Liverpool Bay CCS Ltd
HYNET CARBON DIOXIDE TRANSPORTATION AND STORAGE PROJECT - OFFSHORE

Environmental Statement
Volume 3, appendix N: Marine Archaeology Technical Report

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Technical Report

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Glossary

Term	Meaning
Bathymetry	The measurement of water depth in oceans, seas and lakes
Effect	The consequence of an impact.
Environmental Impact Assessment	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Impact Assessment (EIA) Report.
Gazetteer	A geographical index or dictionary
Impact	A change that is caused by an action.
Mitigation Measure	Measure which would avoid, reduce, or remediate an impact.
Palaeochannel	A geological term describing a remnant of an inactive river or stream channel that has been filled or buried by younger sediment
Palaeoenvironmental	An environment of a past geological age
Project	The HyNet Carbon Dioxide Transportation and Storage Project.
Project Design Envelope (PDE)	Also known as the Rochdale Envelope, the PDE concept is routinely utilised in both onshore and offshore planning applications to allow for some flexibility in design options, particularly offshore, and more particularly for foundations and turbine type, where the full details of the project are not known at application submission but where sufficient detail is available to enable all environmental impacts to be appropriately considered during the EIA.
Proposed Development	The offshore components of the Project which are subject of this Environmental Statement, as described in volume 1, chapter 3.
The Applicant	This is Liverpool Bay CCS Ltd.

Acronyms and Initialisations

Acronym and Initialisations	Description
AD	Anno Domini
ALSF	Aggregate Levy Sustainability Fund
AEZ	Archaeological Exclusion Zone
AMAP2	Areas of Maritime Archaeological Potential 2
APPW	Area of Project Physical Work
BC	Before Christ
BGS	British Geological Survey
BH	Borehole
BP	Before Present
BSF	Below Seafloor
CBF	Cardigan Bay Formation
CPAT	Clwyd-Powys Archaeological Trust
CPT	Cone Penetration Test
EDI	Eni Development Area
ED50	European Datum 1950
EIA	Environmental Impact Assessment
ES	Environmental Statement
GIS	Geographic Information System

Acronym and Initialisations	Description
HER	Historic Environment Record
HSC	Historic Seascape Character
JFS	James Fisher Subtech
LGM	Last Glacial Maximum
LAT	Lowest Astronomical Tide
MASA	Marine Archaeology Study Area
MBES	Multibeam Echo Sounder
MIS	Marine Isotope Stages
MHWS	Mean High Water Springs
MRU	Motion Reference Unit
NLO	Named Location
NRHE	National Record of the Historic Environment
OWF	Offshore Wind Farm
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
RCAHMW	Royal Commission on the Ancient and Historic Monuments of Wales
ROV	Remotely Operated Vehicle
RSL	Relative Sea Level
SBP	Sub-bottom Profiler
SLIP	Sea Level Index Point
SSF	Surface Sands Formation
SSS	Sidescan Sonar
TVG	Transverse Gradiometer
UKHO	United Kingdom Hydrographic Office
USBL	Ultra Short Baseline
UTM	Universal Transverse Mercator
VORF	Vertical Offshore Reference Frames
WCPS	West Coast Palaeoandcape Survey
WIS-A	Western Irish Sea Formation - A
WIS-B	Western Irish Sea Formation - B
WIS-PF	Western Irish Sea Formation – Prograded Sand Facies

Units

Units	Description
%	Percentage
Hz	Hertz (frequency)
KHz	Kilohertz (frequency)
dB	Decibel (unit used to measure the intensity of sound)
km	Kilometres (distance)
km^2	Square kilometres (area)
m	Meters (distance)
nm	Nautical miles (distance; 1 nm = 1.852km)
nT	Nanotesla (magnetic flux density)

Contents

Tables

Figures

Appendices

1 MARINE ARCHAEOLOGY TECHNICAL REPORT

1.1 Introduction

This Marine Archaeology Technical Report provides an assessment of the marine archaeological baseline for the HyNet Carbon Dioxide Transportation and Storage Project (hereafter referred to as “the Project”) and the offshore components of the Project (hereafter referred to as “the Proposed Development”).

The purpose of this report is to identify and assess the archaeological baseline of the site, to feed into the Environmental Impact Assessment (EIA) process. The report includes an archaeological assessment of geophysical and hydrographic data and desk-based assessment. It outlines consultation with stakeholders, methods for the assessment, and the results of the assessment. The assessment of significance, impact assessment and mitigation strategies are set out within the Environmental Statement (ES) chapter 11 for Marine Archaeology.

1.2 Study area

The Proposed Development area which has been considered by this assessment can be broken down into three parts:

- the Area of Project Physical Work (APPW);
- The Eni development area; and
- the wider Marine Archaeology Study Area (MASA).

The APPW covers a restricted area in which Proposed Development activities and the insertion of new infrastructure including cable laying, well drilling and platform construction, as well as associated activities such as sand wave clearance are to be focused.

The Eni Development Area covers a wider area. While the main Proposed Development impacts will be focused within the APPW associated impacts such as vessel anchoring may occur within the Eni Development Area. As such both areas have been treated as the ‘Site’, and all archaeological remains within have been assessed.

The wider MASA forms a 2 km buffer around the Eni Development Area, up to Mean High Water Springs (MHWS) and has been defined to better characterise the archaeological resource within the offshore parts of the Site (Figure 1.1).

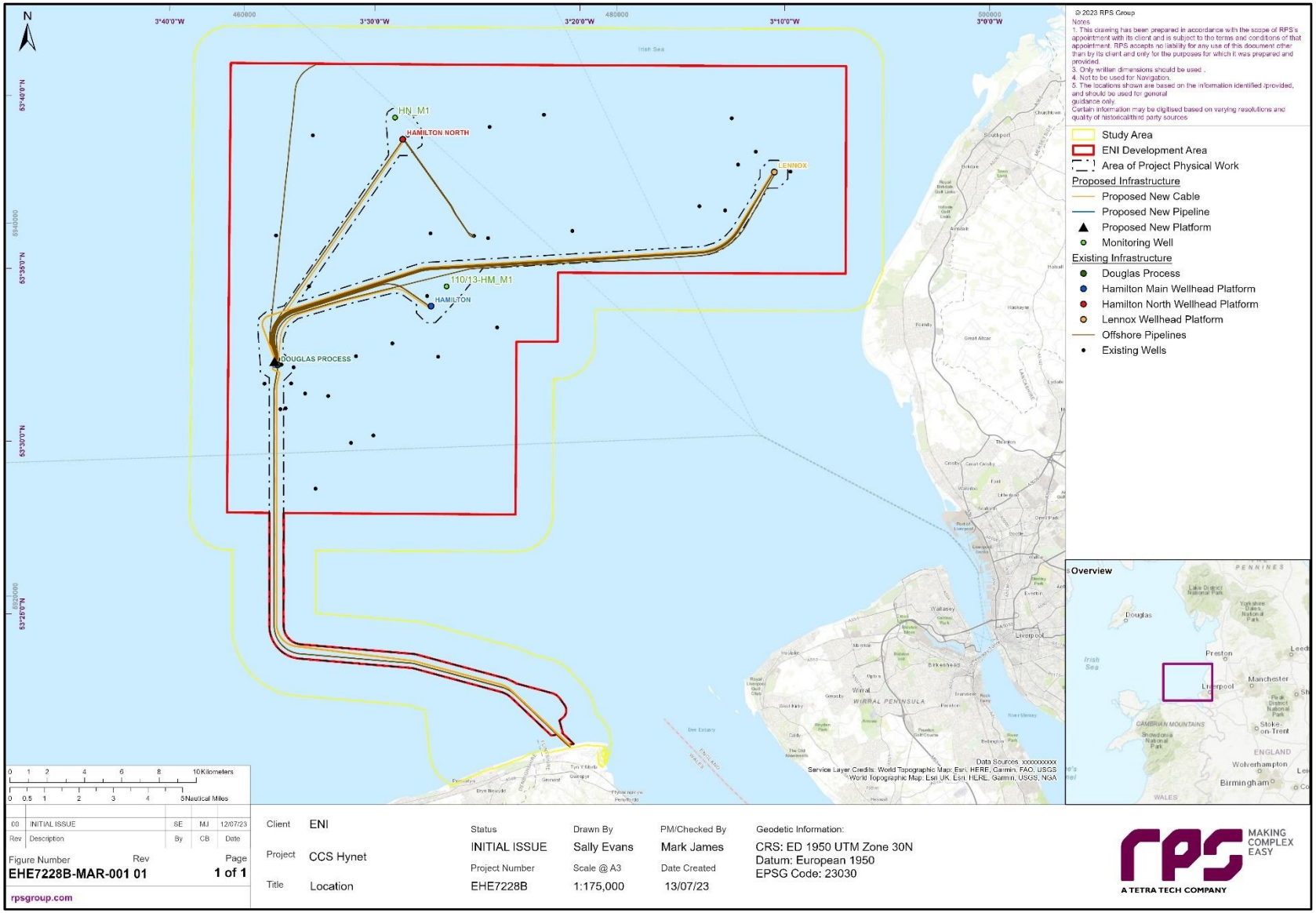


Figure 1.1: Location Of Study Area, Eni Development Area And Area of Project Physical Work

1.3 Consultation

A summary of the key issues raised during consultation activities undertaken to date specific to Marine Archaeology is presented in Table 1.1 below.

Table 1.1: Summary of Key Consultation Issues Raised During Consultation Activities Undertaken For The Proposed Development Relevant To Marine Archaeology

Date	Consultee and type of response	Issues raised
January 2023	The Scoping Opinion contained no responses from consultees relevant to Marine Archaeology	N/A
June 2023	Historic England – email to invite consultation	Historic England have been approached as part of the proposed development consultation. Correspondence via email has confirmed that Historic England are not a statutory consultee on OPRED applications, however, Eni is continuing to seek consultation opportunities with Historic England.
June 2023	Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) – consultation meeting	Introduction to the offshore elements of the proposed development; discussion of geophysical data coverage, noting the data is not full coverage; discussion of the location of *Resurgam* (Protected Wreck) and re-routing of the cables around the protected area; discussion on Archaeological Exclusion Zones (AEZs) and current routing of some cables through AEZs. Agreed a way forward which has been reflected in the documents produced as part of this application.

1.4 Methodology

This section provides an overview of the methods used to inform the assessment. The data sources are described first, followed by detailed methods for the review of these data sources.

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

- Palaeolandscape and submerged prehistory;
- maritime and coastal remains;
- aviation remains; and
- Historic Seascape Character (HSC).

1.4.1 Desktop study

Information on Marine Archaeology within the MASA was collected through a detailed desktop review of existing studies and datasets. The key sources and datasets are summarised at Table 1.2 below, and additional sources are referred to throughout the report.

Table 1.2: Summary Of Key Desktop Reports

Title	Source	Year	Author
Historic England designated data	Historic England	2023 (extract)	Multiple (national dataset)
Cadw designated data	Cadw	2023 (extract)	Multiple (national dataset)
List of wrecks designated under the Protection of Military Remains Act, 1986	https://explore-marine-plans.marineservices.org.uk/	2023 (viewed)	Multiple (national dataset)
Wrecks and Obstructions dataset	UKHO	2023 (extract)	Multiple (national dataset)
National Record of the Historic Environment (NRHE) data	Historic England	2023 (extract)	Multiple (national dataset)
Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) data	RCAHMW	2023 (extract)	Multiple (national dataset)
Clwyd-Powys Archaeological Trust (CPAT) Historic Environment Record (HER) data including National Museum of Wales (NMW) data	CPAT	2023 (extract)	Multiple (regional dataset)
Merseyside HER data	Merseyside HER	2023 (extract)	Multiple (regional dataset)
Historic Seascape Characterisation	Maritime Archaeology and SeaZone	2011	Maritime Archaeology and SeaZone
Platform and Well Ground Model Consultancy Report | Liverpool Bay Offshore United Kingdom. Fugro, Boskalis, Eni	Fugro 2023, Phase 2b Platform and Well Ground Model Consultancy Report | Liverpool Bay Offshore United Kingdom. Fugro, Boskalis, EN	2023	Fugro
Geology of the seabed and shallow subsurface: The Irish Sea	British Geological Survey (BGS)	2015	Mellett *et al.*
United Kingdom Offshore Regional Report (ORR): The geology of the Irish Sea.	BGS	1995	Jackson *et al.*
Liverpool Bay Sheet 53°N-04°". 1: 250,000 Series: Seabed Sediments and Quaternary Geology	BGS	1984	BGS
Anglesey Sheet 53°N- 06°". 1: 250,000 Series: Quaternary Geology	BGS	1990	BGS
The West Coast Palaeolandscape Survey (WCPS)	Aggregate Levy Sustainability Fund (ALSF) report.	2011	Fitch S, Gaffney V, Ramsey E, and Kitchen E
Archaeological Assessment of Geophysical and Hydrographic Data.	Hy-Net Carbon Dioxide Transportation and Storage Project. Archaeological Assessment of Geophysical and Hydrographic Data. Report 2023/MSDS23250/1	2023	MSDS Marine

1.4.2 Site-specific surveys

A summary of the surveys undertaken to inform the Marine Archaeology EIA is outlined in Table 1.3 below.

