ALCATEL SUBMARINE NETWORK

Havhingsten

Appendix E1 - Marine Archaeology Desk-based Assessment

P2228_R4693_Rev4 App E1 | Nov 2019

Intertek Energy & Water Consultancy Services
Exchange House, Station Road, Liphook, Hampshire GU30 7DW, United Kingdom

Cotswold Archaeology marine

Havhingsten Submarine Cable System

Marine archaeology desk-based assessment

for

Intertek

CA Project: 770800

CA Report: 18972

November 2018

Andover Cirencester Exeter Milton Keynes

Havhingsten Submarine Cable System

Marine archaeology desk-based assessment

CA project: 770800

CA report: 18972

prepared by	Ryan Killion, Marine Archaeologist with contributions by Dr Michael Grant, Coastal and Offshore Archaeological Research Services, University of Southampton
date	November 2018
checked by	Michael Walsh, Senior Marine Consultant
date	November 2018
approved by	Michael Walsh, Senior Marine Consultant
signed	*Not usually signed unless requested by client*
date	November 2018
issue	1.0

Cirencester	**Milton Keynes**	**Andover**	**Exeter**
Building 11 Kemble Enterprise Park Cirencester Gloucestershire GL7 6BQ	Unit 8 – The IO Centre Fingle Drive, Stonebridge Milton Keynes Buckinghamshire MK13 0AT	Stanley House Walworth Road Andover Hampshire SP10 5LH	Unit 1 – Clyst Units Cofton Road Marsh Barton Exeter EX2 8QW
t. 01285 771022 **f.** 01285 771033	**t.** 01908 564660	**t.** 01264 347630	**t.** 01392 573970
e. enquiries@cotswoldarchaeology.co.uk			

SUMMARY

Project name: Havhingsten Submarine Cable System

Cotswold Archaeology was commissioned by Intertek to produce an archaeological desk-based assessment (DBA) for the Havhingsten Submarine Cable System. This assessment of marine and coastal cultural heritage, up to the mean high water springs (MHWS), assesses the potential route option running through Irish, Isle of Man and English territorial and offshore waters with potential landfall locations at:

- Loughshinny, Ireland;
- Port Erin, Isle of Man;
- Port Grenaugh, Isle of Man;
- St Anne's, west coast of England; and
- Whitley Bay, east coast of England.

In total, the proposed cable route will run for approximately 607.7km. The cable route is proposed to run under the Irish Sea, with landfall locations on the east coast of Ireland, on the south-east and south-west coasts of the Isle of Man, and on the west coast of England. The proposed cable route continues under the North Sea, with potential landfall locations on the north-east coast of England. Details of the cable route above MHWS are beyond the remit of this report.

This DBA provides a baseline assessment by recording known sites and features of cultural heritage significance along the proposed cable corridors, which have been identified as the potential routes of the new cable system. This assessment will be used:

- to assess the nature of the cultural resources in this area;
- to outline the archaeological potential of the marine environment; and
- to aid in the identification of seabed anomalies that may be detected during the proposed geophysical survey.

No wrecks or obstructions were identified along the route in Irish waters. Any unidentified wrecks in Irish waters are automatically protected under Irish legislation (Section 3 of the National Monuments (Amendment) Act, 1987) until they have been further assessed.

Only one wreck is recorded along the route in Isle of Man waters. This live wreck is considered dangerous. A further nine records relating to the landfall areas on the Isle of Man have minimal information. The descriptions suggest that only one of these sites is situated within the CSC.

A total of 21 sites have been identified along the Irish Sea sector in English waters, comprising three wrecks, three sites, and 15 obstructions. Of the three wrecks, two date from the 20th century and one is of unknown date. One of the 20th century wrecks is the remains of a crashed British aircraft from 1942, which is protected under the Protection of Military Remains Act 1986.

A total of 38 sites have been identified in the North Sea sector in English waters, including 19 wrecks, four sites, and 15 obstructions. Of the 19 wrecks, nine date from the 20th century, five from the 19th century, one from the 18th century, one from the 14th century and three are of unknown date. Only two of the 19 wrecks have a live status, and both are considered dangerous.

The potential to encounter unexpected cultural heritage remains in the English (Irish Sea) sector and Isle of Man sector is considered moderate. The potential to encounter archaeology in the CSCs in other sectors (Irish, and English (North Sea)) has been assessed as low. The assessment of the English (Irish Sea) CSC is based on extensive work previously done in the area of Liverpool Bay that has highlighted numerous palaeo-environmental features and several high potential areas. The assessment of the Isle of Man CSC is based on records held by the UKHO and the Manx Marine Environmental Assessment (MMEA), both of which may be outdated.

CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

LIST OF ACRONYMS USED IN THE TEXT

ADS	Archaeology Data Service
BGS	British Geological Survey
BIIS	British-Irish Ice Sheet
CIfA	Chartered Institute for Archaeologists
CSC	Cable Survey Corridor
DCHG	Department of Culture, Heritage and the Gaeltacht
DTM	Digital Terrain Model
EMODnet	European Marine Observation and Data Network
EPSG	European Petroleum Survey Group
FIS	Fennoscandian Ice Sheet
GIS	Geographic Information System
GPS	Global Positioning System
GRT	Gross Registered Tonnage
GSI	Geological Survey of Ireland
HE	Historic England
HEA	Historic Environment Archive
HER	Historic Environment Record
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
ISB	Irish Sea Basin
ISIS	Irish Sea Ice Sheet
KA	Kilo annum (as in thousand years)
LGM	Last Glacial Maximum
MEDIN	Marine Environmental Data and Information Network
MIS	Marine Isotope Stage
MMEA	Manx Marine Environmental Assessment
MNH	Manx National Heritage
MOD	Ministry of Defence
NMS	National Monuments Service
NSL	North Sea Lobe
OSGB	Ordnance Survey Great Britain
RoW	Receiver of Wreck
SEA	Strategic Environmental Assessment
UAU	Underwater Archaeology Unit
UKHO	United Kingdom Hydrographic Office
UTM	Universal Transverse Mercator
WCPP	West Coast Palaeolandscapes Project
WGS	World Geodetic System
WIID	Wreck Inventory of Ireland Database

1. INTRODUCTION

Outline

1.1. Cotswold Archaeology (CA) was appointed by Intertek in September 2018, to prepare a marine archaeology DBA for the Havhingsten Submarine Cable System. This report includes an assessment of marine and coastal cultural assets potentially affected by this project, up to the mean high water springs (MHWS).

1.2. The Havhingsten Submarine Cable System (henceforth 'the project'), will run under the Irish Sea with potential landfall locations at Loughshinny in Ireland, Port Erin and Port Grenaugh on the Isle of Man and Lytham, St Anne's on the west coast of England. The cable will also run under the North Sea with a potential landfall location at Seaton Sluice, Whitley Bay, on the north-west coast of England. In Irish waters, this assessment is based on the Institute of Archaeologists of Ireland (2006) guidelines for desk-based assessments, historic environment assessments and the terms of the National Monuments Act (1930-2014). In UK and Isle of Man waters, it is based on Standard and Guidance for Historic Environment Desk-Based Assessment published by the Chartered Institute for Archaeologists (2014).

1.3. This report presents the results of an archaeological desk-based assessment (DBA) which records known sites and features of cultural heritage significance within the project area that have the potential to be affected by the proposed development. The significance of each site will be assessed once the geophysical and geotechnical survey results have been analysed and compared with the results from this DBA.

Project background

1.4. The proposed cable route runs for approximately 607.7km; 57.3km through Irish waters, 59.4km through Isle of Man waters and 491km through English waters (see figures 1 & 2). This DBA assesses each of these routes following the relevant national frameworks and guidance of each respective nation through whose waters the cable may be laid.

2. AIMS AND OBJECTIVES

2.1. The aim of this DBA is to identify known and potential cultural heritage receptors within the CSC. The objectives of this assessment are:

- To set out the statutory, planning and policy context relating to the historic environment for each nation through whose territorial waters the cable is planned to pass;
- To provide an overview of the historic environment within the CSC, based on existing archaeological records and secondary sources; and
- To highlight known maritime sites that may be impacted by the proposed project, with particular reference to:
    - Shipwrecks, crashed aircraft and wreck material;
    - Submerged prehistoric sites and artefacts, and
    - Areas of archaeological potential.

3. LEGISLATIVE FRAMEWORK AND GUIDANCE

3.1. As the project is located in Irish, Isle of Man and English territorial and offshore waters, this assessment takes account of the following national and international legislative procedures and guidelines:

Ireland

- National Monuments Acts 1930-2014;
- National Cultural Institutions Act 1997; and
- Framework and Principles for the Protection of the Archaeological Heritage, Department of the Arts, Heritage, the Gaeltacht and the Islands 1999.

UK-wide

- National Heritage (England) Act 2002;
- Protection of Wrecks Act 1973;
- Protection of Military Remains Act 1986;
- Marine and Coastal Access Act 2009;
- Merchant Shipping Act 1995;
- Burial Act 1857;
- Ancient Monuments and Archaeological Areas Act 1979;
- UK Marine Policy Statement (HM Government 2011);

- Technical Advice Note (TAN) 24: The Historic Environment;
- The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (the EIA Regulations);

Isle of Man

- Manx Museum and National Trust Acts 1959-86;
- Wreck and Salvage (Ships and Aircraft) Act 1979; and
- Treasure Trove Act 1586.

International

- European Convention on the Protection of the Archaeological Heritage (Valetta) 1992;
- UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001);
- United Nations Convention on the Law of the Sea (UNCLOS) 1982;
- International Council of Monuments and Sites (ICOMOS) Charter on the Protection and Management of Underwater Cultural Heritage (1996) (the Sofia Charter);
- The European Convention of the Archaeological Heritage of Europe (Revised) 1992; and
- The World Heritage Convention.

3.2. This DBA has been compiled in line with industry best practice and the relevant offshore renewables and marine historic environment guidance. These include:

- Institute of Archaeologists of Ireland code of conduct for archaeological assessments (2006);
- Chartered Institute for Archaeologists (CIfA) guidelines: Standard & guidance for archaeological desk-based assessment (2014);
- Joint Nautical Archaeology Policy Committee (JNAPC) code of practice for seabed development (2008);
- COWRIE Historic environment guidance for the offshore renewable energy sector (2007);
- COWRIE Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (2008);

- COWRIE Guidance for offshore geotechnical investigations and historic environment analysis: guidance for the renewable energy sector (2011);
- The Crown Estate (2014). Offshore renewables protocol for archaeological discoveries;
- The Crown Estate (2010). Round 3 offshore renewables projects model clauses for archaeological written schemes of investigation; and
- EIA Directive 85/337/EEC as amended by 97/11/EC and 2003/35/EC.

