland: The Northern Isles and east coast 13 = National Archive Kew 14 = Hewison (2005), This Great Harbour 15 = Ferguson (1988) Shipwrecks of Orkney & Shetland**

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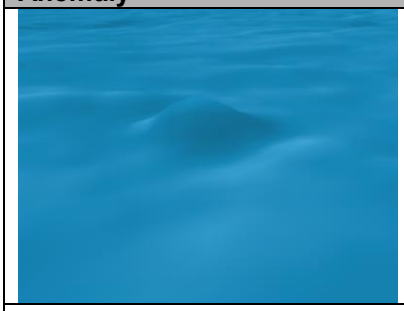
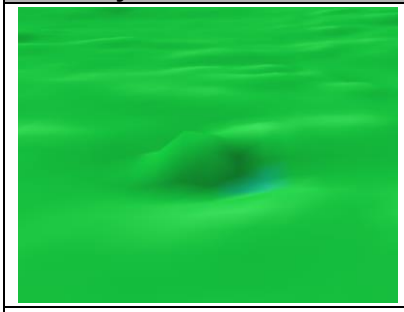
# Appendix 3: MBES anomalies

| Anomaly | MBES01 | |
|---|---|---|
|  | | |
| **Source** | X:\MarineArchaeology\ORCA Marine Projects\448_Brims_ex_Cantick_SSE\Geomatics\GIS\Shapefiles\Fledermaus\C13007_Brims_ALI_XYZ_1m_UTM30N_LAT_rev00.sd | |
| **WGS UTM Zone 30N** | 481863 E | 6514117 N |
| **Dimensions** | 6.8 m x 5.2 m | |
| **Description** | Low ovular mound. Slight scour (0.3 m deep) around feature. Mound is 1.4 m in height in 80 m of water. Coincides with Surveyors M0001 contact | |
| **Level of geophysical potential** | High | |
| **Proximity to Development** | AfL | |

| Anomaly | MBES02 | |
|---|---|---|
|  | | |
| **Source** | X:\MarineArchaeology\ORCA Marine Projects\448_Brims_ex_Cantick_SSE\Geomatics\GIS\Shapefiles\Fledermaus\C13007_Brims_ALI_XYZ_1m_UTM30N_LAT_rev00.sd | |
| **WGS UTM Zone 30N** | 483225 E | 6514509 N |
| **Dimensions** | 6.3 m x 6.8 m | |
| **Description** | Low ovular mound. Slight scour (0.2 m deep) around feature. Mound is 1.3 m high in 61 m of water. Surveyors M009 contact is 47.6 m to the Northwest | |
| **Level of geophysical potential** | Low | |
| **Proximity to Development** | AfL | |

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| Anomaly | MBES03 | |
|---|---|---|
|  | | |
| **Source** | X:\MarineArchaeology\ORCA Marine Projects\448_Brims_ex_Cantick_SSE\Geomatics\GIS\Shapefiles\Fledermaus\C13007_Brims_ALI_XYZ_1m_UTM30N_LAT_rev00.sd | |
| **WGS UTM Zone 30N** | 486390 E | 6512853 N |
| **Dimensions** | 10.6 m x 3.4 m | |
| **Description** | Linear mound aligned Southwest - Northeast. Feature is 3.2 m high in 80.8 m of water. | |
| **Level of geophysical potential** | Medium | |
| **Proximity to Development** | AfL | |

| Anomaly | MBES04 | |
|---|---|---|
|  | | |
| **Source** | X:\MarineArchaeology\ORCA Marine Projects\448_Brims_ex_Cantick_SSE\Geomatics\GIS\Shapefiles\Fledermaus\C13007_Brims_ALI_XYZ_1m_UTM30N_LAT_rev00.sd | |
| **WGS UTM Zone 30N** | 485604 E | 6514323 N |
| **Dimensions** | 6.8 m x 5.1 m | |
| **Description** | Low mound aligned East -West. Feature is 1.5 m high in 71.6 m of water. Surveyors Contact M028 coincides with this feature as does SSS003 contact. | |
| **Level of geophysical potential** | High | |
| **Proximity to Development** | Moodies Eddy Cable Corridor Area of Search | |