Table 1.3: Summary Of Site-specific Survey Data

Title	Extent of survey	Overview of survey	Survey contractor	Date	Reference to further information
Sidescan sonar	Within the Area of Project Physical Work (APPW) and Hoyle Bank	Sidescan Sonar survey to characterise seabed and existing assets	James Fisher Subtech (JFS), reviewed archaeologically by MSDS Marine	2022	James Fisher Subtech, 2022. LBA and CCS Acoustic Survey 2022. Ref: 12377-OPS-REP-002; MSDS Marine 2023 Hy-Net Carbon Dioxide Transportation and Storage Project. Archaeological Assessment of Geophysical and Hydrographic Data. Report 2023/MSDS23250/1
Multibeam	Within the APPW and Hoyle Bank	Survey to characterise seabed and existing assets	JFS reviewed archaeologically by MSDS Marine	2022	James Fisher Subtech, 2022. LBA and CCS Acoustic Survey 2022. Ref: 12377-OPS-REP-002; MSDS Marine 2023 Hy-Net Carbon Dioxide Transportation and Storage Project. Archaeological Assessment of Geophysical and Hydrographic Data. Report 2023/MSDS23250/1
Magnetometer	Within the APPW and Hoyle Bank	Survey to characterise seabed and existing assets	JFS reviewed archaeologically by MSDS Marine	2022	James Fisher Subtech, 2022. LBA and CCS Acoustic Survey 2022. Ref: 12377-OPS-REP-002; MSDS Marine 2023 Hy-Net Carbon Dioxide Transportation and Storage Project. Archaeological Assessment of Geophysical and Hydrographic Data. Report 2023/MSDS23250/1
Sub-bottom Profiler	Within the APPW and Hoyle Bank		XOcean reviewed archaeologically by MSDS Marine	2022	XOcean 2022, 00469-SHW-ENG-BATH Project Results and Interpretation Report. 00469-SHW-ENG-BATH; MSDS Marine 2023 Hy-Net Carbon Dioxide Transportation and Storage Project.

Title	Extent of survey	Overview of survey	Survey contractor	Date	Reference to further information
					Archaeological Assessment of Geophysical and Hydrographic Data. Report 2023/MSDS23250/1

1.4.2.1 Data collection

The geophysical survey was conducted by James Fisher Subtech (JFS) between 12 September and 30 November 2022 as part of the wider Liverpool Bay Asset and Carbon Capture Storage Acoustic Surveys 2022 Campaign. The surveys resulted in the mobilisation of a Multibeam Echo Sounder (MBES), a Sidescan Sonar (SSS), and a Magnetometer. The SSS, and Magnetometer were towed behind the vessel, the MBES was mounted to the vessels.

Survey operations were primarily undertaken within pre-defined corridors centred on existing Eni owned assets including pipelines and platforms, the pre-defined corridors are primarily within the area referred to as the APPW which lies within the wider area referred to as the Eni Development Area within this report. In addition, a wider area of survey was undertaken over Hoyle Bank.

The survey was planned to achieve 100% coverage of SSS (including nadir), and MBES, of all defined corridors and platform locations, the corridors were specified at between 150 m and 300 m centred on the existing pipelines, this was achieved with line spacing of between 20 m and 40 m. In addition, survey was undertaken over Hoyle Bank along a 500 m x 500 m grid. With the exception of the Hoyle Bank survey area, coverage of over 200% was achieved over the majority of the survey area.

In addition, Magnetometer data were collected along each of the survey lines, with the exception of within 500 m of platform locations due to the influence on the magnetic field which would skew the data. The survey navigation tracklines are presented in Figure 1.2, the SSS coverage in Figure 1.3, and the MBES coverage in Figure 1.4. The equipment specification for the surveys is shown in

Table 1.4.

Table 1.4: Geophysical And Hydrographic Sensor Specifications

Sensor	Manufacturer	Model	Frequency
Sidescan sonar	EdgeTech	4205 MP	300/600/900 kHz
Multibeam	Norbit	iWBMS	60 m range
Magnetometer	Geometrics	G-882	400 kHz
Sub-bottom Profiler	Various	Various	10 Hz sample rate

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

- SSS: ensonification of anomalies > 0.5 m;
- multibeam bathymetry: ensonification of anomalies > 1.0 m;
- magnetometer (TVG): 5 nT threshold for anomaly picking; and
- Sub-bottom Profiler (SBP): penetration of up to 15 m was achieved.

1.4.2.2 Positioning

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

Towed sensors were positioned using an Ultra Short Baseline (USBL) positioning system to ensure positional accuracy throughout the survey. USBL ensures the actual position of the sensor is recorded, as opposed to when the position is estimated based upon the direction of the vessel and the amount of cable out (layback).

Although the accuracy of the USBL system is dependent on the angle, and the distance of the beacon from the transceiver, tolerances of between 0.5 m and 2.0 m can be achieved. Positional accuracy is further increased through the correlation of the SSS dataset with the MBES dataset.

Surface and sub-sea position sensors specifications are detailed below in Table 1.5.

Table 1.5: Position Sensor Specifications

Sensor	Manufacturer	Model	Accuracy
Surface positioning	Norbit	iWBMS	Roll/pitch 0.02° Heading 0.03° Position 0.08 m
Sub-sea positioning	Sonardyne	Mini Ranger 2	1% slant range