4. METHODS AND DATA SOURCES

4.1. The following section sets out the methods followed for this DBA, including the geographical scope and the sources used for the collation of data.

Geographical scope

4.2. The CSC comprises a 500m wide corridor, 250m either side of the proposed cable route centre line, extending from the potential landfall sites in Ireland, the Isle of Man, and England. The DBA assesses each jurisdiction from landfall out to the Irish / UK / Isle of Man median lines in the Irish Sea, and the UK / Dutch median line in the North Sea. The purpose of this DBA is to identify known and potential sites contained within the CSC that could be directly affected by the development. The proposed landfall location in Ireland is at Loughshinny in County Dublin. There are two proposed landfall locations on the Isle of Man, at Port Erin and Port Grenaugh in Santon. There is one landfall location on the west coast of England at Lytham, St Anne's in Lancashire, and two on the north-east coast at Whitley Bay and Seaton Sluice in Tyne and Wear.

Sources

4.3. This DBA includes a documentary and cartographic search utilising a variety of sources in order to locate all known cultural heritage assets within the CSC for each sector of the proposed development, and to identify the archaeological potential of the area. Sources utilised for this assessment include, where relevant:

- Information held by the Underwater Archaeology Unit (UAU) of the National Monuments Service (NMS), Department of Culture, Heritage and the Gaeltacht (DCHG);
- The Wreck Inventory of Ireland Database (WIID);
- Information held by Integrated Mapping for the Sustainable Development of Ireland's Marine Resources (INFOMAR);

- National Museum of Ireland archives;
- European Marine Observation and Data Network (EMODnet);
- OceanWise Wrecks and Obstructions database;
- Historic England Archives (HEA);
- UK Historic Environment Records (HER);
- Historic England Intertidal and Coastal Peat Database;
- UKHO review of cartography, historic charts and sailing directions;
- Ministry of Defence (military remains only);
- UK Receiver of Wreck (RoW);
- Records held with the Archaeology Data Service (ADS);
- Marine Environment Data Information Network (MEDIN);
- Readily accessible published sources and grey literature (e.g. results from previous studies);
- Relevant external marine historic environment specialists;
- British Geological Survey regional guide and previous work in the area;
- Relevant dive and other local interest groups;
- Relevant Strategic Environmental Assessment (SEA) reports (e.g. UK Continental Shelf SEA archaeological baseline) and Coastal Survey Assessment reports;
- Manx Marine Environmental Assessment (MMEA); and
- Manx National Heritage (MNH).

4.4. This DBA includes all known and potential maritime cultural heritage assets, identified during this assessment as detailed in the tables and figures below, each assigned a unique Cotswold Archaeology (**CA**) number for ease of identification.

Consultation with statutory bodies

4.5. For this assessment, the following statutory bodies and stakeholders were consulted, including:

- Underwater Archaeology Unit (UAU) of the National Monuments Service, Department of Culture, Heritage and the Gaeltacht (DCHG);
- Heritage Ireland;
- Historic England;
- Manx National Heritage;
- Ministry of Defence (military remains only); and

- Receiver of Wreck (UK Maritime Coastguard Agency).

5. BASELINE ENVIRONMENT

5.1. The following sections outline the nature of the existing environment.

Overview of the area

5.2. The aim of this section is to provide a brief assessment of the palaeo-environmental potential of sediments potentially impacted by the proposed cable routes including the six potential landfall locations.

5.3. The specific objectives of this palaeo-environmental assessment are:

- to review available data in respect of seabed and sub-seabed deposits likely to be of palaeo-environmental and archaeological interest; and
- to identify any deposits of palaeoenvironmental and archaeological potential.

5.4. For the palaeo-environmental assessment the route has been divided into four sections:

- Offshore route:
  - Irish Sea; and
  - North Sea;
- Irish landfall;
- Isle of Man landfall:
  - Port Erin; and
  - Port Grenaugh;
- English landfall:
  - Lytham, St Anne's; and
  - Whitley Bay.

Offshore route

Irish Sea

5.5. The proposed cable routes in the Irish Sea (Irish, Isle of Man and English territorial waters) are shown (Figure 3) overlying the bathymetry of the Irish Sea. The bathymetry is derived from the EMODnet regional Digital Terrain Model (DTM), set at a resolution 1/16 * 1/16 arc minutes (*c*. 115 x 115m). Off the east coast of Ireland, the DTM, derived from EMODnet, is overlaid by available INFOMAR bathymetry set at a 10m resolution.

5.6. The Irish Sea Ice Sheet (ISIS) is the single agent responsible for the glacial stratigraphy and geo-morphology of the Irish Sea Basin (Chiverrell *et al*. 2013). Understanding the behaviour and extent of the ISIS during the last glacial maximum (LGM) will therefore help to support the characterisation of sediment properties and identify areas with a higher geo-technical potential (Mellett *et al*. 2015). The extent and timing of the ISIS is shown in figure 4 (as modelled by Chiverrell *et al*. 2013).

5.7. When an ice sheet retreats, it terminates in one of two ways, either in a marine or in a terrestrial setting. When an ice sheet terminates in a terrestrial setting, the land surface becomes exposed to weathering (in a cold climate) and other processes that significantly influence the sediment properties. Sea-level rise subsequent to the glacial retreat, further reworks and modifies the sedimentary properties. When an ice sheet terminates in a marine setting, in contrast, preservation is high, and reworking is minimal (Mellett *et al*. 2015).

5.8. Whether the ISIS terminated in a marine or terrestrial setting has been subject to considerable debate (McCarroll 2001; Scourse and Furze 2001). Iceberg plough marks and exceptional preservation of glacial landforms to the south of the Isle of Man indicate that the ice sheet in this area terminated in a marine setting (around 18 kilo-annum (ka or thousand years)) (Mellett *et al*. 2015). Further north though, it is likely the ice sheet terminated in a terrestrial setting, creating a broad north/south divide in environmental history, hinged at a point just south of the Isle of Man (Mellett *et al*. 2015).

5.9. The topography of the Irish Sea Basin (ISB) in the area of the CSC can be sub-divided into broad, shallow-dipping to flat platforms and deeply incised channels and troughs (Mellett *et al*. 2015). The proposed cable route runs over:

- the Western Trough - off the east coast of Ireland;
- the Welsh Platform - north of Anglesey; and
- the Eastern Platform, which extends from Liverpool Bay to Morecambe Bay.

5.10. The sediments in these three areas can also be broadly summarised, as follows:

- the ‘Western Irish Sea mud belt’;
- the ‘Eastern Irish Sea mud belt’; and
- the ‘Central Irish Sea gravel belt’ (Mellett *et al*. 2015).

5.11. The sediments in these mud belts are finest near the eastern and western margins and become coarser in the central region of the Irish Sea where the gravel belt is formed (see figure 5).

5.12. Quaternary sediments are expected to be encountered on the seabed across most of the Irish Sea, with the exception of small areas where bedrock is exposed. The thickness of these Quaternary deposits varies considerably from less than 5m on the Welsh Platform to more than 250m in the Western Irish mud belt (Mellett *et al*. 2015).

5.13. The thickness of sediment deposited in the region during the Holocene is typically less than 5m but can be up to 40m when associated with large sediment bedforms (Mellett *et al*. 2015) or incised palaeo-channels. A 'lag' deposit underlying the Holocene sediment may be exposed at the seabed where the overlying 'mobile' sediment has been removed (e.g. by scouring). Finer grained muddier sediments are confined to areas of weaker currents to the west and east of the Isle of Man, coinciding with the location of the Eastern and Western Irish Sea mud belts (Mellett *et al*. 2015).

5.14. Sediment waves are more pronounced off the eastern coast of Ireland where the Western Trough has become a depocenter for present day sediment accumulation. Sediment is also swept from the south around Anglesey into Liverpool Bay and onto the Eastern Platform (Mellett *et al*. 2015).

5.15. Extensive work in the areas of the Welsh and Eastern Platforms, carried out in 2009, sought to investigate the methodology of utilising a wider variety of seismic data sources to determine the extent and nature of the submerged landscapes contained within these areas of the Irish Sea (https://doi.org/10.5284/1018087).

5.16. Based on the preliminary results of this study (Fitch *et al*. 2011), the CSC in English waters in the Irish Sea runs over a fluvio-glacial plain considered to have a high potential for the survival of deposits containing palaeo-environmental evidence. This area has been assessed as high potential due to the extensive number of palaeo-landscape features and deposits that have been mapped. The CSC appears to run directly over three mapped 'peat / organic' features and six channel features (see figures 6-8). As these features are buried under an accumulation of Holocene sediment bedforms they are unlikely to be encountered by this development, so the

potential for encountering palaeo-environmental remains has been assessed as moderate (see table 1).

5.17. The potential for encountering pre-Devensian terrestrial sediments within the CSC along the Irish coastal shelf has been assessed as low, owing to the presence of late Devensian glacial till and significant accumulations of modern sediment (see table 1).

5.18. It has been suggested that survival potential, especially in areas exposed to high-energy conditions typified by lag gravel deposits or scoured bedrock like those in the 'Central Irish Sea gravel belt' south of the Isle of Man, are expected to be low, with the exception of infilled depressions which may have collected and protected material (Westley & Edwards 2017). With no record of any such depressions or channels along the Isle of Man CSC, the potential for encountering palaeo-environmental evidence in this area has been assessed as low (see table 1).

North Sea

5.19. The proposed cable route options in English waters in the North Sea are shown overlying the bathymetry (figure 9) as derived from the EMODnet regional DTM, set at a resolution 1/16 * 1/16 arc minutes.

5.20. During the LGM this area would have been covered at different times by the British-Irish Ice Sheet (BIIS) and the Fennoscandian Ice Sheet (FIS). By *c*. 30-25 ka these would have coalesced north of Dogger Bank thereby blocking the regional drainage, resulting in the formation of the Dogger lake forms west to east along the southern edge of the ice sheet (Roberts *et al*. 2018; see figures 10-14).

5.21. An unstable, oscillatory ice margin would have triggered multiple minor advance / retreat cycles over western Dogger between 30 and 23 ka leading to widespread glacio-tectonism of lake sediments. While the western sector of the CSC would have remained under ice, it is probable that the eastern sector, *c*. 200km from the landfall, will cross these glacio-lacustrine lake deposits, which have been mapped previously as the Botney Cut Formation (Roberts *et al*. 2018).

5.22. Along the north-eastern coastline of the UK a further advance of the North Sea Lobe (NSL), restricted to the western side of the North Sea basin west of Dogger Bank, occurred after 22-21 ka.

5.23. Ice dynamics in the southern North Sea at this time may have been influenced by de-coupling of the BIIS and FIS north of Dogger Bank and were possibly triggered by the Dogger lake outburst flood to the north. Estimates for the date of this de-coupling vary widely from 23 to 22 ka (Patton *et al*. 2017) to 18.7 ka (Hjelstuen *et al*. 2018).