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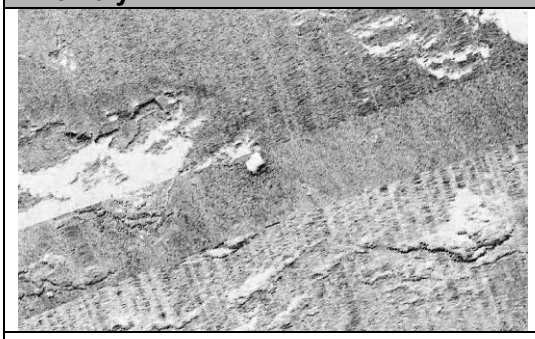
# Appendix 4: SSS anomalies

| Anomaly | SS001 | |
|---|---|---|
|  | | |
| **Source** | W:\Datasets\Marine_Geophysics\448_Brims_ex_Cantick_SSE\Client\Received\2014_09_01\Brims Side Scan Mosaics\SSS Mosaics \ Brims_Comments_Whole.ecw | |
| **WGS UTM Zone 30N** | 485579 E | 6514781 N |
| **Dimensions** | 7.9 m | |
| **Description** | Linear contact Southwest - Northeast, possible anthropogenic. Coincides with Surveyors S019 contact | |
| **Level of geophysical potential** | Medium | |
| **Proximity to Development** | Moodies Eddy Cable Corridor Area of Search | |

| Anomaly | SS002 | |
|---|---|---|
|  | | |
| **Source** | W:\Datasets\Marine_Geophysics\448_Brims_ex_Cantick_SSE\Client\Received\2014_09_01\Brims Side Scan Mosaics\SSS Mosaics \ Brims_Comments_Whole.ecw | |
| **WGS UTM Zone 30N** | 485243 E | 6515338 N |
| **Dimensions** | 3.46 m | |
| **Description** | Hard return, good shadow with a linear feature running to the Northeast; possible debris. Coincides with Surveyors S043 contact. | |
| **Level of geophysical potential** | High | |
| **Proximity to Development** | Moodies Eddy Cable Corridor Area of Search | |

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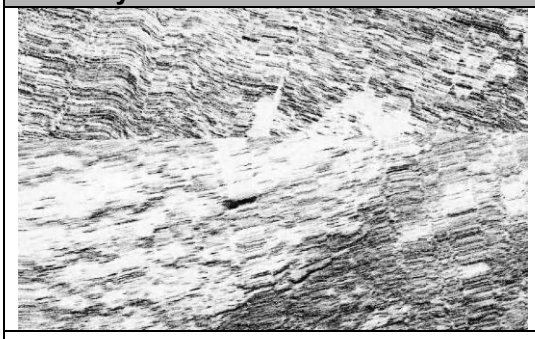
| Anomaly | SS003 | |
|---|---|---|
|  | | |
| **Source** | W:\Datasets\Marine_Geophysics\448_Brims_ex_Cantick_SSE\Client\Received\2014_09_01\Brims Side Scan Mosaics\SSS Mosaics \ Brims_Comments_Whole.ecw | |
| **WGS UTM Zone 30N** | 485610 E | 6514325 N |
| **Dimensions** | 8.4 m | |
| **Description** | Hard return not uniform with surrounding rock formation with an interesting shadow. Coincides with Surveyors S214 and M028 contacts. | |
| **Level of geophysical potential** | High | |
| **Proximity to Development** | Moodies Eddy Cable Corridor Area of Search | |