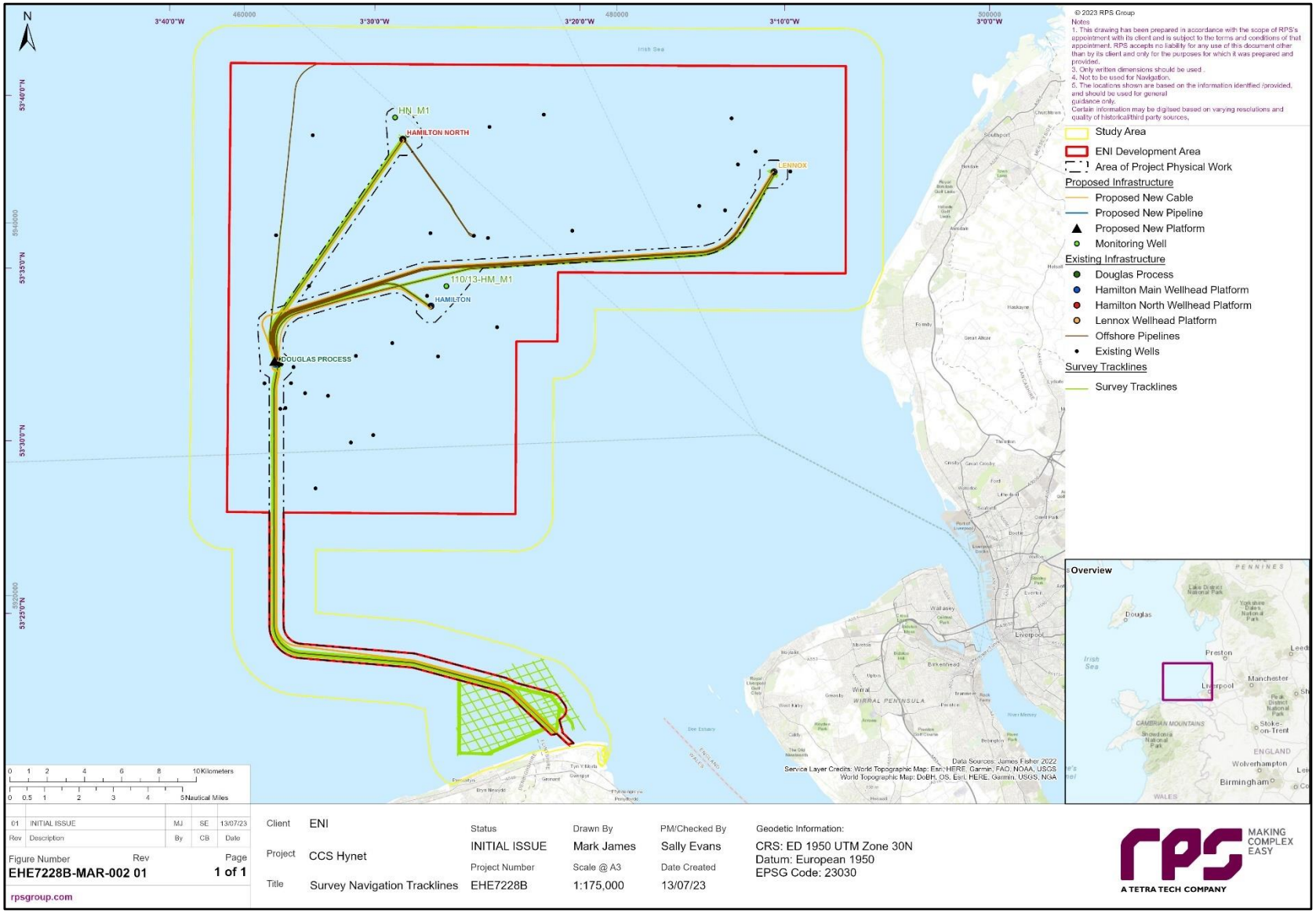


Figure 1.2: Geophysical Survey Tracklines

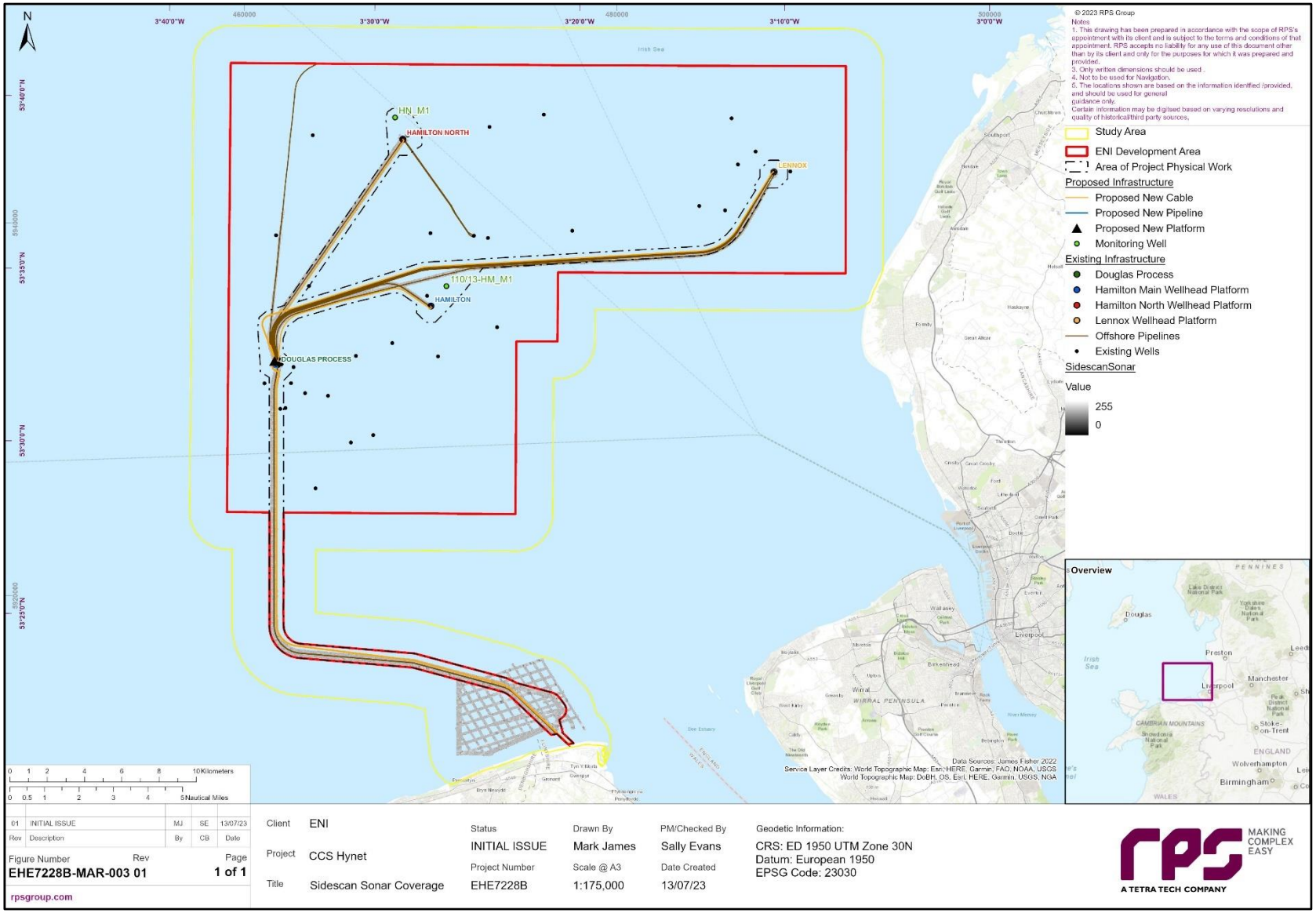


Figure 1.3: Sidescan Sonar Coverage

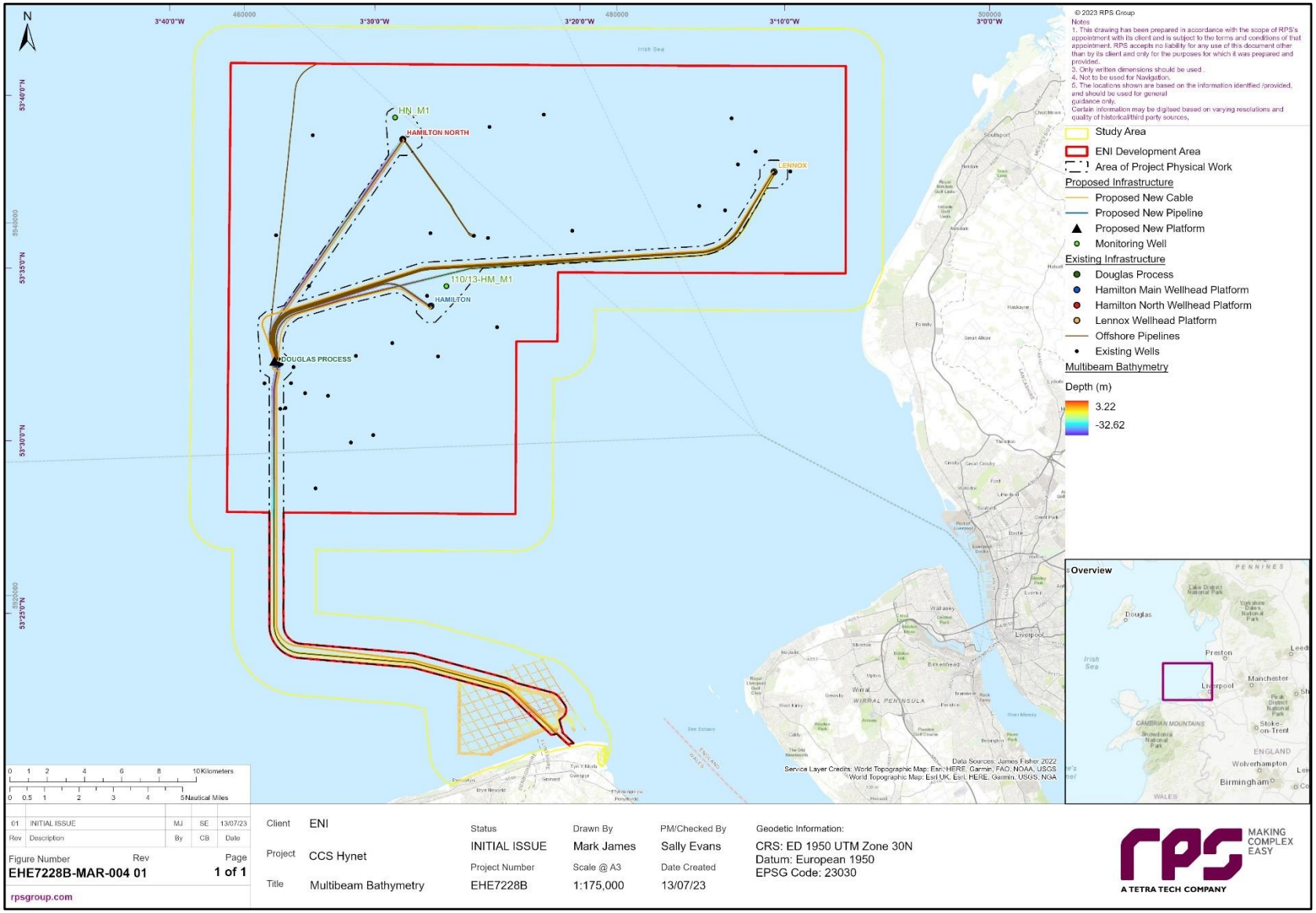


Figure 1.4: Multibeam Bathymetry Coverage

1.4.2.3 Data quality and limitations

Coverage

The data were collected as part of the wider Liverpool Bay Asset and Carbon Capture Storage Acoustic Surveys 2022 Campaign, the scope of which was primarily limited to corridors centred on existing pipelines within the APPW. The survey data collected do not cover the entirety of the APPW, nor the full extents of areas anticipated for infrastructure installation. It must therefore be noted that areas outside of the existing area of coverage, but within the Area of Project Physical Impact have not been subject to the archaeological assessment of geophysical and hydrographic data.

Sidescan Sonar

The SSS data covered the extents of the pre-defined survey areas within the APPW, providing coverage of approximately 200% within the surveyed areas. The data were generally of average to good quality, with minimal interference or data degradation caused by environmental factors, or the simultaneous use of different sensors. Some data degradation due to motion, likely weather, was noted in places, and there was a slight degradation of data quality within the wider Hoyle Bank survey area, likely due to the decrease in depth of water. However, this was not significant and does not affect the overall quality of the data and the suitability for archaeological interpretation.

Horizontal offsets were noted in places between the SSS and MBES data, generally these were not significant and were within what would be considered normal tolerances. However, offsets of up to 15 m were noted in areas, which is beyond what would be expected with a correctly calibrated USBL system. The positions of medium and high potential (and a large number of low potential) anomalies were taken from the MBES data where coverage existed to ensure positional accuracy, where anomalies were outside of the MBES coverage the uncertainty in positioning was taking into consideration during the assessment of mitigation.

Prominent features, such as ripples, sand waves, and infrastructure can cause obstructions to the line of sight of sonar data, in particular the SSS, the data from which is collected closer to the seabed. Typically, this is mitigated through the collection of 200% coverage SSS data, ensuring that the seabed is ensonified from two directions.

Data gaps in the SSS data, either from wide line spacing or acoustic shadow, are to some degree mitigated through the assessment of the MBES data (which extends to 100% coverage), however the minimum object detection size is greater than that of SSS so there is potential that some seabed features, particularly smaller ones of low archaeological potential, may not have been identified within the data where this has occurred.

Multibeam Echo Sounder (MBES)

The MBES data covered the extents of the pre-defined survey boundary within the APPW, providing 100% coverage. A review of the un-gridded point cloud data shows that the quality is average to good with no significant height or positioning errors that effect the overall dataset. The data density is good, and the data is able to be gridded to 0.5 m, increasing the ability to identify smaller features. MBES data is considered to provide the most accurate positioning due to the direct, and fixed, correlation between the sensor, the DGPS antennas, and the Motion Reference Unit (MRU), and was the primary anomaly positioning source.

Magnetometer

The Magnetometer data covered the extents of the pre-defined survey boundary within the APPW and was collected along the pre-defined survey line plan of 20 m to 40 m in most areas. The data were sampled at 10 Hz and the data were suitable to identify anomalies with a peak-to-peak amplitude of 5 nT. It should be noted that the line spacing achieved is too great for the accurate positioning of magnetic anomalies at distances away from the tracklines but can indicate areas of archaeological potential, or can be correlated with visible feature on the seabed that lie on the same plane. Due to the line spacing it is likely that buried ferrous material, particularly smaller objects, falling between the run lines will not have been identified within the data.

Sub-bottom Profiler (SBP)

The ground model which has been assessed as part of this report is based on numerous datasets which have been collected over the Site through a number of years (see MSDS Marine, 2023, Section 5.5 for more details). This includes SBP data collected by XOcean in 2022. The SBP data achieved a penetration of 15 m Below Seafloor (BSF) and allowed interpretation of the main geological units within the survey areas. Note that survey areas were focused around the APPW and did not extend to the full 'Eni Development Area'. Nevertheless, the data provided an important source for understanding the geological, and palaeolandscape, potential of the Site. Fugro (2023) also referred to 14 other geophysical assessments, collected between 1991 and 2021 within the Site. These separate assessments were not available at the time of writing the current report. Fugro also refer to 29 geotechnical investigation reports in their ground model assessment. The locations of these geotechnical investigations were not available as shapefile data for the production of the current report, nevertheless Fugro depict the distribution of these investigations which can be seen to include collection of a large number of vibrocores, Boreholes (BHs) and Cone Penetration Tests (CPTs) across the APPW, correlating with the positions of pipelines and wells. This data has informed the ground model.

SBP data is collected directly beneath the sensor, in general terms, and outside the identification of the palaeolandscape, SBP is not suited to the prospection for buried material of potential anthropogenic origin due to the wide line spacing. It can however be useful for the corroboration of other datasets where a trackline passes directly over a magnetic anomaly, or a potentially buried feature visible in the SSS or MBES data.

General

The survey targeted existing infrastructure, and as such is visible in the majority of the datasets, either as physical infrastructure, or as magnetic anomalies. In addition, the seabed bed around infrastructure is disturbed, for example scour, depressions from jackups, etc. as well as a significant amount of debris (likely related to installation and maintenance) being visible. Not only can these features obscure anomalies of potential archaeological interest, both visually and within the magnetometer dataset, there is potential to misinterpret modern debris as material of archaeological interest and vice-versa. Therefore, a precautionary, but proportional approach has been taken with the assessment.

Summary

The data collected across the extents of the pre-defined survey areas within the APPW are generally of good quality, and in the case of MBES and SSS provided 100% coverage. SBP data were collected to a pre-determined line plan, largely providing suitable coverage and penetration for the interpretation of the palaeoenvironment. The Magnetometer data were collected to pre-determined line plan suitable for the identification of ferrous material with a peak to peak amplitude of 5 nT, with the minimum detection size increasing with distance from the tracklines. The data is considered of an appropriate specification, coverage, and quality, to undertake a robust archaeological assessment to inform the EIA process, noting that additional data collection, and interpretation, will be required prior to construction.

1.4.3 Archaeological assessment of geophysical survey data

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

Following delivery of the required datasets, an initial review was undertaken to gain an understanding of the geological and topographic make-up of the survey area. Within the extent of the survey area the potential for variations in the seabed are high and can affect the interpretation of anomalies.

The assessment considers the full extents of the survey data, which were collected within a pre-defined survey boundary, within the APPW. The assessment of United Kingdom Hydrographic Office (UKHO), National Record of the Historic Environment (NRHE), Royal Commission on the Ancient and Historic Monuments Wales (RCAHMW), and Clwyd-Powys Archaeological trust HER (CPAT HER) data was undertaken within the extents of the survey data and the APPW including a 100 m buffer.

Whilst some of the data extends beyond the pre-defined survey boundary, the purpose of the assessment is to characterise the historic environment and therefore data from the wider area were considered. The focus of the mitigation measures is, however, on anomalies within the extents of the survey data, or where mitigation measures would impact within the APPW. The assessment area is presented in Figure 1.1.

1.4.3.1 Sidescan sonar

SSS is considered the best tool for the identification of anthropogenic anomalies on the seabed due to the ability to ensonify small features and as such forms the basis of any archaeological assessment of data. SSS data in .xtf format were imported into Moga SeaView 5.1.49 software, navigation and positioning were checked and corrected where required, and optimal gains were applied to ensure the consistent presentation of data.

Data were reviewed on a line-by-line basis, and all anomalies of potential anthropogenic origin identified and recorded. Records include at a minimum an image of the anomaly, dimensions, and a description. Whilst typically only images of medium and high potential anomalies are presented with the assessment report, images of all anomalies are recorded, as interpretations can change as the data assessment progresses. A rating of archaeological potential was assigned to the anomaly following the criteria outlined in Table 1.6 below.

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

1.4.3.2 Magnetometer

Magnetometer data indicates the presence of ferrous, and thus usually anthropogenic, material both on, and under the seabed. Where line spacing allows, typically to a specification for the detection of potential UXO, magnetometer data can provide accurate positions of buried ferrous anomalies. The survey line spacing was c.20 m to 40 m which is too great for the accurate positioning of magnetic anomalies at distances away from the tracklines but can indicate areas of archaeological potential. Where possible, magnetic anomalies were correlated with anomalies visible on the seabed.

Magnetometry data were provided as .csv files and as a gazetteer detailing all anomalies greater than 5 nT. An assessment was made by MSDS Marine as to the suitability of the gazetteer for archaeological interpretation. Where required the .csv magnetometer data was imported into either Geometrics MagPick or Moga SeaView 5.1.49 software where the data was smoothed, and a ‘baseline’ identified and removed from the data to highlight ferrous anomalies whilst taking into account geological variations in the data.

Magnetic anomalies identified within the data had the position, intensity and dimensions recorded. A rating of archaeological potential was assigned to the anomaly following the criteria outlined in Table 1.6 below. The data were gridded to visually identify areas where the distribution of anomalies may represent a wider feature such a buried but dispersed wreck, or modern features such as buried cable or chain.

Table 1.6: Criteria For The Assessment Of Archaeological Potential

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

1.4.3.3 Combined assessment

Following the assessment of all datasets the results were loaded into ESRI ArcGIS Pro 3.1.1, a Geographical Information System (GIS), and reviewed alongside each other, along with Geotiffs of the SSS, MBES, and Magnetometer data. The concurrent review allows the amalgamation of duplicate anomalies, the assessment of the wider context, and an understanding of the extents of a feature that may be partially buried or span across two or more lines of data.

Data from the UKHO, including the positions of wrecks and obstructions, and the relevant NRHE, CPAT, and RCAHMW records, as well as all other relevant data such as third-party assets (see MSDS Marine, 2023, Section 4.0) were assessed to ensure that any additional information is drawn upon, but also that anomalies are not unnecessarily identified as having archaeological potential when the origination can be identified. The resultant remaining anomalies assessed as having archaeological potential were compiled into a gazetteer and a shapefile.