5.24. Roberts *et al*. (in press) track the final retreat of the NSL northwards past the Durham and Northumberland coasts and into the Firth of Forth between 19 and 17 ka under glacio-marine conditions, marking the cessation of Marine Isotope Stage (MIS) 2 terrestrial glaciation in the southern North Sea.

5.25. Marine inundation of the central North Sea would have aided deglaciation, while areas to the south of Dogger Bank remained terrestrial until the opening of the Holocene. As the ice retreated it is likely that the majority of the area through which the cable is proposed to run would have been under marine conditions, which would have extended south into the Outer Silver Pit, and continued into the Early Holocene, barring the coastal stretch along north east England (see Sturt *et al*. 2013).

5.26. The dominance of glacial processes is highlighted by the Quaternary deposits mapped on the seabed (see figure 15). Near-surface outcrops of the underlying solid Permian to Cretaceous solid geology are found up to 90km offshore intermittently covered by late Quaternary deposits. These give way to a thicker Quaternary sequence, including the presence, near-surface, of the middle Pleistocene Yarmouth Roads Formation, beginning *c*. 130 km offshore.

5.27. Within *c*. 8km of the shore there is only a thin veneer (<1m) of modern seabed deposits overlying bedrock exposures of Coal Measures and Permian mudstone. Beyond these lie the late Pleistocene to Holocene Forth Formation deposits, consisting of the early Holocene fluvio-marine muddy sands, often with shells, overlying the late Pleistocene Largo Bay Member glacio-marine deposits, present *c*. 5-25km offshore.

5.28. Beyond and beneath these lie the late Pleistocene St Abbs Formation glacio-marine deposits. Further offshore, glacio-marine deposits associated with the late Pleistocene to early Holocene are classified as the Hirundo Formation, indicative of very late pro-glacial sedimentation in a quiet brackish-water environment, and the

extensive Botney Cut Formation. These in many instances are likely to be comparable with the nearer shore Forth Formation deposits.

5.29. Underlying the glacio-marine and glacio-lacustrine deposits are the nearshore Wee Banke Formation tills and further offshore the equivalent Bolders Bank Formation tills. These deposits are associated with the presence, and subsequent retreat, of the NSL, and form part of the California Glaci-genic group (see Stoker *et al*. 2003).

5.30. The late Quaternary deposits most likely to be encountered offshore (beyond the coastal shelf) are likely to have glacio-lacustrine, glacial and marine origins, so the potential for encountering any palaeo-environmental remains has been assessed as low. There would, however, be high potential for understanding the late Pleistocene glacial dynamics, which would help enhance current understanding of the timing of the Dogger lake (ribbon lake in figure 12) and the de-coupling of the BIIS and FIS, and any catastrophic flood that accompanied this event.

5.31. The dominance of glacial processes and subsequent marine inundation of this area of the North Sea, combined with the solid geology exposed near the seabed along the Whitley Bay coast, suggests that there is very little evidence for submerged landscapes along the proposed CSC. This is supported by the lack of organic deposits recorded in Historic England's *Intertidal and Coastal Peat database* for the North Sea. The records closest to the CSC are those from Dogger Bank which lies to the south (figure 9).

5.32. Organic deposits, associated with the Dogger Bank Formation, are known to be extensive in this area, and have been reported for more than a century. Whitehead and Goodchild (1909) report findings of moorlog (peaty deposits dredged up by fishermen) along the northern margins of the Dogger Bank Formation, though the nearest reported find by Whitehead (1920) lies *c*. 23km south of the CSC on the northern edge of the Dogger Bank Formation.

5.33. A recent review of the Quaternary deposits of Dogger Bank (Cotterill *et al*. 2017) has shown a series of buried palaeo-landsystems which are characterised by a range of features including glacial, glaci-fluvial and fluvial channels, a large-scale glaci-tectonic thrust-moraine complex with intervening ice-marginal basins, a lacustrine basin and marine ravinement surfaces on Dogger Bank itself, but these do not extend to the north where the glacio-marine and glacial deposits are found abutting the northern edge of Dogger Bank.

5.34. The East Bank Ridges, to the north-east of Dogger Bank, are a group of sub-parallel ridges in relatively deep water (figure 9). These banks are believed to be features which initially formed early in the Holocene when sea levels were lower, and they were subjected to higher tidal currents. They are now in water depths too great, with tidal currents too weak, for their active maintenance. They are now considered 'moribund' (i.e. a feature that is no longer active) and are composed of very fine to fine sand, which contrasts with the fine to coarse sand composition of other sandbanks (Davis & Balson 1991).

5.35. Overall, the potential for encountering any palaeo-environmental remains in the area of the CSC in English waters in the North Sea is considered low (see table 1).

Table 1 Summary of environmental archaeological potential for offshore CSCs

Proposed CSC	Assessed potential	Justification
Ireland	Low	Based on the presence of late Devensian glacial till and significant accumulations of modern sediment
Isle of Man	Low	Based on the high-energy conditions of the area and a lack of reported depressions or channel features
England (Irish Sea)	Moderate	Based on intensive mapping of palaeo-environmental features done by the WCPP
England (North Sea)	Low	Based on a history dominated my glacial processes, leaving sediments characterised by glacio-lacustrine, glacial and marine origins

Irish landfall

5.36. Previous investigations in Loughshinny have shown evidence of made ground over clay and gravel to a depth of 9-12m over rock. More recent assessments in the area of Rush, just south of the landfall location, have identified aeolian deposits at the estuary entrance and beach deposits along the coast as well as alluvial deposits along the rivers. The landfall location itself appears to be overlying a small river valley containing alluvium. The potential for encountering palaeo-environmental remains in this location has been assessed as moderate (see table 2).

5.37. It should be noted that the coast from Skerries to Rush, which includes the landfall location, has been designated a Geological Heritage Area (GHA) by the Geological Survey of Ireland (GSI).

Isle of Man landfall

5.38. There are records of submerged peats just south of the Isle of Man at Strandhall and from the Bay Ny Carrickey (Tooley 1978). No reports of existing peat deposits, however, could be found in the proposed landfall locations, slightly north and to the

east and west of these deposits. The landfall locations are dominated by till deposits and rocky outcrops, which are probably indicative of areas shaped by the terrestrial termination of the ISIS. The potential for encountering submerged palaeo-landscapes in these areas is therefore considered low (see table 2).

Port Erin

5.39. The low cliff sections which outcrop at the northern end of the beach are part of the Mull Hill and Lonan Formations, formally identified as parts of the Port Erin Formation and all members of the Manx Group (https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=LNN; Hawkins *et al*. 2013). The rocks are thin-bedded sandstone / mudstone units inter-bedded with very thin layers of siltstone-mudstone, consisting of more sandstone towards the north end of the beach (Hawkins *et al*. 2013). The unit is considered to be at least 2,500m thick (https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=LNN).

Port Grenaugh

5.40. The Santon Member of the Lonan formation lies to the north-east of Port Grenaugh, in the area of Santon Head. The formation is characterised by a thin to medium-bedded sandstone, inter-bedded with laminated mudstone and siltstone. The sandstone is predominantly wacke but includes quartz arenite. The unit contains more abundant sandstone and is more thickly bedded, distinguishing it from the units above and below (https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=SNTN; Hawkins *et al*. 2013). This unit is considered to be at least 600m thick (https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=SNTN).

English landfall

Lytham, St Anne's

5.41. There are extensive dune systems between Blackpool and Lytham, St. Anne's, containing sub- / inter-blown sand and organic deposits. Tooley (1978) has undertaken most work in this area, producing mid- to late-Holocene ages. Heyhouse Lane, 4km to the south west produced early-Holocene dates. Just north of the landfall, Environment Agency coring (SD33SW153) at the southern end of the Blackpool promenade revealed up to 15m of sands with occasional gravels and no apparent organics other than occasional shell fragments. Coring from the 1990s (SD33SW111) immediately east of the landfall location revealed up to 10m of sands and gravels in the uppermost layers (see figure 16 for borehole locations). Therefore, although there is archaeological potential for the presence of submerged

palaeo-landscape features in the wider area, it has been established previously that, at the landfall location, the top 10m immediately onshore has low potential (see table 2).

5.42. Within these sand dune systems, however, there is a potential to encounter prehistoric remains as evidenced by the discovery of a Neolithic polished stone celt (HEA – AR115856) (**CA6**) in the sandhills in the south-east of the landfall location (see figure 16). Based on the geological history of the area, this find is assumed to be from a secondary context and therefore not indicative of other similar remains.

Whitley Bay

5.43. At the southernmost landfall location in Whitley Bay, two BGS boreholes, NZ37SE315 and NZ37SE314, suggest a possible till / head deposit directly overlying shallow sandstone solid geology. A similar sequence was encountered south of Seaton Sluice (NZ37NW47/S51). On the northern side of Seaton Sluice, the presence of shale has been recorded immediately under made ground (NZ37NW42/S3). The shallow bedrock immediately onshore suggests that the presence of intertidal / submerged peats is unlikely (see figure 17 & 18 for borehole locations). Given the northern landfall location sits immediately north of the Seaton Burn river mouth, the potential for encountering alluvial deposits with palaeo-environmental remains is moderate to low (see table 2).

Table 2 Summary of environmental archaeological potential for CSC landfall locations

Landfall location	Assessed potential	Justification
Loughshinny	Moderate to low	The landfall location appears to be overlying a small river valley containing alluvium
Isle of Man (Port Erin & Port Grenaugh)	Low	The landfall locations are dominated by till deposits and rocky outcrops indicative of a terrestrial termination of the ISIS
Lytham, St. Anne's	Low	Coring has revealed up to 10m of sands and gravels in the uppermost layers
Whitley Bay (south)	Low	Coring has revealed a possible till / head deposit directly overlying shallow sandstone solid geology
Whitley Bay (north) Seaton Sluice	Moderate to low	The landfall location is immediately north of a river mouth creating a potential to encounter alluvial deposits

6. RECORDED MARITIME CULTURAL HERITAGE

Limitations of data

6.1. One of the greatest limitations when researching known and potential offshore cultural heritage is the difficulty of locating recorded maritime losses. For many losses, the location of the sinking of the vessel can be in the form of a general area description, which is not useful practically for the purpose of accurate assessment, except to show the potential exists to encounter lost cultural remains.

6.2. Recorded maritime losses are also heavily biased towards the 19th and 20th centuries when more comprehensive records of losses began to be compiled.

6.3. Many wrecks have been identified through sonar survey, but this too presents difficulties as many of these wrecks have been located using GPS, which until relatively recently was only accurate to 100m (Baird 2009; Satchell 2012); or by DECCA which can give locations accurate to only one kilometre.