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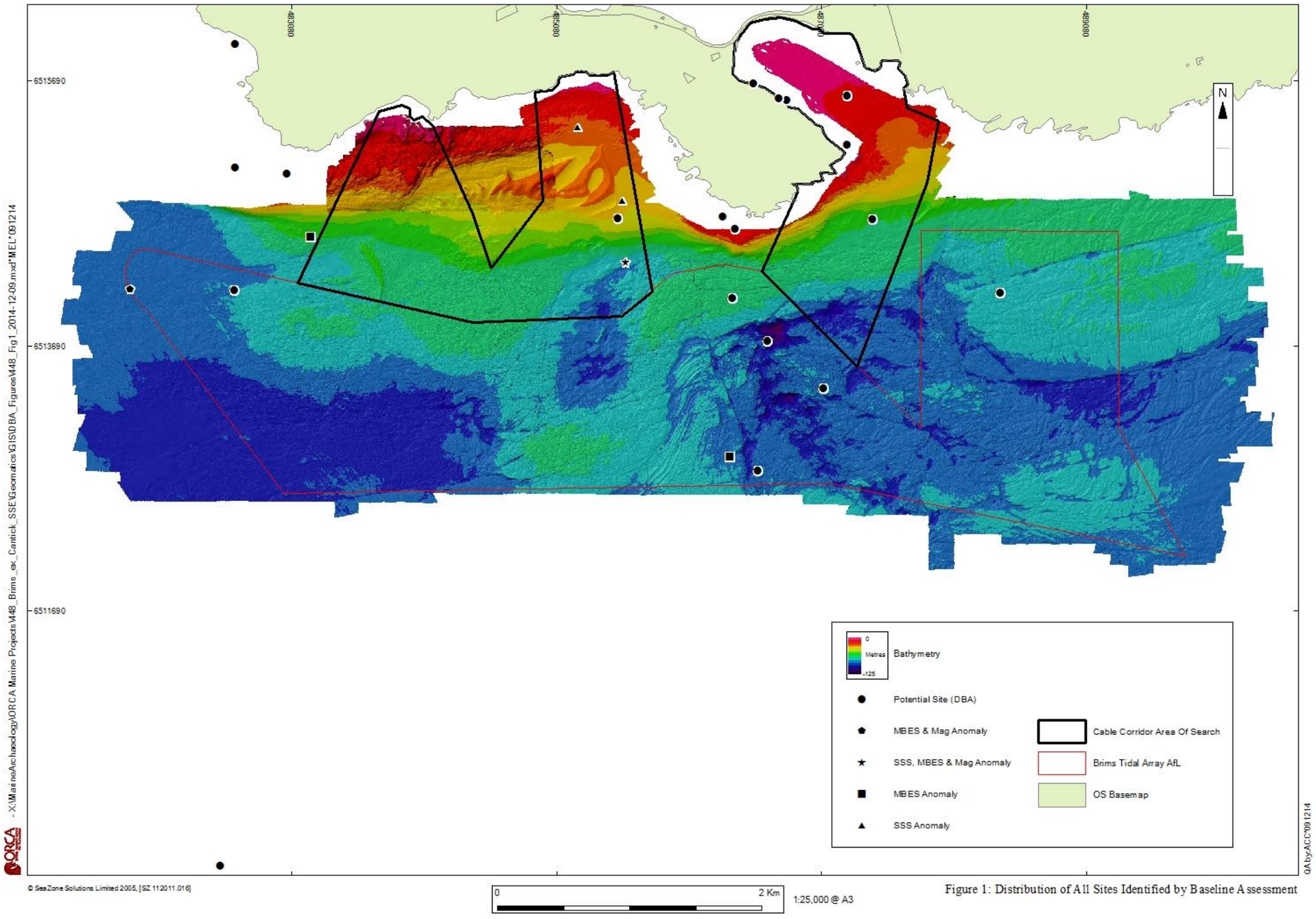