The interpretation of geophysical and hydrographic data is, by its very nature, subjective. However, with experience and by analysing the form, size, and characteristics of an anomaly, a reasonable degree of certainty as to the origin of an anomaly can be achieved.

Measurements can be taken in most data processing software, and whilst largely accurate, discrepancies can be noted due to a number of factors. Where there is uncertainty as to the potential of an anomaly, or its origin, a precautionary approach is always taken to ensure the most appropriate mitigation for the historic environment.

It should be noted that there may be instances where an anomaly may exist on the seabed but not be visible in the geophysical data. This may be due to being covered by sediment or being obscured from the line of sight of the sonar. The use of both SSS and MBES data mitigates this by visualising anomalies from multiples angles, including from above. Anomalies were named following the standard MSDS Marine convention, [PROJECTYEAR_ID] (e.g. CCS23_XXX).

1.4.3.4 Multibeam bathymetry

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

Navigation corrected, but unprocessed, MBES data were provide to MSDS Marine as .xyz files, the data were imported into QPS Fledermaus where it was gridded and exported as a floating point raster, the raster was imported into ArcGIS Pro 3.1.1 and a hill-shaded surface applied, shading was adjusted to ensure the optimal presentation of data. The resulting 3-Dimensional image was viewed on a block-by-block basis, and all anomalies of potential anthropogenic origin identified and recorded.

Records include, at a minimum, an image of the anomaly, dimensions, and a description (MSDS Marine 2023). A rating of archaeological potential was assigned to the anomaly following the criteria outlined in Table 1.6. Where the interpretation of an anomaly was unclear, the data were imported into point cloud visualisation software such as Cloud Compare, in order to view the un-gridded data. The gridded surface image was exported as a Geotiff to allow further assessment alongside other datasets.

1.4.4 Palaeolandscapes and submerged prehistory

The report investigates the potential for submerged prehistoric remains to be present within the Site. Existing geological data, findspots of prehistoric material (i.e. archaeological evidence and faunal remains) and key studies are important sources to establishing this potential.

The assessment of submerged prehistoric remains seeks to identify periods in which the Site was dry land, and thus inhabitable, and periods in which the area lay under ice sheets or water masses, rendering the Site uninhabitable. Different geological formations are also associated with differing environmental conditions, and

thus different archaeological potential and the report therefore investigates the Quaternary sequence within the Site. The assessment also seeks to identify the previous environmental characteristics of the Site and Study Area (e.g. marine, terrestrial, lacustrine, fluvial, marsh, riverine etc.) at different times during the Quaternary period, as this is key to understanding palaeolandscape and paleoenvironmental potential, and also to how past human populations may have used the areas. Determining the potential for remains to survive is equally important. This involves consideration of the current geological makeup of the area, along with the effects of erosion and other geological forces, following the succession of glaciations and marine transgressions which have shaped the area.

This element of the report draws on the archaeological assessment of geophysical and hydrographic data (MSDS Marine, 2023). The full method for the assessment of that data relative to palaeolandscapes and submerged prehistory is set out within that report. As a summary, the data drawn on includes legacy oil and gas data, the ground model for the site (Fugro, 2023), SBP and MBES data collected by XOcean in 2022, and the results of previous BH, vibrocore and CPT investigations within the area. Studies undertaken by the BGS and other nearby developments have also been drawn on.

The method for interpreting palaeolandscape remains has been principally to draw on the ground model (based on geophysical and geotechnical data) to provide insight into the potential geological formations within the Site, and their likely depositional environment. This feeds into the assessment of the palaeolandscape through time, and corresponding archaeological potential. Information from the ground model and geological maps derived from the interpretation of sub-surface data and the current seabed derived from MBES data were assessed alongside existing studies which contribute to the understanding of the palaeolandscape and prehistoric archaeological potential within the Site.

An archaeological review of the ground model covering the Eni Development Area and APPW was conducted by MSDS Marine. This included a review of geophysical survey data reports, select seismic profiles and ground model outputs including geological profiles at well locations. These sources were reviewed in order to establish an understanding of the geological make-up of the area, formations present and their paleoenvironmental and archaeological potential. Information about the wider area has also been used to better contextualise the various environments experienced in the area during the Pleistocene and Holocene.

1.4.5 Desk-based assessment of maritime, coastal and aviation records

In addition to the review of geophysical survey data, and in order to provide an assessment of the known and potential maritime, coastal and aviation archaeological resources within the Site, records of known wrecks, recorded losses and casualty records, Named Locations (NLO), isolated finds and seabed features were collated. Searches of records held in the UKHO wrecks database, the NRHE and NHLE, RCAHMW, Merseyside and CPAT HER and NMW datasets were undertaken and all details for the area recorded. UKHO data includes detail on wrecks and seabed obstructions that have been collated to ensure the safety of navigation at sea. As such, information on the size, position and nature of features on the seabed to ensure safety of navigation is the primary focus of the data, although in a number of cases specific historical detail is provided to establish the identity and nature of loss of a wreck or obstruction.

Data from the NRHE and NHLE have been collected to provide information on the terrestrial and marine historic environment and archaeological interest of sites and features on land and at sea. Within the marine zone NRHE data constitute records of Known Wrecks where a specific wreck location is known, Recorded Losses linked to casualty records (reports of ships or aircraft seen in distress or lost at sea rather than specific sites on the seabed), and isolated Find Spots and NLOs (records where only approximate or no location data exist). Many of these records are broadly indicative of areas of maritime archaeological potential, rather than specific records of wrecks on the seabed. HER data constitutes findspots, monuments, listed buildings; this data contributes to the archaeological understanding of the area.

Once collected, all the data records (including from the geophysical survey data) were loaded into the project GIS to enable analysis and comparison between datasets. In addition, a gazetteer of all the recorded maritime and prehistoric archaeological sites, features and materials were produced.

Additionally, the results of the archaeological assessment of geophysical and hydrographic data were also drawn into the gazetteer. This includes all anomalies identified within the data extents. Further information on the methods and sources for the review of this data are included within the aforementioned report (MSDS Marine, 2023) and above in Section 1.4.3.

1.4.6 Historic seascape characterisation

The assessment of HSC within the Site involved reviewing the HSC data in the project GIS to identify any historical or archaeological character, or elements thereof. The existing character types were then summarised.

1.4.7 Chronology

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

- Absolute dates: These are fixed dates that correspond with calendar years and are suffixed with BC (Before Christ) or AD (Anno Domini). For example, a date of 643 BC occurred 2,664 years ago, and a date of 1066 AD occurred 956 years ago (correct as of 2022).
- Calibrated radiocarbon dates: these can either be presented as calendar dates, or as the number of years before 1 January 1950 (before practical radiocarbon dating technology was available, and before large scale nuclear testing altered the global ratio of 14C to 12C making dating subsequent to this date unreliable). For example, a date of 11,700 Before Present (BP) occurred 11,772 years ago (correct as of 2022) and could also be presented as 9,749 BC, noting that there is no ‘year zero’ so 1 Is subtracted from each date.
- Uncalibrated radiocarbon dates: these are dates that are based on the radiocarbon dating that do not take fluctuations in 14C levels into account. These dates can be calibrated using a calibration curve to convert them into calendar dates.

Dating in this report uses BP or BC dates. For events or sites that predate the Mesolithic (10,000 BP/8,000 BC) dates are usually given in BP. From the Mesolithic onwards dates are generally given in BC. In some cases, dates after the Mesolithic are provided in BP where environmental features and events are discussed (e.g. the development of the current coastlines of the UK in approximately 5,000 BP).

The main archaeological periods discussed in this report are listed in Table 1.7.

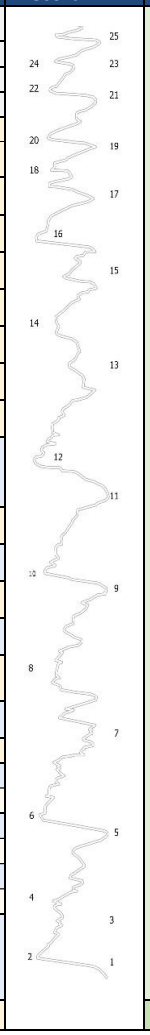
Table 1.7: Archaeological Periods And Dates In England

Broad Period	Sub-Period	Date
Palaeolithic	Lower	c.970,000 – 150,000 BP
	Middle	150,000 – 40,000 BP
	Upper	40,000 – 10,000 BP
Mesolithic	Early	8000 BC – 7000 BC
	Late	7000 – 4000 BC
Neolithic	Early	4000 – 3300 BC
	Middle	3300 – 2900 BC
	Late	2900 – 2200 BC
Bronze Age		2600 – 700 BC
Iron Age		800 BC – 43 AD

Broad Period	Sub-Period	Date
Roman		43 – 410 AD
Early Medieval		410 – 1066 AD
Medieval		1066 – 1540 AD
Post Medieval		1540 – 1901 AD
Modern		1901 AD – Present

The Quaternary chronology of the UK is outlined in Table 1.8. Marine Isotope Stages (MIS) are alternating warm and cold periods derived from oxygen isotope data taken from deep sea core samples.

Table 1.8: Quaternary Chronology (Based On Historic England n.d, With Dates From Lisiecki and Raymo, 2005)

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

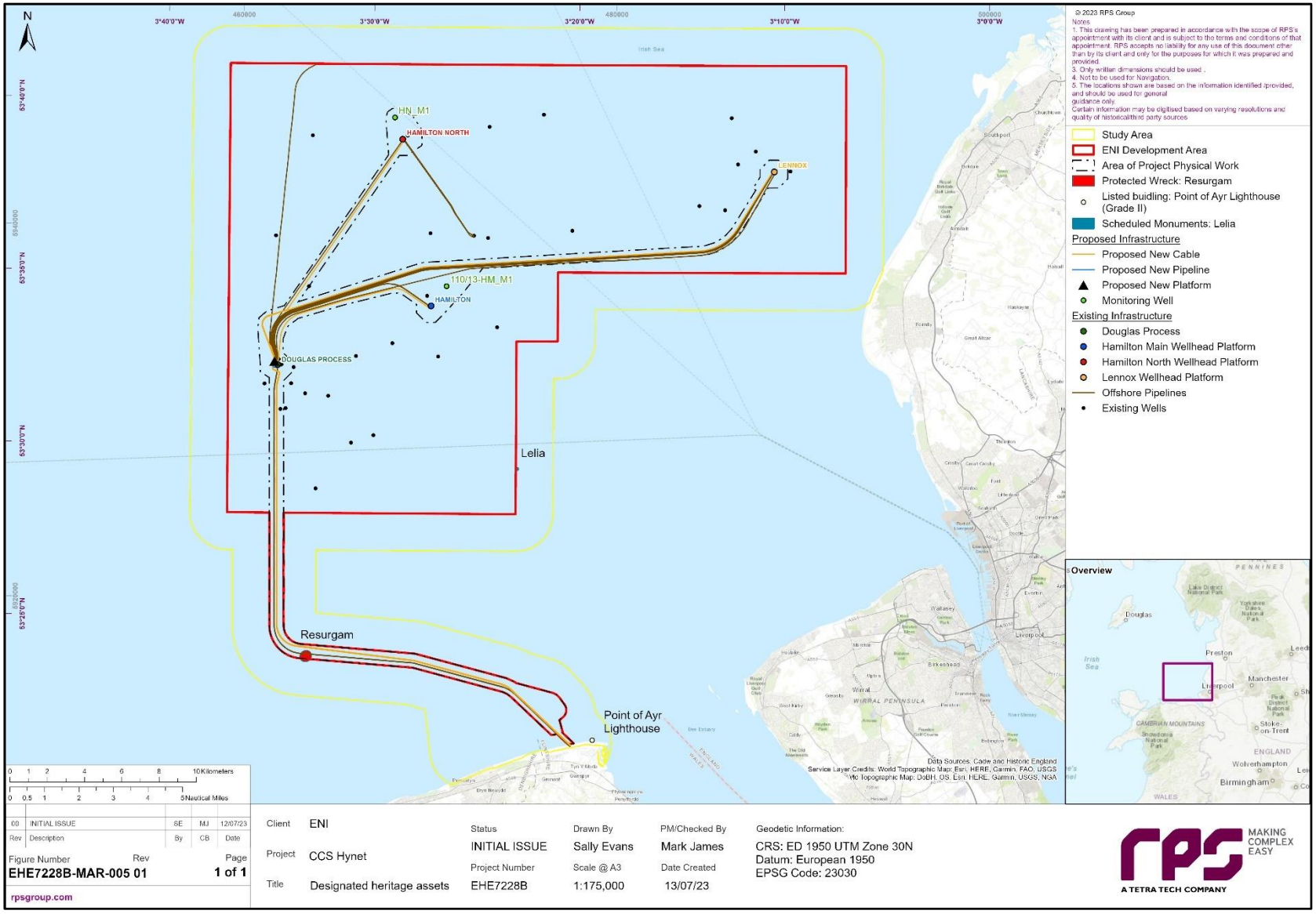


Figure 1.5: Designated Heritage Assets

1.5 Baseline environment

1.5.1 Summary of designated heritage assets

One designated heritage asset lies within the APPW (Figure 1.5). This is:

- The Protected Wreck of the *Resurgam* (Appendix N: E_001). The *Resurgam* was an experimental submarine built in 1870. It is designated under the Protection of Wrecks Act 1973, and has an associated designated area with a 300 m radius. The wreck itself lies within the Study Area but the designated circle extends to within the APPW and Eni Development Area.