6.4. Accuracy has been much improved in Irish waters by the recent INFOMAR surveys. To reduce error in sonar measurements, owing to tidal range varying across bays and coastlines, onshore and offshore tidal gauges were installed to ensure accurate tidal height data.

6.5. The details for specific offshore cultural heritage assets within the CSC were acquired from the sources cited above. These databases are each derived, in turn, from a variety of sources including various published lists of marine losses and marine surveys. Consequently, there are both overlaps and considerable discrepancies between the datasets.

6.6. In order to complete this assessment, covering both the Irish and the North Seas, datasets from two coordinate systems were combined into Geographic Information System (GIS) workspaces.

6.7. The workspace for data in the Irish Sea used World Geodetic System 1984 (WGS84) 30N Universal Transverse Mercator (UTM) (European Petroleum Survey Group (EPSG) projection 32631). The workspace for data in the North Sea used WGS84 31N UTM. Geospatial data for the CSCs was supplied by the client in WGS84, as was data from OceanWise and from the National Monuments Service

(NMS) in Ireland. This data was projected into each workspace without transformation.

6.8. Geospatial data from Historic England and from county Historic Environment Records (HERs) in the UK were transformed from Ordnance Survey Great Britain 1936 (OSGB36) (EPSG projection 27700) into WGS84 (EPSG projection 4326), using the transformation OSGB 1936 to WGS 1984 Petroleum (EPSG transformation 1314), which has a stated accuracy of ±2m. Transformed and projected data were then clipped using the extent of the CSC polygons.

6.9. Wrecks and obstructions discussed below are generally referred to as either 'live' or 'dead'. 'Live' refers to those where there is a known location, which has been verified by recent surveys. 'Dead' refers to those that have been recorded in a certain location, but which have not been detected by repeated or the most recent surveys.

6.10. Where a live wreck has been identified this information is provided in the tables below; a wreck in a known location that has not been identified is referred to as unidentified. Where the status of a wreck or obstruction discussed below is given as 'unknown', this indicates that it has an unreliable or unknown position, is unidentified and / or has no status assigned to it.

6.11. The tables and discussion below relate to the four sectors of the cable routes in Irish, Isle of Man and English territorial waters and cover all UAU, INFOMAR, NMS, WIID, HER, HEA, MNH and UKHO [as held by OceanWise] entries. Records of dead wrecks and obstructions are included because although they may not have been detected in recent surveys, the recorded locations may still contain remains of cultural heritage interest. Given locational discrepancies, there is also a possibility that wrecks lie beyond previous search areas.

6.12. The old archaeological adage that absence of evidence is not evidence of absence seems to apply here. In other cases, however, it is clear from the details of an entry that there is no reason to believe that there are now or ever have been archaeological remains. These entries have also been included in the text and illustrations and are discussed on a case by case basis below.

Sites of cultural heritage interest within the CSC

6.13. The various datasets used in the compilation of this DBA have been cross-referenced to remove duplicate entries and are presented in the tables below. For those mentioned in multiple datasets, the reference to each source is provided. The wrecks and obstructions have been split into the four separate jurisdictions/sectors:

- Ireland;
- Isle of Man;
- England (Irish Sea); and
- England (North Sea).

Ireland

6.14. No wrecks or other archaeological sites have been identified in this assessment in Irish foreshore or offshore areas. Irish legislation automatically protects any wrecks in Irish waters; any discovered along the Irish CSC will require further investigation / mitigation.

National Museum of Ireland records

6.15. Records for the townlands of Loughshinny, Drumanagh, and Ballustree were inspected at the National Museum of Ireland in Dublin. A total of 101 entries are recorded, comprising 13 for Loughshinny, 82 for Drumanagh, and six for Ballustree, although there was some repetition with some finds recorded in more than one townland. Only six records seem to relate to the foreshore (1941.15-20); the remainder appear to have been found on land, in the plough soil in the vicinity of the promontory fort. These finds appeared mainly to comprise flints, pottery sherds and metalwork from a range of periods including a sherd of Roman samian ware. These finds from the promontory fort are beyond the remit of this assessment, which extends seaward from MHWS, so will not be discussed further.

6.16. The six records from Loughshinny include one stone tool (1941.15) and five flint flakes (1941.16-20). It is not entirely clear from the record exactly where the finds were made but it seems probable that the finds came from a terrestrial site eroding from the cliff face, ‘site exposed on low cliff running north from causeway road onto the original island joining outer side of harbour and extends for about 50 yards from the road north’ (NMI 1941. 15-20).

Isle of Man

6.17. Only one wreck, the *Abydos* (**CA1**), has been identified in Isle of Man waters, which may be within the CSC (see table 3; see figure 19).

6.18. There are reports of quite a large number of known wrecks in Isle of Man waters that are not recorded on national databases (A. Corkill pers. comm.). Adrian Corkill is a local diver and author of *Shipwrecks of the Isle of Man* (2003); he maintains the only comprehensive database for shipwrecks in Isle of Man waters (A. Corkill pers. comm; Johnson *et al.* 2013)

6.19. The MMEA report appears to support this, stating that 'vessels have been most vulnerable whilst negotiating the areas of dangerous coast round Langness in the south east (63 wrecks) [and] the Calf of Man in the south west (50 wrecks)' (Johnson *et al.* 2013). Consequently, the potential to encounter wrecks not identified in this DBA seems moderate to high.

Table 3 Sites of cultural heritage interest in the Isle of Man CSCs

CA no.	Name	Type	Date	Status	Longitude	Latitude	Source & ref. no.
CA1	*Abydos*	Wreck, dangerous	1894	live	-4.771983	54.087650	OceanWise EK001-FN810-02688

Offshore

6.20. The *Abydos* (**CA1**) was an iron steamship of 1339 gross registered tonnage (grt) built in 1871 by the London Glasgow Engineering & Iron Shipbuilding Co. Ltd. In December 1894, the *Abydos* was caught in 'the worst storm since 1839' (A. Corkill pers. comm.). The cause of the loss was never established but it is presumed to have foundered with the loss of 21 lives. Locational information is variable and unreliable; the most credible source suggests the wreck lies 11.3km off the coast of Niarbyl (A. Corkill pers. comm.), which is well north of the CSC. The wreck, measuring 78m x 10m, apparently lies intact and upright on the seabed in 95m of water, standing up to 10m above the seabed (A. Corkill pers. comm.).

Onshore

6.21. All information of sites in and around the two landfall locations on the Isle of Man was provided by MNH without any spatial information. The descriptions of the sites though, suggest that none are located below MHWS or within the CSC.

6.22. There are four records for each landfall location. A fifth record for Port Grenaugh, mentioned by Andrew Johnson of MNH (pers. comm.), was unavailable.

Port Erin

6.23. The records for Port Erin include *Chibbyr Catreeney*, a medieval well, *Keeill Catreeney*, a medieval chapel, and two modern chapels.

Port Grenaugh

6.24. The records for Port Grenaugh include *Purt ny Ceabagh*, an Iron Age defended promontory, *Ballafurt Keeill*, a medieval chapel and burial ground, an early to middle Bronze Age burial cist, from which nearly forty worked flints were recovered, and *Cronk ny Merriu*, a presumed Iron Age promontory, which was later built over by a Viking longhouse.

6.25. There is nothing to suggest that these sites are located below MHWS or within the CSC.

6.26. The fifth site has no formal record. This is a curvilinear line of boulders in the intertidal zone, interpreted as the remains of a fish trap, or a rudimentary barrier against small vessels. The boulders were removed by a local landowner a few years ago before they could be surveyed. MNH believe that traces of this structure may remain; this possibility will be investigated during the foreshore survey (A. Johnson pers.comm.).

England (Irish Sea)

6.27. Three wrecks (**CA2**-**CA4**), three terrestrial sites (**CA6**-**CA8**) and 15 obstructions (**CA5** & **CA9**-**CA22**) have been identified within the English CSC in the Irish Sea (see table 4; see figure 19).

Offshore

6.28. There is one wreck site within the CSC which is designated under the Protection of Military Remains Act 1986. It comprises the site of a crashed aircraft (**CA2**); a Blackburn Botha Mk I twin-engine crew trainer which caught fire and was ditched 19.3km off Squires Gate in 1942. The crew escaped.

6.29. The two other wrecks in the CSC include the possible remains of the *SS Linda Blanche* (**CA3**) and an unknown wreck in an unknown position (**CA4**).

6.30. *The Linda Blanche* (**CA3**) was a British steamer of 539grt built by Scott & Sons, Bowling in 1914. On 30 January 1915, on a voyage from Manchester to Belfast, the ship was captured and sunk by the German submarine U-21 (Wreck Site). The recorded position of the wreck is unreliable.

6.31. **CA5** is an unidentified dead obstruction.

Table 4 Sites of cultural heritage interest in the CSC in English (Irish Sea) waters

CA no.	Name	Type	Date	Status	Longitude	Latitude	Source & ref. no.
CA2	N/A	Aircraft crash site	1942	Unknown	-3.294010	53.755130	HER
CA3	Linda Blanche	Wreck, non-dangerous	1915	dead	-3.686117	53.754167	OceanWise EK001-FN810-02688
CA4	Unknown	Wreck, non-dangerous	Unknown	dead	-5.139433	53.796850	OceanWise EK001-FN810-02688
CA5	N/A	Obstruction, foul ground	Unknown	dead	-3.988183	53.790483	OceanWise EK001-FN810-02688
CA6	N/A	Find spot	Neolithic	N/A	-3.055941	53.775127	HER; HEA – AR115856
CA7	N/A	Defences	WWII	N/A	-3.056174	53.776680	HEA – AR115856
CA8	N/A	Defences	WWII	N/A	-3.053263	53.773472	HEA – AR115856
CA9	N/A	Obstruction	Unknown	Unknown	-3.986950	53.790280	HEA – AR115856
CA10	N/A	Obstruction	Unknown	Unknown	-3.426730	53.749640	HEA – AR115856
CA11	N/A	Obstruction	Unknown	Unknown	-3.768380	53.758300	HEA – AR115856
CA12	N/A	Obstruction	Unknown	Unknown	-3.836820	53.765540	HEA – AR115856
CA13	N/A	Obstruction	Unknown	Unknown	-3.980550	53.788880	HEA – AR115856
CA14	N/A	Obstruction	Unknown	Unknown	-3.539160	53.742130	HEA – AR115856
CA15	N/A	Obstruction	Unknown	Unknown	-3.651720	53.750790	HEA – AR115856
CA16	N/A	Obstruction	Unknown	Unknown	-3.453360	53.747700	HEA – AR115856
CA17	N/A	Obstruction	Unknown	Unknown	-3.456000	53.749380	HEA – AR115856
CA18	N/A	Obstruction	Unknown	Unknown	-3.359200	53.753030	HEA – AR115856
CA19	N/A	Obstruction	Unknown	Unknown	-3.980550	53.788880	HEA – AR115856
CA20	N/A	Obstruction	Unknown	Unknown	-3.986770	53.791830	HEA – AR115856
CA21	N/A	Obstruction	Unknown	Unknown	-3.392530	53.751840	HEA – AR115856
CA22	N/A	Obstruction	Unknown	Unknown	-3.374930	53.751860	HEA – AR115856

6.32. **CA9-CA22** all appear to be fishermen's net fastenings 'possibly indicative of wreckage or a submerged feature' (HEA – AR115856) but there are few other details.