Figure 1: Distribution of All Sites Identified by Baseline Assessment

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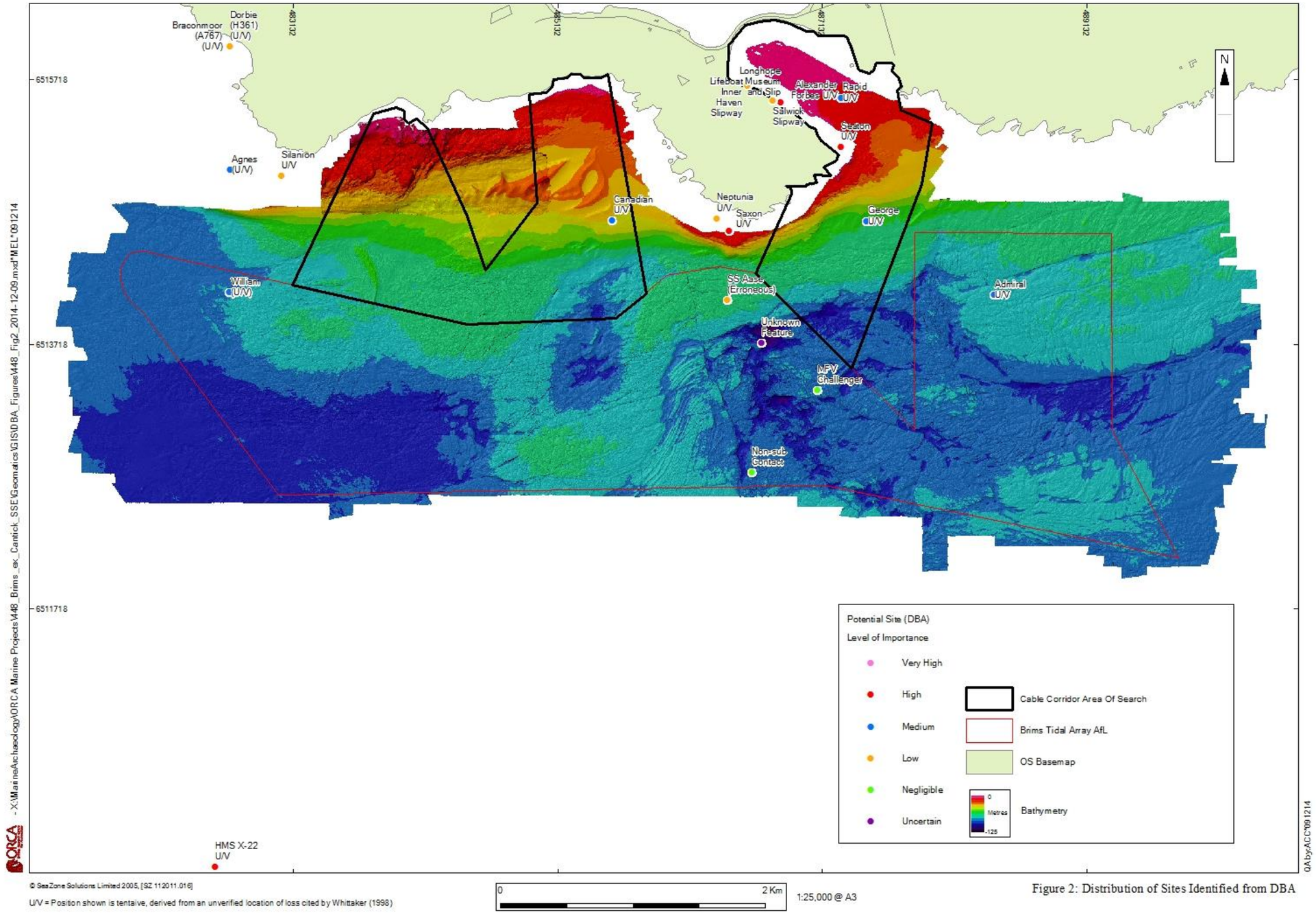
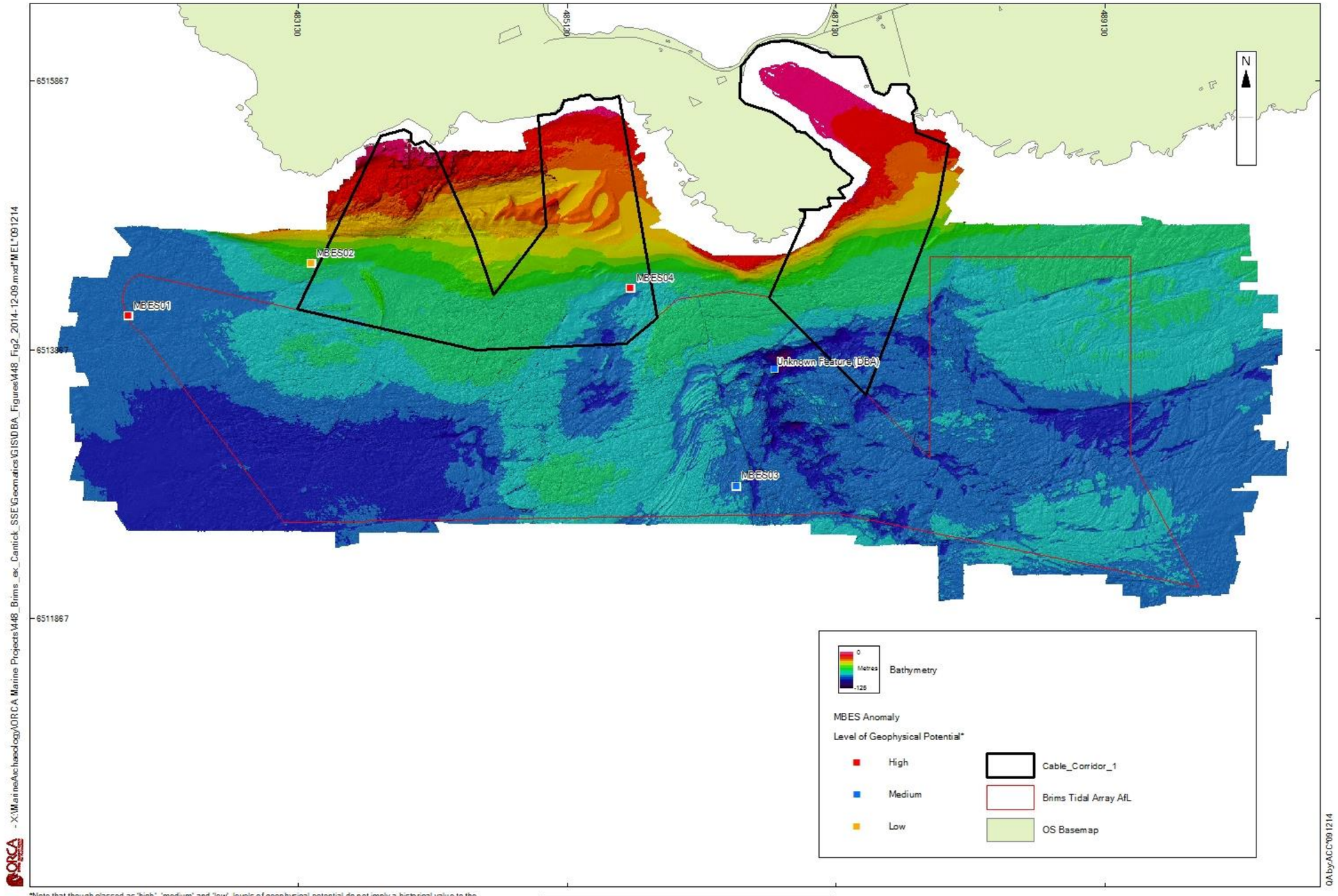