Two other designated heritage assets lie within the Study Area, but beyond the APPW and the Eni Development Area (Figure 1.5). These are:

- The Scheduled wreck of the *Lelia*, a paddle steamer built in 1864 and associated with the British involvement in the American Civil War (Appendix N: E_002). It is designated under the Ancient Monuments and Archaeological Areas Act 1979 and lies within the Study Area, c. 10 m beyond the Eni Development Area boundary, on its eastern side.
- The Grade II Listed Point of Ayr Lighthouse, thought to have been built in c. 1776 (Appendix N: E_003). It is designated under the Planning (Listed Buildings and Conservation Areas) Act 1990, and lies c. 1 km to the east of the proposed Landfall site and Eni Development Area.

1.5.2 Summary of non-designated heritage assets

A series of non-designated heritage assets lie within the APPW, Eni Development Area, and Study Area. These are summarised below, and are based on all available desk-based and geophysical data, tying in information from pre-existing datasets (Table 1.2) and the archaeological assessment of geophysical survey data undertaken as part of this Proposed Development (MSDS Marine, 2023). Full details can be found within the gazetteer (Appendix N). Magnetic anomalies are listed separately within Section 1.5.4.1.

There are a total of 134 records within the Study Area, 176 within the Eni Development Area, and 110 within the APPW, giving a total of 420 records (including the three designated assets detailed above). The majority relate to heritage assets however, a number of geophysical anomalies have been interpreted as of being geological in nature. These are included in Table 1.9 below and gazetteer for completeness, however, they are not considered further within this report.

The remainder of the records include a range of wreck and potential wreck sites, other maritime remains (ranging from the remains of oil platforms, to navigation beacons, unidentified obstructions, and other potential debris), palaeolandscape features, terrestrial features and records deriving from documentary evidence, including NLOs of vessels lost in the area where there are currently no known seabed remains.

Table 1.9: Summary Of Non-designated Heritage Assets

Broad Category	Type	Area of Project Physical Work	Eni Development Area	Study Area
Wreck remains	Wreck	2	30	20
	Wreck (possible)			1
	Wreck (probable)		1	
	Wreck or Ballast mound		1	
	Wreck or beacon		2	
	Wreck or debris		2	1
	Wreck or Wreckage (possible)		1	
	Wreck/Geology			1
	Wreckage		13	
	Possible wreck	3		6
	Possible wreck or cargo			2
	Possible wreckage		1	
Other maritime remains	Anchor, chain and cable		2	
	Beacon		3	
	Chain, Cable, or Rope	4		1
	Collapsed platform		1	
	Debris	5	3	3
	Debris - likely infrastructure	20		1
	Disused wartime tower			1
	Fisherman's fastener		1	3
	Fishing gear	3		
	Tower		2	
	Foul		2	
	Geophysical anomaly - debris		1	2
	Geophysical anomaly - origin unknown		3	
	Geophysical anomaly - possible debris		2	
	Geophysical anomaly - potential anchor cable			1
	Mound	1		2
	Obstruction		3	2
	Obstruction: Non-submarine contact		3	2
	Pipe			1
	Platform		1	
	Possible oil rig leg		1	
	Potential debris	32	1	5
	Unidentified object			1
	Unidentified obstruction	9	75	3
	Unknown	1		
	Seabed disturbance	1		

Broad Category	Type	Area of Project Physical Work	Eni Development Area	Study Area
	Linear feature	3		4
	Masonry			1
	Mattresses	2		
	Spoil ground		1	
Geological features	Geology	5	10	1
	Likely geological	14	1	2
Palaeolandscape Features	Glacial tunnel valley			1
	Footprints			1
Terrestrial and Coastal Features	Terrestrial - Anti-glider poles			1
	Terrestrial - boundary stone			2
	Terrestrial - Lifeboat house			1
	Terrestrial - Lighthouse			1
	Terrestrial - lifeboat station			1
	Terrestrial - lighthouse cottages			1
	Terrestrial - Pillbox			6
	Terrestrial - Summer camp			1
	Terrestrial asset - holiday park			1
	Terrestrial asset - lighthouse cottages			1
	Terrestrial asset - Swimming baths			1
	Terrestrial- slipway			1
	Terrestrial - Event			3
	Terrestrial - Findspot			1
	Terrestrial - position in error	2	1	
	Test record.		4	
Documentary Records	NLO			1
	Aircraft (NLO)		2	7
	Wreck (NLO)	2	1	27
	Wreck (not found)	1	1	
	Navigational aid shown on historic maps			6
	Seascape			2
	Grand Total	**110**	**176**	**134**

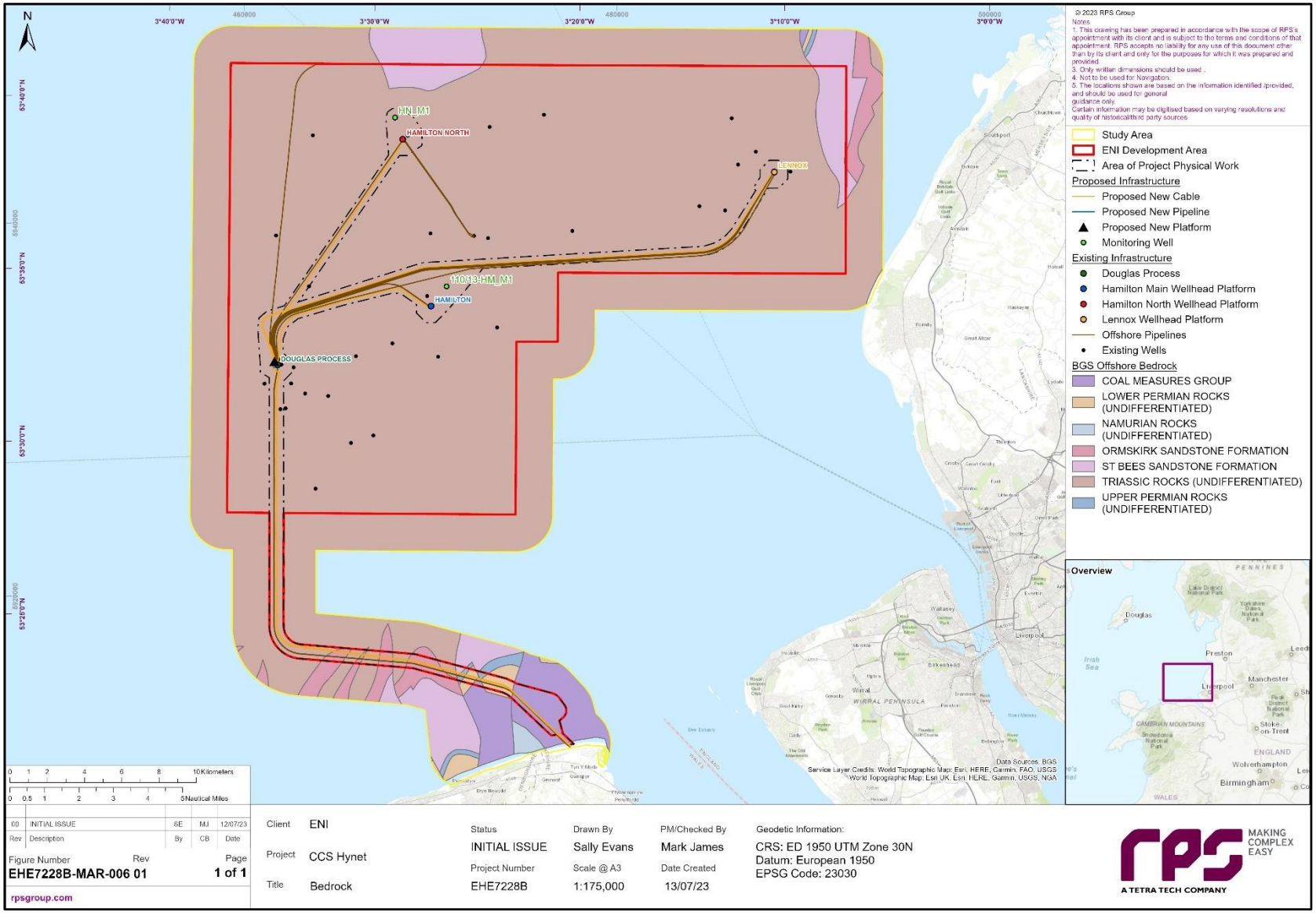


Figure 1.6: Bedrock (BGS Offshore GeoIndex)

1.5.3 Submerged prehistory

This section considers the potential for submerged prehistoric remains and palaeolandscapes.

1.5.3.1 Pre-quaternary bedrock

Bedrock within the Eni Development Area is shown on Figure 1.6 and consists of:

- Triassic mudstones and hailite of the Mercia Mudstone Group. This bedrock dominates the majority of the Site. The remainder of the bedrock characterises the nearshore area (from the shore to 8 km offshore) and includes:
- Ormskirk Sandstone Formation of the Sherwood Sandstone Group;
- St Bees Sandstone Formation of the Sherwood Sandstone Group;
- undifferentiated lower and upper Permian rocks (sandstone, breccia, and conglomerate; and mudstone and gypsum-stone);
- sandstones of the Coal Measures Group; and
- undifferentiated sandstones of the Namurian formation.

Faulting is common within the bedrock, and multiple faults have been identified, in particular affecting bedrock in the nearshore area.

1.5.3.2 Quaternary deposits and formations

Thickness of quaternary deposits

Quaternary deposits overlie the bedrock within the Site. The BGS indicate that the Quaternary sequence within the Site is 20 m to 30 m in thickness in the nearshore area, out to c. 15 km from the shore. Further offshore the deposits thin to between 5 m to 20 m in thickness, in line with the findings from previous investigations in the area (see summary in MSDS, Marine 2023; Fugro, 2023) and in some areas the Mercia Mudstone (which characterises the offshore area including the location of the wells) is at less than 2 m below BSF (e.g. at the Douglas Platform. Fugro, 2023; MSDS Marine, 2023). There are localised pockets where deposits are > 50 m in thickness.

Table 1.10: Units And Reflectors Identified In The Site (Fugro, 2023; MSDS Marine, 2023)

Unit	Lithology	Distribution within Site (presence at platforms)	Correlated Formation and Member	Age	Depositional Environment	Archaeological potential
Unit I	Sands, generally associated with seabed bedforms. May be a thin veneer elsewhere.	Hamilton; Hamilton North ; Lennox ; Douglas; Well 110/13-2; Well 110/13-3; Well 110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-13; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1	Surface Sands Formation (SSF)	Holocene	Intertidal to marine	Potential for redeposited remains
Unit IIa	Medium dense to very dense SAND with shell fragments and occasional pockets of clay	Hamilton; Hamilton North; Lennox ; Douglas; Well 110/13-2; Well 110/13-3; Well 110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1	Western Irish Sea Formation – Prograded Sand Facies (WIS-PF)	Devensian	Proglacial, glaciofluvial	Limited-Inhospitable environment. Surface and uneroded areas may hold some limited potential.
Unit IIb	Fine to coarse sandy GRAVEL with numerous pockets of clay and occasional cobbles (interpreted as gravel lag)	Hamilton North; Well 110/13-2; Well 110/13-3; Well 110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1				
Unit IIc	Very low strength silty very sandy CLAY locally with layers of medium dense sand	Hamilton North; Well 110/13-5; Well 110/13-6; Well 110/13-17	Western Irish Sea Formation			
Unit IIIa	Medium to extremely high strength sandy CLAY with pockets	Hamilton; Lennox ; Douglas; Well 110/13-2; Well 110/13-3; Well	Cardigan Bay Formation (CBF)	Wolstonian to Devensian	Fluctuating glacial to proglacial	

Unit	Lithology	Distribution within Site (presence at platforms)	Correlated Formation and Member	Age	Depositional Environment	Archaeological potential
	partings laminations and beds of sand and gravel	110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-13; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1				Limited-Inhospitable environment
Unit IIIb	Very dense fine SAND with GRAVEL and occasional cobbles	Douglas; Well 110/13-2; Well 110/13-3; Well 110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1				
Unit IIIc	Very high to extremely high strength sandy CLAY with pockets of sand and occasional gravel	Douglas; Well 110/13-2; Well 110/13-3; Well 110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1				
Unit IV	Bedrock (Mercia Mudstone)	Hamilton; Hamilton North; Lennox; Douglas; Well 110/13-2; Well 110/13-3; Well 110/13-4; Well 110/13-5; Well 110/13-6; Well 110/13-10; Well 110/13-11; Well 110/13-13; Well 110/13-14; Well 110/15-6Z; Well 110/13-17; Well HE-1	Mercia Mudstone	Triassic	Bedrock	None