Onshore

6.33. There are three sites (**CA6-CA8**) located, or partially located, within the landfall area of the CSC (see figure 16).

6.34. **CA6** is located within the CSC and is the findspot of a Neolithic polished stone celt, mentioned previously.

6.35. The remains of a WWII military building and barbed wire perimeter **(CA7)**, and lines of beach scaffolding **(CA8)**. only partially encroach the CSC. Neither is visible in the latest 1989 Ordnance Survey vertical photography.

England (North Sea)

6.36. Nineteen wrecks (**CA23-CA41**), 15 obstructions (**CA42-CA56**) and four terrestrial sites (**CA57-CA60**) have been identified in the CSC in English waters in the North Sea (see table 5; see figure 20).

Offshore

6.37. *The SS Eston* (**CA23**) was a British cargo ship of 1487grt built in 1919 by Goole Shipbuilding & Repairing Co. Ltd. The *Eston* was lost on 26 January 1940. It is presumed to have struck a mine laid by the German submarine U-22. The master and seventeen crew members were all lost. The ship reportedly lies upright on the seabed in a depth between 15.5-24m. The wreck was recorded in 1999 as badly broken with no discernible outline, but with general debris surrounding it (Wreck Site).

6.38. *The SS Prunelle* (**CA24**) was a steam-driven Swedish cargo vessel of 579grt built in 1874 by Bergsund Mekaniske Verksted, Stockholm. On 22 August 1918, on a voyage from London to Dundee, the ship was hit by a torpedo from the German submarine UB-112 (HEA – AR115856). Twelve crew members, including the captain, were lost in the attack. The ship now lies in two sections at a depth between 19.5-24m with debris in between (Wreck Site).

6.39. The *SS Ferryhill* (**CA25**) was a screw-driven steamer, built of steel in 1919 by Hall, Russel & Co. Ltd. On 22 January 1940, while transporting coal from Blyth to

Aberdeen, the *Ferryhill* struck a mine laid by the German submarine U-61 eleven crew members were lost. The site was last recorded in 1955 as dispersed into several sections. The wreck is considered dead as it was not located in surveys between 1971 and 1999 (HEA – AR115856; Wreck Site).

Table 5 Sites of cultural heritage interest in the CSC in English waters in the North Sea

CA no.	Name	Type	Date	Status	Longitude	Latitude	Source & ref. no.
CA23	*Eston*	Wreck, dangerous	1940	live	-1.410767	55.057917	OceanWise EK001-FN810-02688; HEA – AR115856; HER
CA24	*Prunelle*	Wreck, dangerous	1918	live	-1.438200	55.095833	OceanWise EK001-FN810-02688; HEA – AR115856
CA25	*Ferryhill*	Obstruction, foul ground; Wreck	1940	dead	-1.451617	55.093683	OceanWise EK001-FN810-02688; HEA – AR115856; HER
CA26	*Rupert*	Wreck, non-dangerous	1917	dead	-0.340550	55.263217	OceanWise EK001-FN810-02688
CA27	*La Morlaye*	Wreck showing any portion of superstructure	1986	dead	-1.443283	55.050083	OceanWise EK001-FN810-02688
CA28	*Kilsyth*	Wreck showing any portion of superstructure	1977	dead	-1.443283	55.050083	OceanWise EK001-FN810-02688
CA29	*Carl Gustav*	Wreck	1852	Unknown	-1.464643	55.081820	HEA – AR115856
CA30	*Sainte Adresse*	Wreck	1901	Unknown	-1.464643	55.081820	HEA – AR115856
CA31	*Palmedagh*	Wreck	1365	Unknown	-1.464643	55.081820	HEA – AR115856
CA32	*Neptune*	Wreck	1823	Unknown	-1.464643	55.081820	HEA – AR115856
CA33	*Belvidera*	Wreck	1831	Unknown	-1.464643	55.081820	HEA – AR115856
CA34	*Crook*	Wreck	1870	Unknown	-1.464643	55.081820	HEA – AR115856
CA35	*Cleadon*	Wreck	1904	Unknown	-1.464643	55.081820	HEA – AR115856
CA36	Unknown	Wreck	1752	Unknown	-1.464643	55.081820	HEA – AR115856
CA37	*Eleanor*	Wreck	1812	Unknown	-1.443166	55.049981	HER
CA38	*Ida*	Wreck	1917	Unknown	-1.439638	55.049495	HER
CA39	12996	Wreck	Unknown	Unknown	-1.445388	55.095049	HER
CA40	Unknown	Wreck, non-dangerous	Unknown	dead	-1.278300	55.080917	OceanWise EK001-FN810-02688
CA41	Unknown	Wreck, non-dangerous	Unknown	Unknown	2.351117	55.659050	OceanWise EK001-FN810-02688
CA42	N/A	Obstruction, undefined	Unknown	dead	-1.418283	55.053417	OceanWise EK001-FN810-02688
CA43	N/A	Obstruction, undefined	Unknown	dead	-1.338300	55.068417	OceanWise EK001-FN810-02688

CA no.	Name	Type	Date	Status	Longitude	Latitude	Source & ref. no.
CA44	N/A	Obstruction, foul ground	Unknown	Unknown	0.198883	55.325167	OceanWise EK001-FN810-02688
CA45	N/A	Obstruction, foul ground	Unknown	Unknown	0.609450	55.361283	OceanWise EK001-FN810-02688
CA46	N/A	Obstruction, foul ground	Unknown	Unknown	0.789167	55.384883	OceanWise EK001-FN810-02688
CA47	N/A	Obstruction	Unknown	Unknown	-1.321845	55.111687	HEA – AR115856
CA48	N/A	Obstruction	Unknown	Unknown	-1.295555	55.120004	HEA – AR115856
CA49	N/A	Obstruction	Unknown	Unknown	-1.161384	55.146943	HEA – AR115856
CA50	N/A	Obstruction	Unknown	Unknown	-1.331928	55.111177	HEA – AR115856
CA51	N/A	Obstruction	Unknown	Unknown	-1.364969	55.102855	HEA – AR115856
CA52	N/A	Obstruction	Unknown	Unknown	-1.283891	55.123333	HEA – AR115856
CA53	N/A	Obstruction	Unknown	Unknown	-1.290563	55.079221	HEA – AR115856
CA54	N/A	Obstruction	Unknown	Unknown	-1.354416	55.068141	HEA – AR115856
CA55	N/A	Obstruction	Unknown	Unknown	-1.250557	55.090275	HEA – AR115856
CA56	N/A	Obstruction	Unknown	Unknown	-1.159162	55.151107	HEA – AR115856
CA57	N/A	Defences	WWII	N/A	-1.479208	55.086767	HEA – AR115856
CA58	N/A	Defences	WWII	N/A	-1.478380	55.085412	HEA – AR115856
CA59	N/A	Defences	WWII	N/A	-1.483856	55.090468	HEA – AR115856
CA60	N/A	Battery	17th C.	N/A	-1.472043	55.085127	HEA – AR115856

6.40. The *FV Rupert* (**CA26**) is the remains of a British registered fishing vessel of 114grt built in 1892 by Cochrane, Hamilton, Cooper & Schofield in Hull. The ship was captured and scuttled by the German submarine UB-22 on 6 February 1918 with the loss of one crew member. The position is unreliable as it was not located by a Gardline survey in 2009 (Wreck Site).

6.41. The *MFV La Morlaye* (**CA27**) and the *MFV Kilsyth* (**CA28**) were British fishing trawlers which ran aground and sank in 1986 and 1977, respectively. Although both wrecks reportedly stand proud of the seabed both are considered dead as neither has been located in recent surveys.

6.42. Eight wrecks, **CA29-CA36,** are only vaguely recorded by the HEA; rather than specific locations, an area is recorded, only part of which encroaches the CSC (see figure 18). It is therefore probable that none of these wrecks are located within the CSC. Of the eight wrecks, details have been found on just two; the SS *Sainte Adresse* (**CA30**) & the *SS Cleadon* (**CA35**). The other six wrecks are the *Carl Gustav* (**CA29**), the *Palmedagh* (**CA31**), the *Neptune* (**CA32**), the *Belvidera* (**CA33**), the *Crook* (**CA34**) and an unknown wreck (**CA36**).

6.43. The *SS Sainte Adresse* (**CA30**) was, a French steamer of 983grt, built in 1884 which wrecked on Seaton Sea Rocks near Blyth harbour on a voyage from Dieppe in ballast (Wreck Site). The position of the vessel is considered unreliable.

6.44. The *SS Cleadon* (**CA35**) was as British cargo ship of 760grt built in 1871 by Watson W. in Sunderland. The SS *Cleadon* was lost on 4 August 1904 on a voyage from Aberdeen to Sunderland after colliding with another ship. The position is unreliable.

6.45. Little is known of the remains of the *Carl Gustav* (**CA29**), a schooner lost in 1852.

6.46. The *Palmedagh* (**CA31**) was a Flemish cargo vessel dating from 1365. The ship was reportedly stranded at Seaton Sluice on passage from Skane to Newcastle-upon-Tyne. The ship was made of wood and reported to have been laden with goods and merchandise.

6.47. The *Neptune* (**CA32**) was an English brig that wrecked in 1823. The ship reportedly beached near Gloucester Lodge after grounding on the Farne Islands and springing a leak.

6.48. The *Belvidera* (**CA33**) was a brig, which wrecked while en route from Shields to London with an unspecified cargo. The ship was stranded near Hartley and said in one source to be “on Blyth Sands, near Seaton Sluice” (HEA – AR115856).

6.49. The *Crook* (**CA34**) was a British vessel from 1870 but nothing else is known.

6.50. An unknown Scottish brig or brigantine (**CA36)** dating from 1752 and carrying a cargo of oats is recorded as stranding on Hartley Rocks.

6.51. The *Eleanor* (**CA37**) was an English craft, dating from 1812, which stranded in Whitley Bay during a storm.

6.52. The *Ida* (**CA38**) was a Swedish steamship of 2200grt. On 9 June 1917, the ship was attacked by a German U-boat and sank in 30m of water off the coast of Whitley Bay. She has since been heavily salvaged and her bell has been recovered.