Figure 2: Distribution of Sites Identified from DBA




*Note that though classed as 'high', 'medium' and 'low', levels of geophysical potential do not imply a historical value to the anomalies - an anomaly may be of high geophysical potential (i.e. it looks anthropogenic) but may not be of historical importance.

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0 2 Km

1:25,000 @ A3

Figure 3: Distribution of Identified MBES Anomalies

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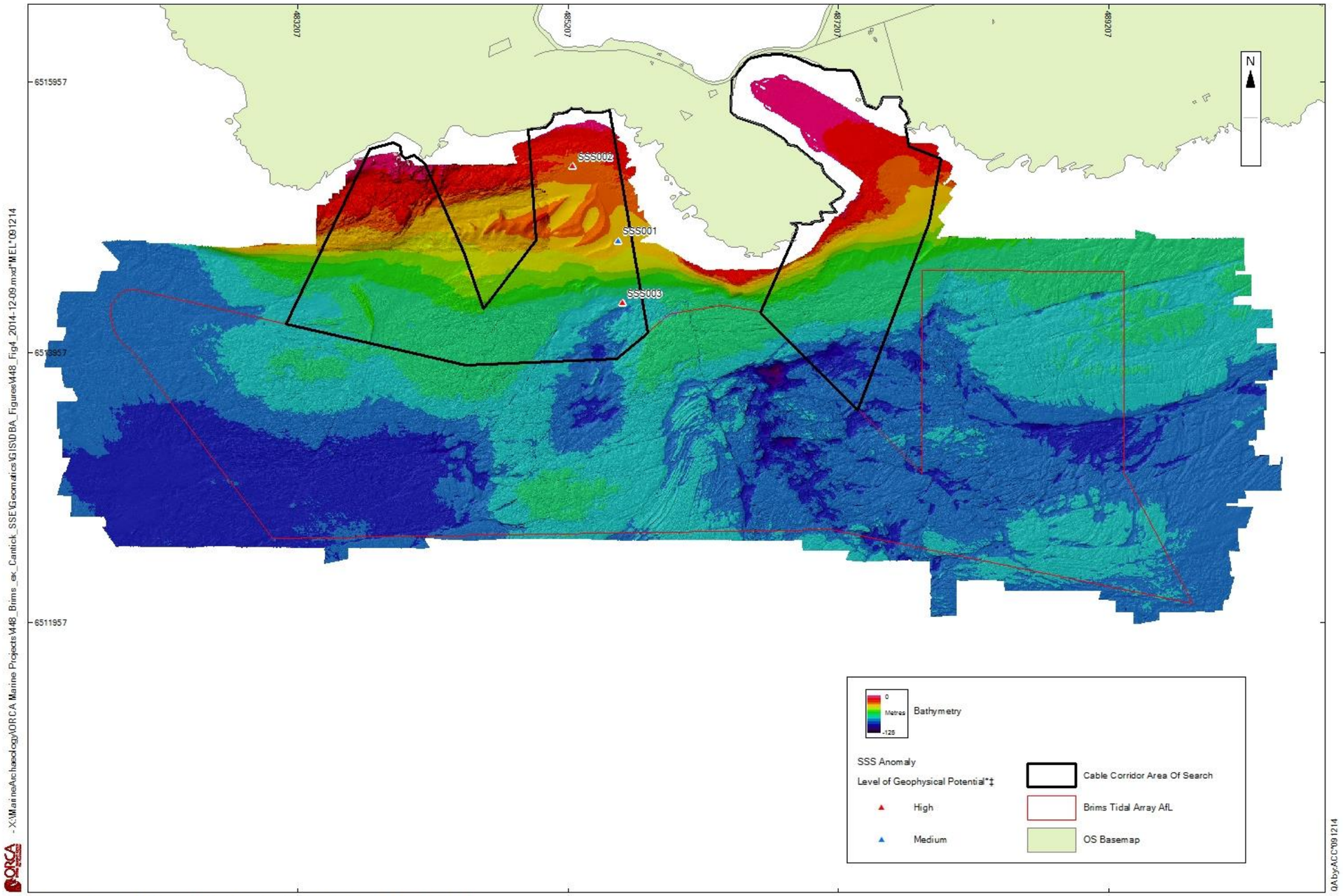


*Note that though classed as 'high', 'medium' and 'low', levels of geophysical potential do not imply a historical value to the anomalies - an anomaly may be of high geophysical potential (i.e. it looks anthropogenic) but may not be of historical importance.