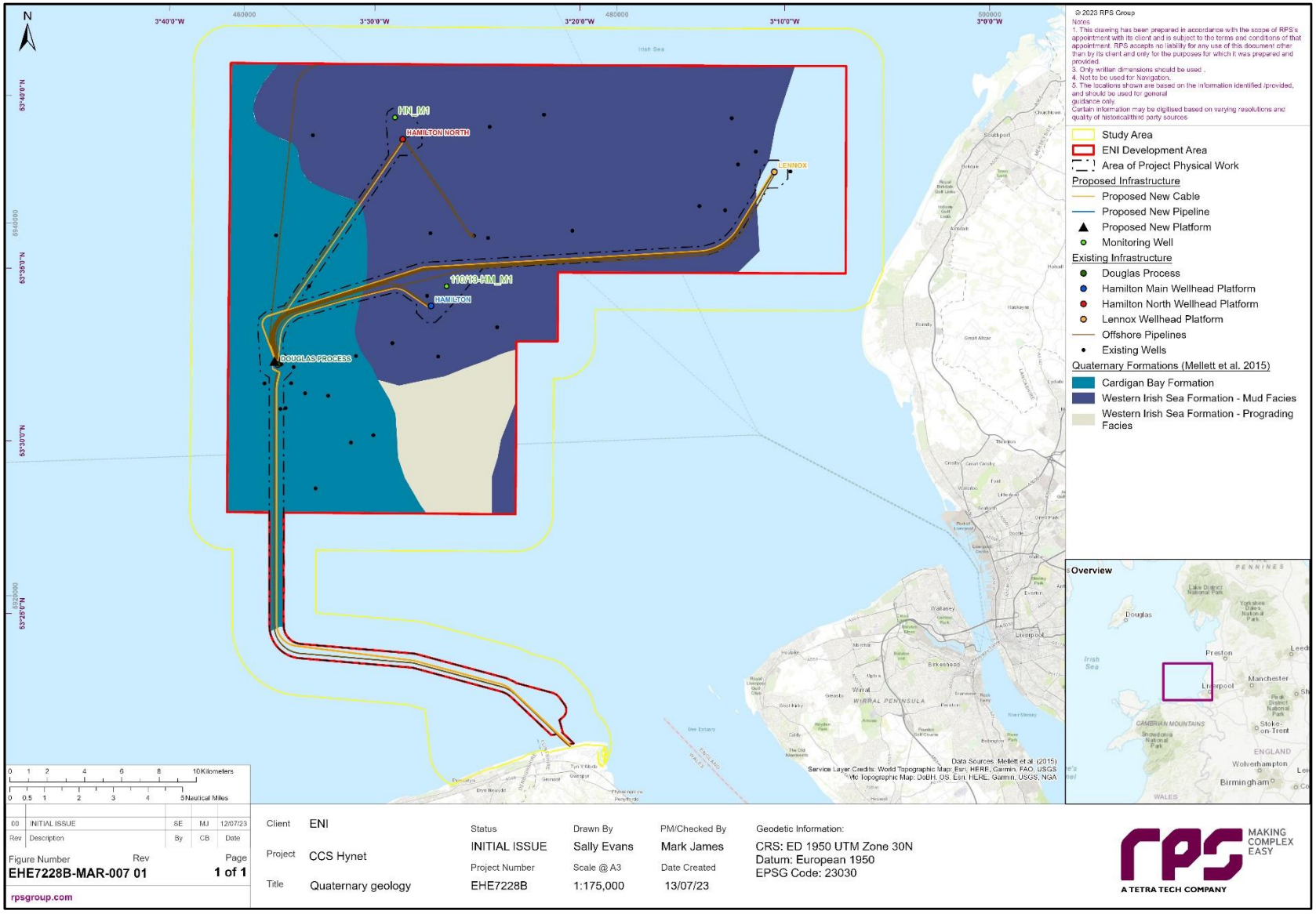


Figure 1.7: Quaternary Formations Outcropping (Or Subcropping Below The Surface Sands Formation Mapped By Mellet *et al*. (2015)

Quaternary sequence

Seven geotechnical units have been identified using historical geotechnical and geophysical data surrounding the platforms within the Site (Table 1.10; Fugro, 2023; MSDS Marine, 2023). The units have been correlated with three major formations: the SSF, Western Irish Sea Formation and Cardigan Bay Formations (CBFs). Correlations between units identified within the Site and deposits known in the wider area are preliminary at this stage, and further investigation is required to confirm the correlations.

The BGS also map Quaternary formations within the Site (Jackson *et al*., 1995; Mellett *et al*. 2015; Figure 1.7). While the formations they identify are the same as those identified using historic geotechnical and geophysical data (i.e. the SSF, Western Irish Sea Formation and CBF, overlying Mercia Mudstone bedrock), there are slight differences in distributions. For example, at the Douglas platform Mellett *et al.* (2015) indicate that the CBF sub crops the SSF, while historic geotechnical data indicates a thin layer of the Western Irish Sea Formation overlaying the CBF, and beneath the SSF (see MSDS, 2023). The site-specific data gained from geotechnical investigations is likely to paint a more accurate picture of localised deposit distributions within the Site, compared with the regional view provided by the BGS, nevertheless the latter is highly useful for understanding wider patterns, distributions and palaeolandscapes. Figure 1.8 sheds additional light on these discrepancies, and notes that the Mercia Mudstone; CBF and SSF sequence is evident in profiles based on the assessment of seismic data at the Douglas Platform, while the Western Irish Sea Formation is evident only in the geotechnical data (CPTs illustrated on the left of Figure 1.8). This may indicate difficulties resolving the Western Irish Sea Formation in this location, potentially due to similarities in the acoustic properties of the sediments within and below the formation, or potentially due to the thinness of the deposits in this location (which may have been thinner than the seismic data could resolve).

Figure 1.8 shows an example cross section showing interpreted geotechnical data and interpretations from SBP data at the Douglas Platform (Fugro, 2023). While the thickness of each unit varies across the Site (see MSDS Marine, 2023) the cross-section depicts the main stratigraphy. In addition, the figure also shows that the CBF extends deeper than the interpreted top of the bedrock within the geophysical interpretation data. This is due to problems differentiating between the high strength till of the CBF and the weathered top of the Mercia Mudstone, on the basis of seismic data alone, accounting for the discrepancies between the interpreted depth of the top of bedrock between seismic and geotechnical data, shown in Figure 1.8 (Fugro, 2023). In addition, the cross section also depicts a Quaternary channel passing through this area. The channel is infilled with Unit III (the CBF). This feature represents the only channel identified within the Site.

Despite localised discrepancies in distributions of sediments according to different data types, the different sources agree that the main formations present are the Surface Sands, Western Irish Sea, and CBFs. The following paragraphs contain a summary of the different units.

Unit III is thought to represent the earliest Quaternary deposit within the Site. This unit has been correlated with the CBF, representing fluctuating glacial to proglacial environments. The deposits within the CBF were laid down between MIS six to MIS two (specifically 180.6 ka BP to 13.9 ka BP) (BGS, 2020). Lower parts of the CBF including the Lower Till Member may pre-date the last (Devensian) glaciation, while later deposits including the Bedded and Infill Member and the Upper Till Member represent the formation's latest deposits. The latter is thought to be a Devensian glacially-derived till deposit formed in glacial to subglacial environments and comprising stiff or hard clay with inclusions ranging from cobbles to large boulders. A diamicton interpreted as the Upper Till has been identified in BHS02B, BHS12, and BHS14 from Walney Extension, c. 37 km to the north of the Site (Figure 1.9) (MSDS Marine, 2019) and within data from the Rhiannon OWF, 25 km to the west (Wessex Archaeology, 2013) (Figure 1.9). Mellett *et al*. (2015) indicate that the Upper Till is present in the area of the Site in diagrams depicted subcropping formations beneath the SSF. The lower members may also be present beneath the Upper Till Member.

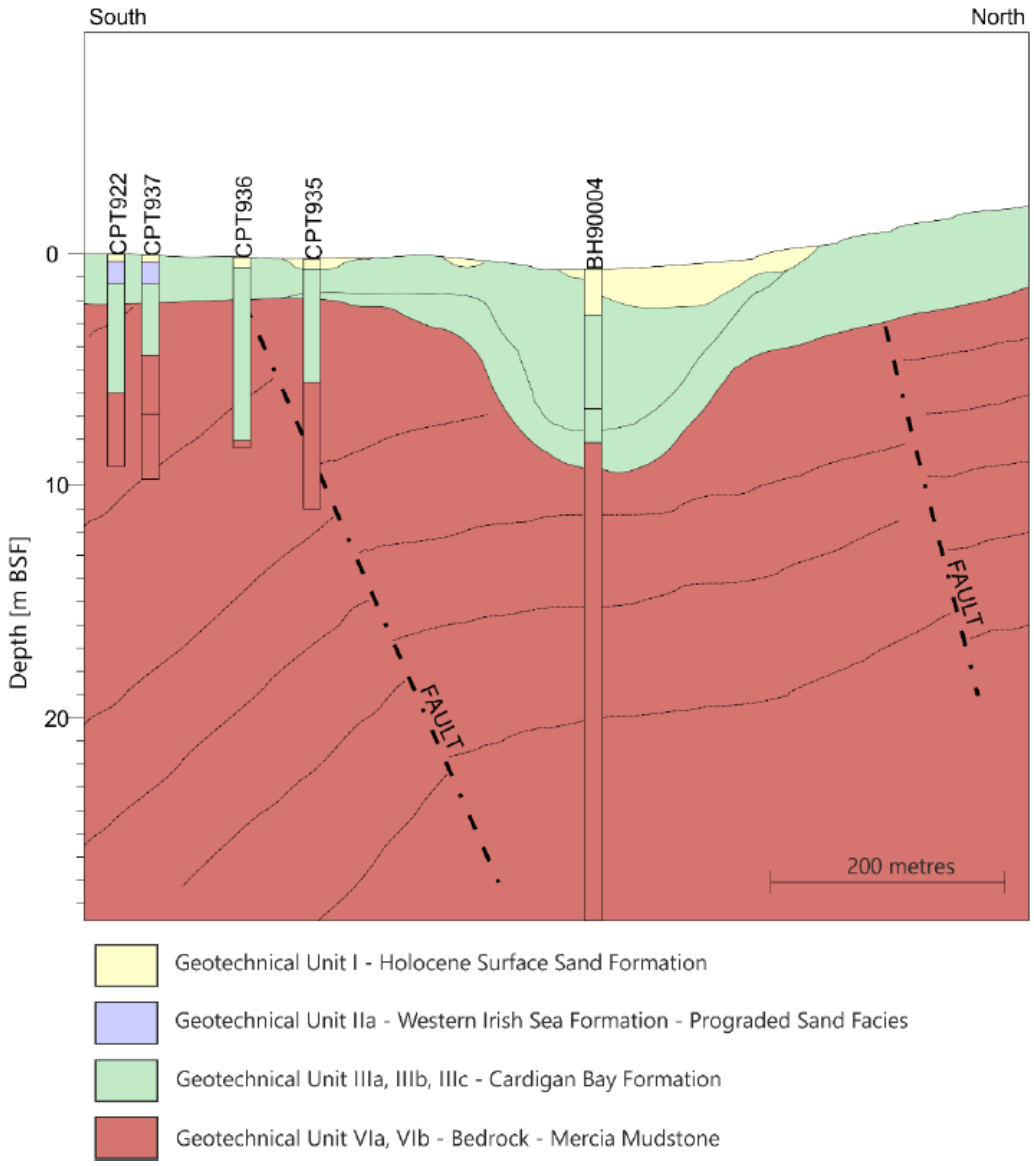


Figure 1.8: Example Cross Section Showing Interpreted Geotechnical Data And Interpretations From Sub-bottom Profiler Data At The Douglas Platform (Fugro, 2023)

The CBF is typically considered to be represented by diamicton deposits in the Irish Sea region, representing subglacial and proglacial environments, which may contain evidence of ice edge features such as proglacial lakes though none are specifically identified within the current data. Sub-units have, however, been identified, including and upper and lower high strength clay (Unit IIIa, c), separated by a deposit characterised by sands and gravels (Unit IIIb). The different sub-units may represent different glacial to pro-glacial environments, though further work would be required to determine this.