6.53. **CA39-CA41** are all unknown wrecks. **CA39** is reported as a well broken up wreck lying 366m east of the Ferryhill and standing 2m off the seabed (HER – AR115856). **CA40** is listed as a dead wreck. **CA41** has no assigned status.

6.54. **CA42** and **CA43** are undefined dead obstructions. while **CA44-CA46** are defined only as foul ground.

6.55. **CA47-CA56** all appear to be fishermen's net fastenings 'possibly indicative of wreckage or a submerged feature' (HEA – AR115856) but there are few other details.

Onshore

6.56. **CA57-CA59** represent a series of WWII beach defences that were constructed during 1940-41 as part of the "Northumberland coast defences - Defences of the Northumberland coast line and immediate hinterland" (HEA – AR115856). All four sites only partially encroach the CSC (see figure 18).

6.57. **CA57** comprises two WWII pillboxes, a barbed wire obstruction and tank traps, comprising lines of anti-tank cubes. None of these features are visible on the latest 1988-1993 Ordnance Survey vertical photography but may have been buried by shifting sands (HEA – AR115856).

6.58. **CA58** comprises a WWII pillbox, an ordnance store, barbed wire obstruction and Nissen huts. The pillbox is the only visible feature on the latest 1988-1993 Ordnance Survey vertical photography (HEA – AR115856).

6.59. **CA59** comprises a number of WWII features including a minefield, a pillbox, a trench, military buildings, Nissen huts, a tank trap, and barbed wire obstructions. No surface features are visible on the latest 1988-1993 Ordnance Survey vertical photography (HEA – AR115856).

6.60. **CA60** is a 17th century battery overlooking Seaton Sluice Harbour, constructed by Sir Ralph Delaval. The only indication of the battery's existence was a symbol representing guns on Greenville Collins' chart. The site is now built over and no antiquities were found (HEA – AR115856).

7. CONCLUSIONS

Ireland

7.1. No wrecks or obstructions have been identified in Irish waters.

7.2. The landfall location appears to overlie a small river valley containing alluvium so there is a moderate potential for encountering palaeo-environmental remains.

Isle of Man

7.3. Only one wreck is recorded within the CSC. The wreck is live and is considered to be dangerous. The location is unreliable, but the most authoritative source suggests

it is some distance from the CSC (A. Corkill pers. comm.). A total of nine sites are recorded in the vicinity of the two landfall locations, but from the limited information available, all bar one appear to be located beyond the CSC.

7.4. The OceanWise data for Isle of Man waters is not comprehensive and the majority of wrecks are concentrated along the south-east and south-west coasts, in the area of the CSC. The potential to encounter undiscovered maritime cultural remains has been assessed as moderate.

England (Irish Sea)

7.5. A total of 21 sites were identified within the CSC in the English waters of the Irish Sea, including three wrecks, three sites, and 15 obstructions. One of the wrecks is protected under the Protection of Military Remains Act 1986. The frequency of known wrecks is sparse, suggesting there is low potential for encountering undiscovered maritime cultural remains.

7.6. Based on the work of the WCPP, the offshore area of the CSC is considered to have a moderate potential for encountering palaeo-environmental remains.

England (North Sea)

7.7. A total of 38 sites were identified within the CSC, in the English waters of the North Sea, including 19 wrecks, 15 obstructions and four sites. Just two wrecks are live, and both are considered dangerous. None of the sites is designated. The frequency of known wrecks is sparse, suggesting there is low potential for encountering undiscovered maritime cultural remains.

8. FIGURES (OVERLEAF)

300000
400000
500000
6100000
6000000
5900000

N

Legend

- Ireland CSC
- Isle of Man CSC
- England (Irish Sea) CSC

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 30Kilometers

Cotswold Archaeology marine
Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Irish Sea CSCs

DRAWN BY	RK	*PROJECT NO*	770800	*FIGURE NO.*
CHECKED BY	RK	*DATE*	13/11/18	1
APPROVED BY	MW	*SCALE@A3*	1:1,000,000	

180000 240000 300000 360000 420000 480000 540000

6300000 6250000 6200000 6150000 6100000 6050000 6000000

N

Legend

- England (North Sea) CSC
- UK_Norway_EEZ_Boundary
- UK_Denmark_EEZ_Boundary
- .UK_EEZ_Limit

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 40Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564460
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

North Sea CSC

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**2**
APPROVED BY	**MW**	*SCALE@A3*	**1:1,250,000**	

300000
400000
500000
6000000
5900000

N

Legend

- England (Irish Sea) CSC
- Isle of Man CSC
- Ireland CSC

EMODnet Bathy

Value

High : 0.0

Low : -255.05

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 25Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Irish Sea bathymetry

DRAWN BY	RK	PROJECT NO	770800	FIGURE NO.
CHECKED BY	RK	DATE	13/11/18	3
APPROVED BY	MW	SCALE@A3	1:742,194	

300000

400000

500000

6000000

5900000

N

Legend

Irish Sea Ice Sheet extents

- 17.8-16.9ka
- 21.9-20.7ka
- 22.5-21.2ka
- England (Irish Sea) CSC
- Isle of Man CSC
- Ireland CSC

EMODnet Bathy

Value

High : 0.0

Low : -255.05

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 25Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Extents of the Irish Sea Ice Sheet (after Chiverrell et al. 2013).

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**4**
APPROVED BY	**MW**	*SCALE@A3*	**1:742,194**	

300000

400000

500000

300000 400000 500000

6100000 6000000 5900000

Legend

- Mud M
- Slightly gravelly mud (g)M
- Slightly gravelly sandy mud (g)sM
- Gravelly mud gM
- Slightly gravelly muddy sand (g)mS
- Sandy mud sM
- Muddy sand mS
- Sand S
- Sand (French classification)
- Gravelly sand (French classification)
- Gravelly sand gS
- Slightly gravelly sand (g)S
- Gravelly muddy sand gmS
- Muddy gravel mG
- Muddy sandy gravel msG
- Gravel G
- Gravel (French classification)
- Sandy gravel sG
- Sandy gravel (French classification)
- Gravel, sand and silt
- Clay and sand
- Mussell deposit
- Rock and sediment
- Diamicton
- Rock or diamicton
- Rock
- England (Irish Sea) CSC
- Isle of Man CSC
- Ireland CSC

N

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 30Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Irish Sea seabed sediments

DRAWN BY	RK	PROJECT NO	770800	FIGURE NO.
CHECKED BY	RK	DATE	13/11/18	5
APPROVED BY	MW	SCALE@A3	1:1,000,000	

400000

500000

6000000

5900000

N

Legend

Relative topography

High to Low

- High
- High - Intermediate
- Intermediate
- Intermediate - Low
- Low
- Very Low
- 2D features
- 3D features
- England (Irish Sea) CSC
- Isle of Man CSC

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 15Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Liverpool Bay landscape characterisation

DRAWN BY	RK	PROJECT NO	770800	FIGURE NO.	
CHECKED BY	RK	DATE	13/11/18		6
APPROVED BY	MW	SCALE@A3	1:448,290		

400000

500000

6000000

5900000

N

Legend

Palaeoenvironmental potential

Potential

- High

Relative topography
High to Low

- High
- High - Intermediate
- Intermediate
- Intermediate - Low
- Low
- Very Low
- 2D features
- 3D features
- England (Irish Sea) CSC
- Isle of Man CSC

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 15Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Liverpool Bay palaeo-environmental potential

DRAWN BY	RK	PROJECT NO	770800	FIGURE NO.	
CHECKED BY	RK	DATE	13/11/18		7
APPROVED BY	MW	SCALE@A3	1:448,290		

400000

500000

6000000

5900000

N

Legend

England (Irish Sea) CSC

Isle of Man CSC

Archaeological potential

Value

High : 732

Low : 0

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 15Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Liverpool Bay archaeological potential

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**8**
APPROVED BY	**MW**	*SCALE@A3*	**1:448,290**	

240000 300000 360000 420000 480000

6250000 6200000 6150000 6100000 6050000

Dogger Bank

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Legend

England (North Sea) CSC

EMODnet Bathy

Value

High : 0.0

Low : -192.61

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 32.5Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

North Sea bathymetry

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**9**
APPROVED BY	**MW**	*SCALE@A3*	**1:1,018,898**	

100000 200000 300000 400000 500000 600000 700000 800000

6300000 6200000 6100000 6000000 5900000 5800000 5700000

Dogger Lake?

Yorks

?

Norfolk

Pre 30 ka ice advance + early lake build-up?

1

0 50 100 Kilometers

N

Legend

England (North Sea) CSC

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 50Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Pre 30 ka ice advance & early lake build-up? (after Roberts et al. 2018)

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*	
CHECKED BY	**RK**	*DATE*	**13/11/18**		**10**
APPROVED BY	**MW**	*SCALE@A3*	**1:2,600,419**		

100000 200000 300000 400000 500000 600000 700000 800000

6300000 6200000 6100000 6000000 5900000 5800000 5700000

Dogger Lake

BDK
Limit?

Ice advance
into Dogger
lake 30 – 25 ka

2

0 50 100 Kilometers

N

Legend

England (North Sea) CSC

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 50Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Ice advance into Dogger lake 20-25 ka (after Roberts et al., 2018)

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**11**
APPROVED BY	**MW**	*SCALE@A3*	**1:2,600,419**	

100000 200000 300000 400000 500000 600000 700000 800000

6300000
6200000
6100000
6000000
5900000
5800000
5700000

ribbon lake

DB thrust
moraine complex

?

?