‡ Note that there are no SSS Anomalies of Low Geophysical Potential in this map area

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Figure 4: Distribution of Identified SSS Anomalies

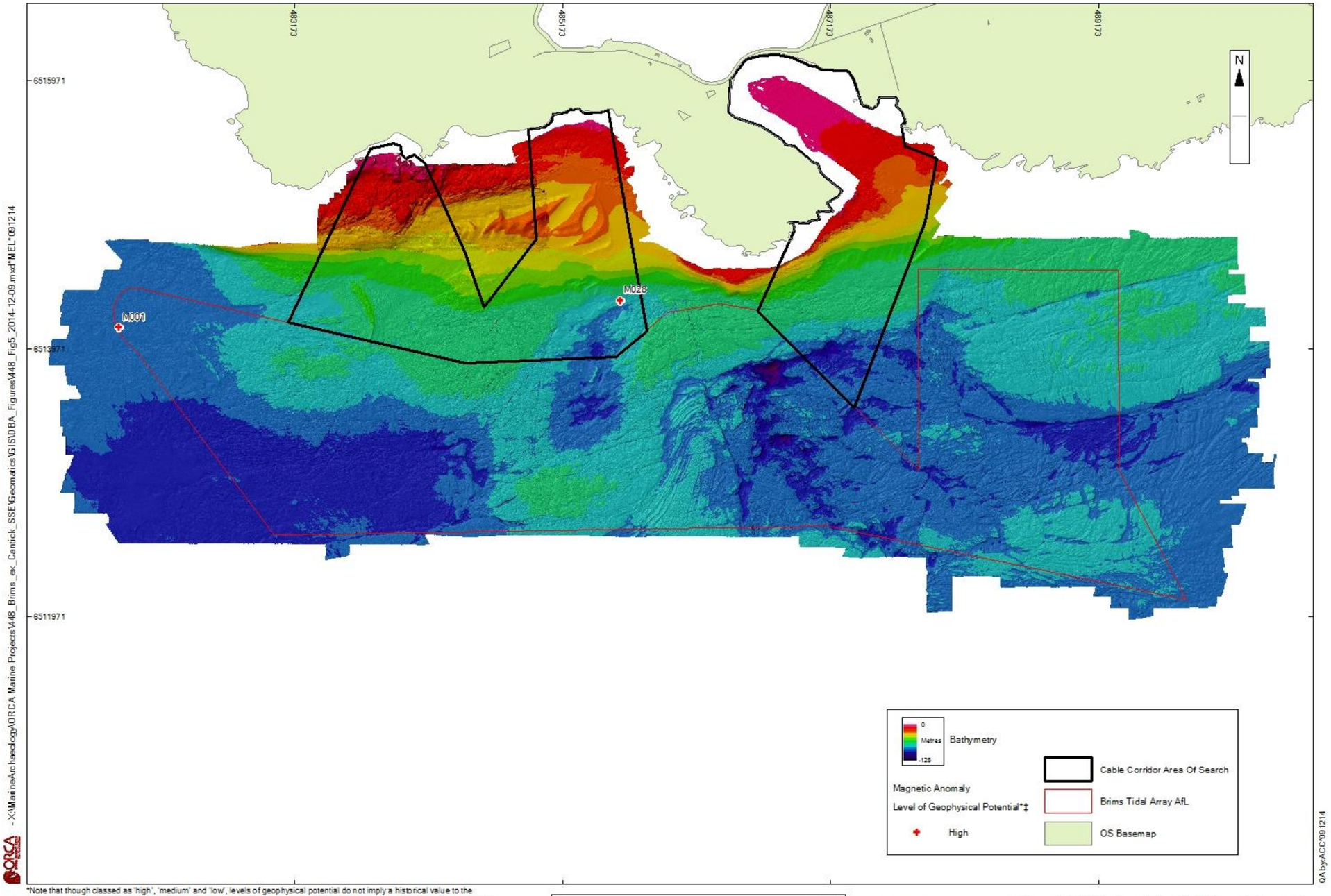


Figure 5: Distribution of Identified Magnetic Anomalies

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