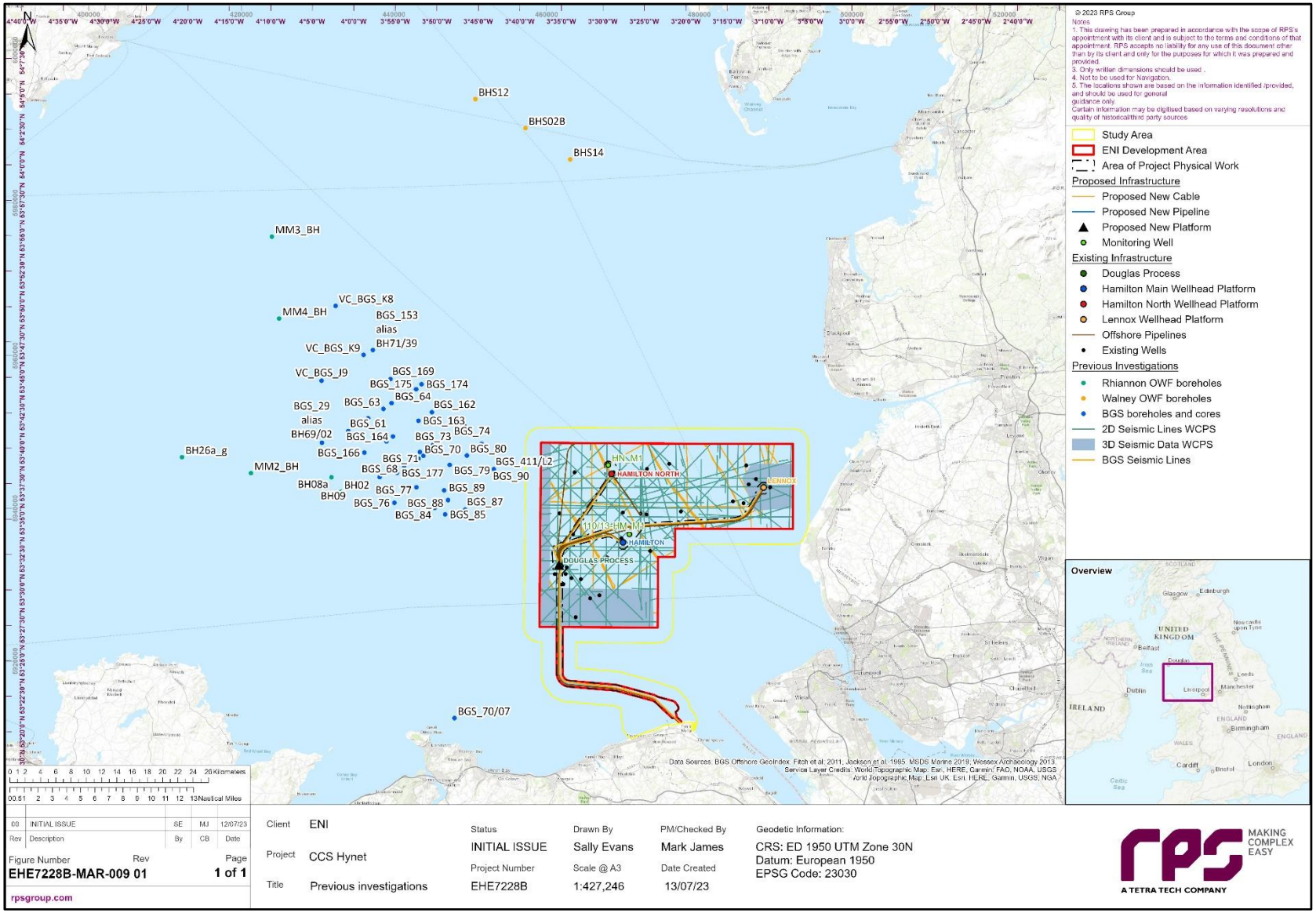


Figure 1.9: Previous Investigations

Unit II has been correlated with the late Devensian Western Irish Sea Formation. Fugro (2023) indicate that the Prograded Facies of this formation are present within the Site (Units IIa and IIb) and the formation generally has been identified as Unit IIIc (facies unspecified). While the latter is unspecified only the Prograded Facies and Mud Facies are currently recorded within this part of the Irish Sea (e.g. Figure 1.7) (Mellett *et al.,* 2015). The Prograded Facies comprises wedges of fine to medium sand with rare to absent microfossils suggesting it was deposited in a cold-water environment (Jackson *et al.,* 1995). The Prograded Facies deposition has been suggested to be deltaic (Mellett *et al.,* 2015) or prodeltaic to glaciomarine laid in a period of ice retreat. The archaeological assessment associated with Rhiannon OWF identified a very similar unit, with a similar distribution, and interpreted as the Prograded Facies of the WIS-A c. 25 km to the west of the Site. This deposit was termed Unit 6 in that report, and investigated by a number of BHs, including BH09, BH08a, and BH02 (Figure 1.9) (Wessex Archaeology, 2013). The assessment of the cores, and others from the wider area, concluded that this unit represented outwash sediments, and while some dark flecking was initially thought to represent organic remains in BH08a, more detailed geoarchaeological recording concluded that the flecks represented mudstone fragments rather than organic matter (Wessex Archaeology, 2013). The Mud Facies were laid down in a glaciomarine to marine setting and overlies the Prograded Facies.

Unit I represents the SSF. This formation has two members: The SL1 and SL2 members. The SL2 member represents an intertidal to marine environment which occurred following the last glaciation. The member is thought to have formed around the time of the Holocene marine transgression after 10.2 ka BP (Jackson *et al.,* 1995). The SL2 member represents varied lithologies and has been shown to contain organic and intertidal sediments, subsequent erosion surfaces and shallow marine sediments formed just prior to, during and following the Holocene marine transgression.

Peat within the SL2 member was identified in a BGS BH taken c. 10 km west of the Site (BGS BH 70/07; Figure 1.9) which is believed to represent a coastal reed swamp, developed in an environment close to open water, dating to 9.2 ka BP (Jackson *et al.,* 1995). The peat was below sands and gravels (interpreted as the SL1 member), at a depth of 3.5 m below seabed level. The peat overlay stiff clay and boulder clay (interpreted as glacial till). Intertidal muds also form part of this member (Jackson *et al.,* 1995) (Figure 1.9).

The SL1 member lies atop an erosion surface in the SL2 member and represents modern seabed sediments18. SL1 deposits are mobile, and range in thickness from areas of absence to large scale barchan-type dunes (Jackson *et al*., 1995).

The SL1 member is likely to be present within the Site, representing the modern marine-dominated environment. It is not clear whether the SL2 member is present, though there is potential for it to exist based on its presence within the wider area (e.g. BGS BH 70/07; Figure 1.9).

Potential for other units

In addition to the units identified within the Site, there is also potential for other deposits. The surveys on which the assessment is based are focused principally on the offshore area, around the location of former wells and platforms. Data for the cable route has not been assessed, and potential for different deposits exists in these areas. Potential is discussed further below (Section 1.5.3.3).

Sea level data

There are limited Sea Level Index Points (SLIPs) offshore in the Irish Sea. The majority of the SLIPs are present along the current coastline and date to after the maximum extents of the Devensian glaciation (Last Glacial Maximum (LGM)). These indicate that the Site was periodically submerged as the coastline fluctuated following the LGM, however, the exact date of submergence of this area is debated and different models of submergence exist (Brooks *et al*., 2011, Fitch *et al*., 2011, Shennan *et al.,* 2018)

The two main geological sources that cover this area were produced by the BGS (Jackson *et al.,* 1995; Mellett *et al*., 2015). These sources include differing interpretations of geological formations laid during the Devensian/Holocene transition resulting in different interpretations of contemporary palaeolandscape evolution. The sources agree that the site was subject to subglacial to glaciomarine conditions during the

Devensian. Following ice retreat at the end of the LGM Jackson *et al.* (1995) suggest the deposits which survive with the area represent subglacial, glaciomarine, prodeltaic and full marine environments, indicating a lack of deposits representing subaerial exposure. Mellett *et al*. (2015) instead suggest that the area was subject to subglacial to glaciomarine to deltaic conditions and thus potentially indicating subaerial exposure prior to full marine inundation. Neither source provide definitive dating for these landscape changes. These differences principally relate to how the Western Irish Sea (A) formation is interpreted, and in particular whether there was subaerial exposure, though in general all interpretations indicate a shifting environment associated with glacial retreat. The WIS-A Formation is interpreted as Unit II within the Site.

Landscape models by Shennan *et al.* (2018) and Brooks *et al.* (2011) and Fitch *et al.* (2011) present alternative theories for sea level rise and associated landscape evolution during this period suggesting that the Site was terrestrial to intertidal at various points. The former sources largely concur, while the latter sets out different evidence. All are discussed below.

Shennan *et al*. (2018) have produced a recent and extensive study of Relative Sea Level (RSL) in Britain and Ireland since the LGM. Their study, incorporating over 2,000 data points including SLIPs along with marine and terrestrial limiting data, provides regional insights into RSL across the UK. Sea level data for the Irish Sea area indicate sea level rise coinciding with the Windermere interstadial (14.7 ka BP to 12.9 ka BP), a subsequent fall during the Loch Lomond stadial (12.9 ka BP to 11.7 ka BP), and finally a relatively swift period of sea level rise after c. 10 ka BP attributed to the Holocene transgression (Shennan *et al.,* 2018). Supporting this scenario of sea level change are data from around the coast of Cumbria which indicate RSLs were at least +2 m OD in the Windemere Interstadial while data from around the Irish Sea demonstrates lower sea levels during and following the Loch Lomond stadial (between -29 m and -24 m OD from c. 12.6k BP to 11.1k BP).

Data from around Liverpool Bay, within the vicinity of the Site, demonstrates later sea level rise (Shennan *et al.,* 2018). The data points for the north-west are clustered around the current coastline, however, they indicate periods of marine lowstand during which parts of the Site may have been aerially exposed, particularly during the early Holocene. It is thought that the current coastline of the Liverpool Bay area was established in around 6k BP, as such much of the Site was likely to have been subject to marine conditions considerably before this, with the data collated by Shennan *et al.* (2018) indicating a RSL of c. -14 to -15 m at between 9,500 and 9,300 BP (during the early Mesolithic), rising rapidly after this date. Peat from BH 70/07 reportedly indicates a reed swamp environment adjacent to open water before 9.2k BP. The core was taken from depths of -14.5 m LAT, 14 km south-west of the Site, supporting the presence of a nearby coastline at c. -15 m just after 10 k BP. Brooks *et al.* (2011) support the picture of early inundation and indicate submergence of the western half of the Site (including all well platforms with the exception of Lennox) by at least 10k BP, and with all but the nearshore portion of the cable route and the Lennox platform area submerged by 8k BP, and the Lennox Platform and majority of the cable route submerged by 6k BP. These dates for submergence correlate with nearby SLIPs. According to the model of Brooks *et al.* (2011), BH 70/07, for example, lies within an area submerged between 8 k and 10 k BP, fitting in with the date of 9.2 k BP for the reed swamp environment noted in that core. Additional, SLIPs HV8649, HV8650 and HV8651 (located 1.2 km to the south of the Site boundary; Figure 1.10) lie within an area which was submerged between 8 k BP and 6 k BP according to Brooks *et al.* (2011). Samples dating to between c. 7.1 k and 6.8 k BP, indicating an RSL of -2.5 m to -2.0 m were recorded in these samples, again correlating with the model by Brooks *et al.* (2011).

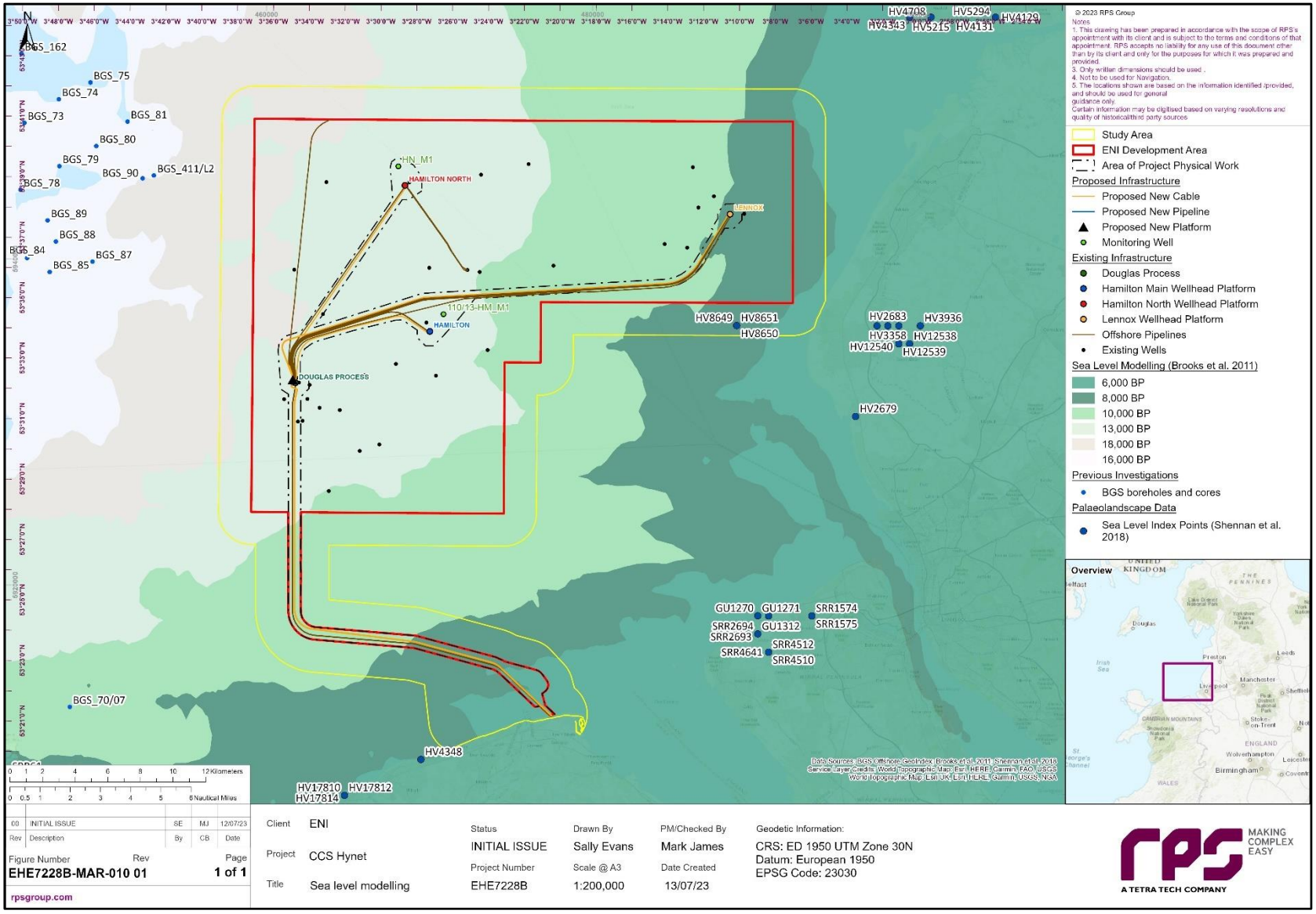


Figure 1.10: Sea Level Modelling And SLIPs (Brooks *et al.* 2011; Shennan *et al.* 2018)