23 ka retreat

3

0 50 100 Kilometers

N

Legend

England (North Sea) CSC

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 50Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

23 ka ice retreat (after Roberts et al., 2018)

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**12**
APPROVED BY	**MW**	*SCALE@A3*	**1:2,600,419**	

100000 200000 300000 400000 500000 600000 700000 800000

6300000 6200000 6100000 6000000 5900000 5800000 5700000

Dogger lake drainage

DB

22 – 21 ka re-advance + lake drainage

4

0 50 100 Kilometers

N

Legend

England (North Sea) CSC

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 50Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

22-21 ka re-advance of ice sheet & lake drainage (after Roberts et al., 2018)

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**13**
APPROVED BY	**MW**	*SCALE@A3*	**1:2,600,419**	

100000 200000 300000 400000 500000 600000 700000 800000

6300000 6200000 6100000 6000000 5900000 5800000 5700000

Marine inundation

DB

21 – 19 ka
retreat + marine
inundation

0 50 100 Kilometers

5

N

Legend

England (North Sea) CSC

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 50Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

21-19 ka ice retreat & marine inundation (after Roberts et al. 2018)

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**14**
APPROVED BY	**MW**	*SCALE@A3*	**1:2,600,419**	

240000 300000 360000 420000 480000

6250000 6200000 6150000 6100000 6050000

Legend

N

- England (North Sea) CSC
- Mud M
- Slightly gravelly mud (g)M
- Slightly gravelly sandy mud (g)sM
- Gravelly mud gM
- Slightly gravelly muddy sand (g)mS
- Sandy mud sM
- Muddy sand mS
- Sand S
- Sand (French classification)
- Gravelly sand (French classification)
- Gravelly sand gS
- Slightly gravelly sand (g)S
- Gravelly muddy sand gmS
- Muddy gravel mG
- Muddy sandy gravel msG
- Gravel G
- Gravel (French classification)
- Sandy gravel sG
- Sandy gravel (French classification)
- Gravel, sand and silt
- Clay and sand
- Mussell deposit
- Rock and sediment
- Diamicton
- Rock or diamicton
- Rock

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 32.5Kilometers

Cotswold Archaeology marine
Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

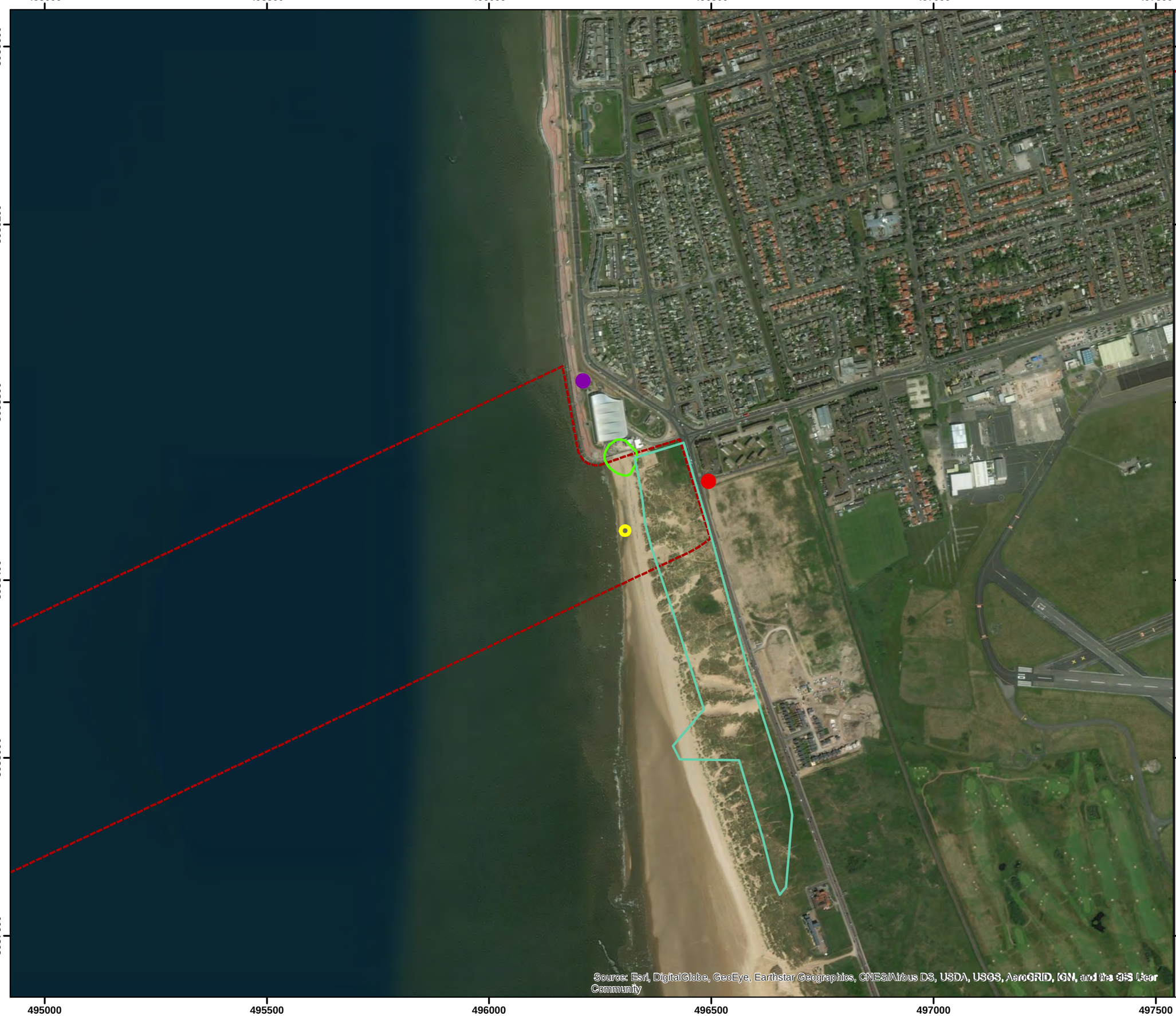
FIGURE TITLE

North Sea seabed sediments

DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**15**
APPROVED BY	**MW**	*SCALE@A3*	**1:1,018,898**	

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

240000 300000 360000 420000 480000



N

Legend

borehole

- SD33SW153
- SD33SW111

England (Irish Sea) CSC

Gazetteer entries

- CA6
- CA7
- CA8

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 0.25Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Landfall - Lytham, St. Anne's

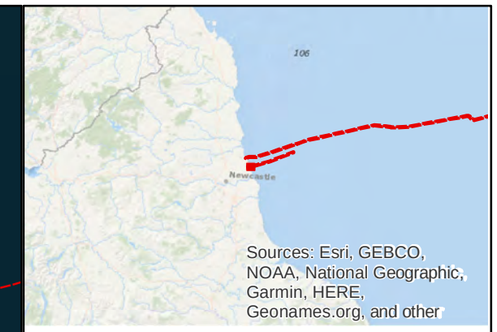
DRAWN BY	RK	*PROJECT NO*	770800	*FIGURE NO.*
CHECKED BY	RK	*DATE*	13/11/18	16
APPROVED BY	MW	*SCALE@A3*	1:7,907	

216000

218000

6110000

6108000



N

Legend

borehole

- NZ37SE314
- NZ37SE315

England (North Sea) CSC

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 0.3Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Landfall - Whitley Bay (south)

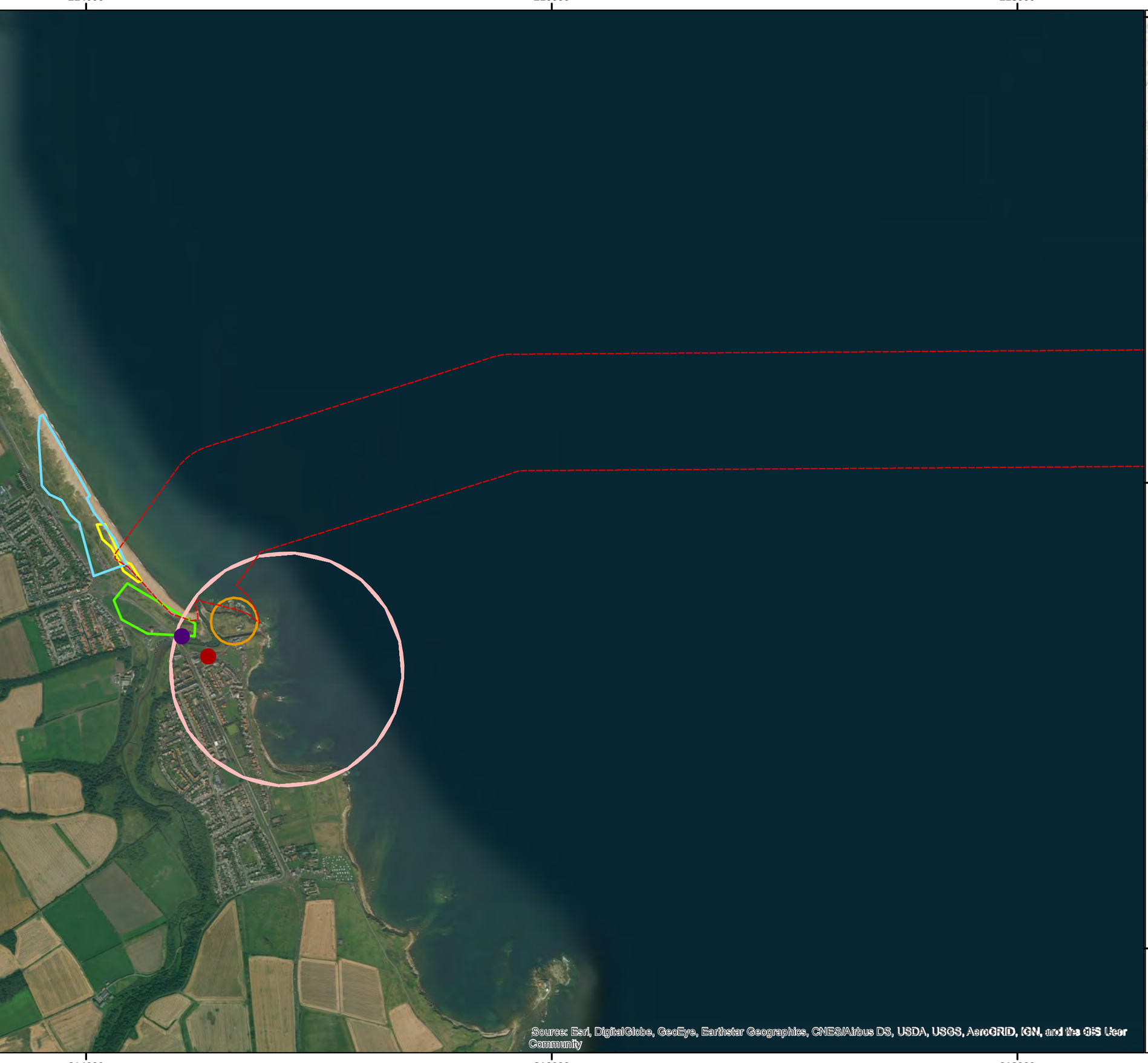
DRAWN BY	**RK**	*PROJECT NO*	**770800**	*FIGURE NO.*
CHECKED BY	**RK**	*DATE*	**13/11/18**	**17**
APPROVED BY	**MW**	*SCALE@A3*	**1:9,088**	

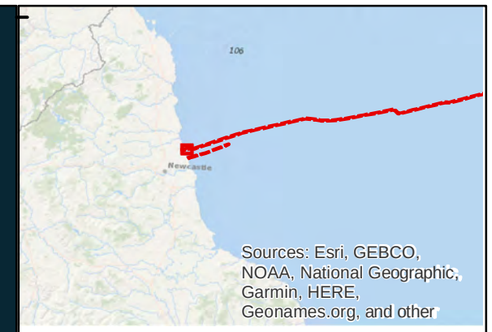
214000 216000 218000

6116000

6114000

6112000





Legend

N

England (North Sea) CSC

borehole

NZ37NW42/S3

NZ37NW47/S51

Gazetteer entries

CA29
CA30
CA31
CA32
CA33
CA34
CA35
CA36
CA57
CA58
CA59
CA60

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 0.5Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Landfall - Whitley Bay (north), Seaton Sluice

DRAWN BY	RK	*PROJECT NO*	770800	*FIGURE NO.*	18
CHECKED BY	RK	*DATE*	13/11/18		
APPROVED BY	MW	*SCALE@A3*	1:15,941		

360000 380000 400000 420000 440000 460000 480000

6020000 6000000 5980000 5960000 5940000 5920000

CA1
CA4
CA5
CA13
CA20
CA19
CA9
CA11
CA3
CA12
CA14
CA15
CA10
CA18
CA21
CA17
CA16
CA22
CA2

N

Legend

Gazetteer entries

Type

- obstruction
- wreck
- England (Irish Sea) CSC
- Isle of Man CSC
- Ireland CSC

Coordinate System: WGS 1984 UTM Zone 30N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: -3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 12.5Kilometers

Cotswold Archaeology marine
Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

Irish Sea gazetteer entries

DRAWN BY	RK	*PROJECT NO*	770800	*FIGURE NO.*
CHECKED BY	RK	*DATE*	14/11/18	19
APPROVED BY	MW	*SCALE@A3*	1:404,981	

Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

250000 300000 350000 400000 450000

6240000 6200000 6160000 6120000 6080000 6040000

CA41 CA44 CA45 CA46 CA26 CA48 CA25 CA43 CA40 CA52 CA47 CA49 CA55 CA37 CA56 CA27 CA28 CA24 CA38 CA42 CA23

N

Legend

Gazetteer entries

Type

- obstruction
- wreck
- England (North Sea) CSC

Coordinate System: WGS 1984 UTM Zone 31N
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500,000.0000
False Northing: 0.0000
Central Meridian: 3.0000
Scale Factor: 0.9996
Latitude Of Origin: 0.0000
Units: Meter

0 25Kilometers

Cotswold Archaeology marine

Andover 01264 347630
Cirencester 01285 771022
Exeter 01392 826185
Milton Keynes 01908 564660
w www.cotswoldarchaeology.co.uk
e enquiries@cotswoldarchaeology.co.uk

PROJECT TITLE

Havhingsten submarine cable

FIGURE TITLE

North Sea gazetteer entries

DRAWN BY	RK	*PROJECT NO*	770800	*FIGURE NO.*	
CHECKED BY	RK	*DATE*	14/11/18		20
APPROVED BY	MW	*SCALE@A3*	1:813,753		

Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

REFERENCES

Baird, B. (2009). *Shipwrecks of the Forth and Tay*. Dunbeath, Scotland: Whittles.

Chartered Institute for Archaeologists, 2014. *Standard and Guidance for Historic Environment Desk-Based Assessment.*

Chiverrell, R.C., Thrasher, I.M., Thomas, G.S.P., Lang, A., Scourse, J.D., van Landeghem, K.J.J., Mccarroll, D., Clark, C.D., Cofaigh, C.Ó., Evans, D.J.A. and Ballantyne, C.K. 2013. Bayesian modelling the retreat of the Irish Sea Ice Stream. *Journal of Quaternary Science* 28 (2), 200-209

Clark, C.D., Hughes, A.L.C., Greenwood, S.L., Jordan, C. and Sejrup, H.P. 2012. Pattern and timing of retreat of the last British–Irish Ice Sheet. *Quaternary Science Reviews* 44, 112–146.

Corkill, A. (2003). *Shipwrecks of the Isle of Man*. Stroud: The History Press.

Cotterill, C.J., Phillips, E., James, L., Forsberg, C.F., Tjelta, T.I., Carter, G. and Dove, D. 2017. The evolution of the Dogger Bank, North Sea: A complex history of terrestrial, glacial and marine environmental change. *Quaternary Science Reviews* 171, 136-153.

COWRIE, 2011. *Guidance for Offshore Geotechnical Investigations and Historic Environment Analysis: guidance for the renewable energy sector*.

COWRIE, 2008. *Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy*.

COWRIE, 2007. *Historic Environment Guidance for the Offshore Renewable Energy Sector*. Wessex Archaeology.

Davis, R.A. and Balson, P.S. 1991. Stratigraphy of a North Sea Tidal Sand Ridge. *Journal of Sedimentary Petrology* 62 (1), 116-121.

Fitch, S., Gaffney, V., Ramsey, E. and Kitchen, E. 2011. *West Coast Palaeolandscapes Survey*. Birmingham: University of Birmingham. 110pp.

Hanley, L.J., Gell, F.G., Kennington, K., Stone, E., Rowan, E., McEvoy, P., Brew, M., Milne, K., Charter, L., Gallagher, M., Hemsley, K., Duncan, P.F. (eds.) 2013. *Manx Marine Environmental Assessment*. Isle of Man Marine Plan. Isle of Man Government.

Hawkins, K., Burnett, D., Hanley, L.J. 2013. Coastal and Offshore Geology. In Hanley et al., (eds.), *Manx Marine Environmental Assessment*. Isle of Man Marine Plan. Isle of Man Government, pp. 33

Hjelstuen, B.O., Sejrup, H.P., Valvik, E., Becker, L.W.M., 2018. Evidence of an ice-dammed lake outburst in the North Sea during the last deglaciation. *Marine Geology* 402, 118-130.

Institute of Archaeologists of Ireland, 2006. *IAI Code of Conduct for Archaeological Assessment Excavation.*

Jansen, J.F.H. and Hensey, A.M. 1981. Interglacial and Holocene sedimentation in the northern North Sea: an example of Eemian deposits in the Tartan Field. *The International Association of Sedimentologists*, 323-334.

Johnson, A., Fox, A., Brew, M., Hanley, L., Corkill, A., Moore, S. 2013. Marine and Coastal Historic Environment. In Hanley et al., (eds.), *Manx Marine Environmental Assessment*. Isle of Man Marine Plan. Isle of Man Government, pp. 34

Joint Nautical Archaeology Policy Committee, 2007. Code of Practice for Seabed Development. *JNAPC*.

McCarroll, D. 2001. Deglaciation of the Irish Sea Basin: a critique of the glaciomarine hypothesis. *J. Quaternary Sci*., 16, 393–404.

Mellett, C., Long, D., Carter, G., Chiverrell, R. and Van Landeghem, K. 2015. Geology of the seabed and shallow subsurface: The Irish Sea. *British Geological Survey* Commissioned Report, CR/15/057. 52pp.

Patton, H., Hubbard, A.L., Andreassen, K., Auriac, A., Whitehouse, P.L., Stroeven, A.P., Shackleton, C., Winsborrow, M., Heyman, J., Hall, A.M. 2017. Deglaciation of the Eurasian ice sheet complex. *Quaternary Science Reviews* 169, 148-172.

Roberts, D.H., Evans, D.J.A., Callard, S.L., Clark, C.D., Bateman, M.D., Medialdea, A., Dove, D., Cotterill, C.J., Saher, M., Cofaigh, C.Ó., Chiverrell, R.C., Moreton, S.G., Fabel, D. and Bradwell, T. 2018. Ice marginal dynamics of the last British-Irish Ice Sheet in the southern North Sea: Ice limits, timing and the influence of the Dogger Bank. *Quaternary Science Reviews* 198, 181-207.

Roberts, D.H., Grimoldi, E.Callard, S.L., Evans, D.J.A., Clark, C.D., Stewart, H.A., Dove, D., Saher, M., Cofaigh, C.O., Chiverrell, R., Bateman, M.R., Moreton, S.G., Bradwell, T., Fabel, D., Medialdea, A., (in press). The mixed-bed glacial landform imprint of the North Sea Lobe in the western North Sea. *Earth Surface Processes and Landforms*.

Satchell, J., 2012. *Maritime Archives and the Crown Estate Project Report*.

Scourse, J.D. and Furze, M.F.A. 2001. A critical review of the glaciomarine model for Irish sea deglaciation: evidence from southern Britain, the Celtic shelf and adjacent continental slope. *Journal of Quaternary Science* 16(5), 419-434

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 (2018) 143-159The Crown Estate, 2014. Offshore Renewables Protocol for Archaeological Discoveries.

Stoker, M.S., Balson, P.S., Long, D. and Tappin, D.R. 2003. An overview of the lithostratigraphical framework for the Quaternary deposits on the United Kingdom continental shelf. *British Geological Survey* Research Report, RR/11/03, 48pp.

Sturt, F., Garrow, D. and Bradley, S. 2013. New models of North West European Holocene palaeogeography and inundation. *Journal of Archaeological Science* 40 (11), 3963-3976.

The Crown Estate, 2010. *Round 3 Offshore Renewables* Projects Model Clauses for Archaeological Written Schemes of Investigation.

Tolan-Smith, C. (2008). *North East Rapid Coastal Zone Assessment* (NERCZA) - Final Report. Swindon: Historic England.

Tooley, M.J. 1978. Sea-level Changes in North-West England during the Flandrian Stage. *Oxford University Press*.

Westley, K. and Edwards, R. 2017. Irish Sea and Atlantic Margin. In Flemming, N.C., Harff, J., Moura, D., Burgess, A. and Bailey, G.N. (eds) Submerged Landscapes of the European Continental Shelf: *Quaternary Palaeoenvironments*. Wiley, 241-279

Whitehead, H. and Goodchild, H.H. 1909. Some notes on “moorlog”, a peaty deposit from the Dogger Bank in the North Sea. *Essex Naturalist* 16, 51-60.

Whitehead, H. 1920. More about “moorlog” – a peaty deposit from the Dogger Bank in the North Sea. *Essex Naturalist* 19, 242-250.

Online Resources

Archaeology Data Service [accessed October 2018]

https://doi.org/10.5284/1018087

British Geological Survey [accessed October 2018]

https://www.bgs.ac.uk/lexicon/lexic on.cfm?pub=LNN;
https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=SNTN

Historic England Intertidal and Coastal Peat Database [accessed October 2018]

https://historicengland.org.uk/content/docs/research/peat-database-nseapdf/

History of War [accessed October 2018]

http://www.historyofwar.org/articles/weapons_bla ckburn_botha.html

Wreck site [accessed October June 2018]

https://www.wrecksite.eu

Cotswold Archaeology

Andover Office

Stanley House
Walworth Road
Andover
Hampshire
SP10 5LH

t: 01264 347630

Cirencester Office

Building 11
Kemble Enterprise Park
Cirencester
Gloucestershire
GL7 6BQ

t: 01285 771022

Exeter Office

Unit 1
Clyst Units
Cofton Road
Marsh Barton
Exeter
EX2 8QW

t: 01392 573970

Milton Keynes Office

Unit 8 - The IO Centre
Fingle Drive
Stonebridge
Milton Keynes
Buckinghamshire
MK13 0AT

t: 01908 564660

e: enquiries@cotswoldarchaeology.co.uk