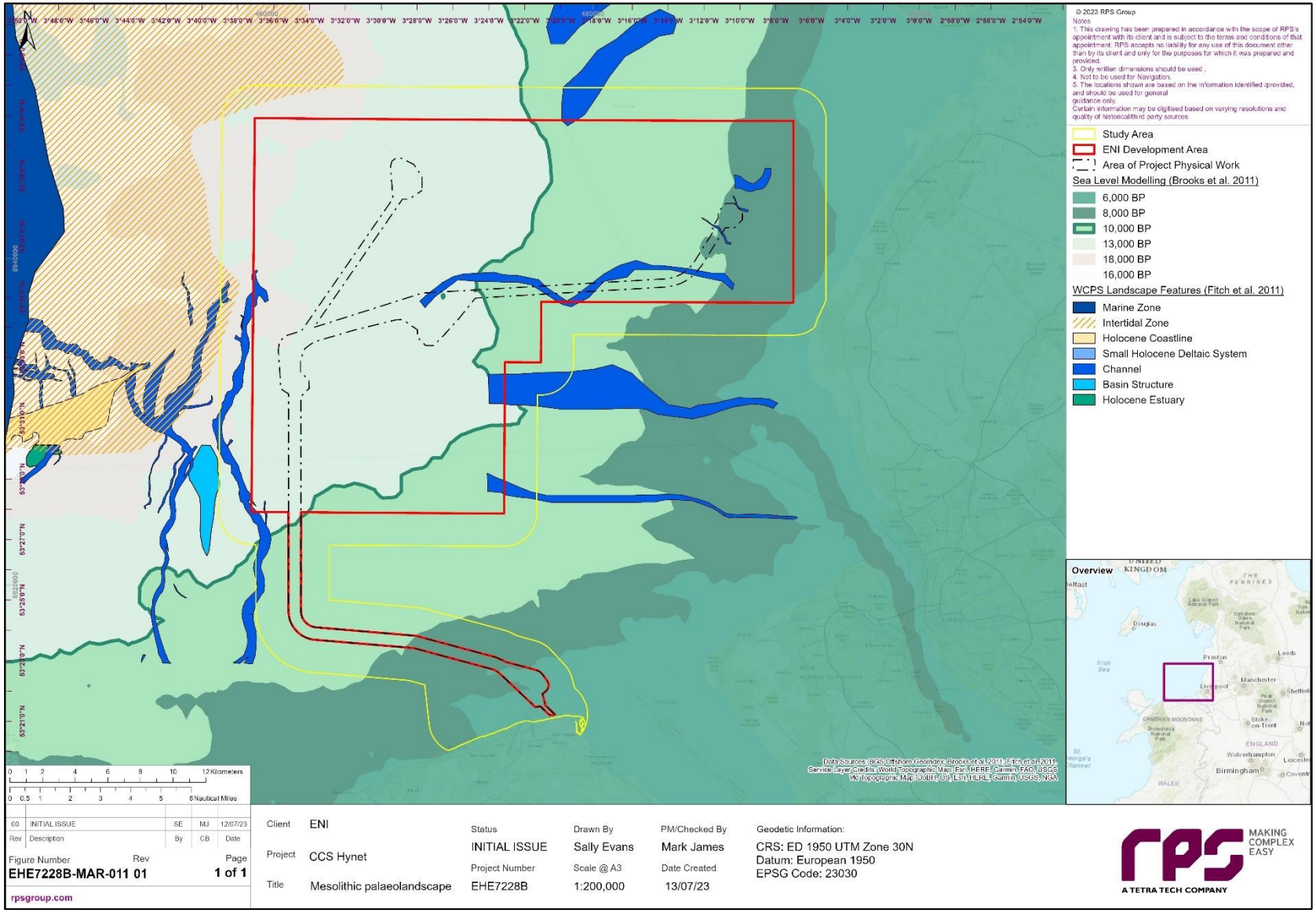


Figure 1.11: Mesolithic Palaeolandscape Features And Sea Levels (Brooks *et al*. 2011; Fitch *et al*. 2011)

While these recent studies, based on direct SLIPs and modelling, both indicate a similar timing for submergence within the Site, Fitch *et al.* (2011) suggest a later date and indicate that the site was terrestrial at 10ka BP, during the Mesolithic (Holocene) (see Figure 1.11). Direct dating was not undertaken by this study, and contemporaneity was generally judged according to depth of the features identified (e.g. Fitch *et al.,* 2011: 42). However, sea level curves were referred to in inferring potential dates for features (Fitch *et al.,* 2011: 70), in particular that of Shennan and Horton (2002). While this was the latest major sea level study available at the time, this work has since been updated by the same team (Shennan *et al.,* 2018) and the latter is therefore considered more accurate. Thus it may be that features initially interpreted as Mesolithic in date by Fitch *et al.* (2011), particularly those situated further westward, may now be interpreted to derive from earlier periods (as the latest sea level data indicates the submergence of much of the Site by 10 k BP, rendering it impossible for active channel systems to have been present in areas now thought to have been submerged by that date), and could reflect evidence of glacial/late glacial rather than Holocene landscapes.

Comparison of the coastlines as proposed in Brooks *et al.* (2011), with coastlines and palaeolandscape features mapped by Fitch *et al.* (2011) is shown in Figure 1.11. This figure highlights the coastline according to Brooks *et al.* (2011) at 10 k BP (the onset of the Mesolithic) and compares it with the Mesolithic coast and intertidal zone as mapped by Fitch *et al.* (2011). The latter can be seen to be c. 16 km further westward than the Site, while Brooks *et al.* (2011) show the 10 k BP coastline crossing the Site.

The comparison also shows a number of Holocene channels eastward of the 10 k BP coastline proposed by Brooks *et al.* (2011), many of which terminate around or just eastward of the modelled coastline, extending to within the Site (Figure 1.11). These features, which trend east-west, may represent Mesolithic channels and there is greater potential for Mesolithic landscape features to the east of the 10 k BP coastline depicted in Figure 1.11. A number of shorter channels are also evident in the easternmost side of the Site, around the Lennox platform. Interestingly, these channels terminate close to the 8 k BP coastline as modelled by Brooks *et al.* (2011) indicating potential for these channels to have been active after 8 k BP, though they are likely to have been submerged by 6 k BP. Comparison of these datasets therefore indicates potential for Mesolithic landscape features to be present within the eastern part of the Site, dating from 10 k BP – 6k BP. Channels to the west of the Site, along north-south orientations, are likely to have been submerged before 10 k BP and therefore are more likely to represent late Devensian features, rather than Holocene/Mesolithic features. Some extend a short distance into the Site, according to Fitch *et al*. (2011) (see Figure 1.11). It is possible that they represent fluvial features associated with glacial outwash systems, as has been identified within the WIS-A formation, Prograded Facies, 25 km east of the Site, associated with the Rhiannon OWF (Wessex Archaeology, 2013). While these features only appear to extend a short distance into the Site there is potential for other features related to glacial outwash plain environments to be present within the Site associated with Unit II, in addition to the other environments associated with the WIS-A (glaciomarine, prodeltaic, marine etc).

While potential inundation dates and implications for the dating of landscape features has been discussed here based on existing data, further evidence on the timing of the transgression is required to determine when the Site was finally submerged, though a date in the early Mesolithic appears likely for much of the eastern part of the Site based on the most recent studies, with inundation in the west occurring by c. 8 k BP to 6 k BP and submergence of much of the cable route by 6 k BP. Units I and II may have been deposited during these periods and may hold evidence relating to the transgression and palaeolandscape changes.

1.5.3.3 Submerged prehistoric archaeological potential

This section considers the potential for submerged prehistoric remains, including archaeological sites, palaeolandscape elements and paleoenvironmental evidence, to be present within the Site.

The prehistoric archaeological record of the UK covers the period from the earliest hominin occupation, potentially as far back as 970,000 BP, to the end of the Iron Age and the Roman invasion of Britain by Claudius in AD 43. The coastline of the UK changed drastically during this period and large tracts of what is now the seabed were once subaerially exposed.

The UK has been affected by several glacial events over the last 1 million years; including the Anglian (480 ka BP to 430 ka BP), the Wolstonian (350 ka BP to 132 ka BP), and the Devensian (122 ka BP to 10 ka BP) and intervening marine transgressions all of which have influenced archaeological potential. The potential is inferred from the presence of prehistoric landscapes within the Irish Sea, discussed in a variety of published reports and grey literature (see below). Potential palaeolandscape and palaeoenvironmental remains associated with the site are further investigated here.

Prehistoric archaeological potential is gauged with reference to evidence for human activity in the UK during each period, and the contemporary environment within the site. Depositional environment and post-depositional factors are also key to understanding potential, and as such geological deposits present within the Site form an important consideration in understanding archaeological, palaeoenvironmental and palaeolandscape potential. Deposits with potential for prehistoric archaeological remains, or palaeoenvironmental information are generally those laid during periods of aerial exposure or by fluvial process, rather than sub-glacial or marine deposits. However, there is also potential for archaeological material to be redeposited or reworked within secondary contexts as a result of fluvial erosion or glacial processes (Hosfield and Chambers, 2004), this will be taken into consideration when potential is assessed.

Review of the geological stratigraphy of the Site (Fugro, 2023) indicates that the Quaternary deposits likely originating in the Wolstonian, Devensian and Holocene periods. Thus, the following discussion will only relate to the archaeological and palaeoenvironmental potential of deposits laid during these periods (MIS six to one).

Middle and Upper Palaeolithic

Unit III is interpretated as the CBF. The formation has a series of members which may span the Wolstonian to Devensian period (MIS six to two; specifically, 180.6 ka BP to 13.9 ka BP): The Lower Till Member, Infill Member, Bedded Member and Upper Till Member.

The Lower Till Member comprises ‘stiff clay, abundant pebbles, slightly pebbly sand with shell clasts, together suggestive of a sub-glacial lodgement till, and elsewhere includes sands interpreted as ice-proximal glaciomarine deposits’ (BGS, n.d.). It is therefore thought to represent glacial environments, during a Wolstonian (MIS 6) glacial phase. The Bedded and Infill Members of the CBF are thought to have been formed in arctic, or boreal, conditions from the Wolstonian to the Devensian, and the Upper Till facies represent a glacial till deposit formed during the late Devensian (BGS, 1994). These deposits all have low archaeological potential owing to inhospitable conditions. While this formation is primarily glacial, its deposition also spans the Ipswichian interglacial (MIS 5e) though sediments of this date are either absent or not well defined (BGS, 1994). Additionally, although during the Ipswichian climatic amelioration may have allowed the development of environments which were more conducive to human activity than the preceding glacial phase, no such activity has been identified within the UK dating to this period and sea levels were generally higher further limiting potential associated with this Unit within the Site (Marshall *et al.,* 2020).

The Devensian (122,000 BP to 10,000 BP, MIS 5d-1) glaciation which directly followed the Ipswichian interglacial was the last glaciation to affect the UK. The maximum extents of the glaciation reached c.250 km south of the Site between 26 ka BP and 14.7 ka BP. Within the wider area, deposits described by the BGS indicate predominantly glacial conditions during the Devensian: the Upper Till Member of the CBF, which may be present within Unit III, is a glacial till that forms the base of the Quaternary sequence across much of the Irish Sea (Jackson *et al.,* 1995). Glacial tills and associated sediments included within Unit III represent inhospitable environments and have very limited archaeological potential. This has been confirmed by geoarchaeological assessment of cores from Walney Extension, c. 37 km to the north of the Site, which found a diamicton interpreted as Upper Till in BHS02B, BHS12 and BHS14 (Figure 1.9) and concluded that, following staged geoarchaeological assessment, the deposit had no archaeological potential (MSDS Marine, 2019). This was also reflected in the geoarchaeological assessment associated with Rhiannon OWF12. Therefore, Unit III holds very limited archaeological potential. However, material may survive on the surface of the unit where later subaerial exposure may have occurred.

Unit II represents the late Devensian WIS-A Formation. Wider studies have shown that the Prograding Facies of the WIS-A formation were deposited in cold water environments laid in deltaic/pro-deltaic to glaciomarine ice-proximal conditions during a period of ice retreat (Jackson *et al*., 1995). The Mud Facies which are also associated with the WIS- A Formation were likewise deposited in glaciomarine conditions (Mellett *et al.,* 2015). The information from the BGS and developments in the wider area indicates glacial, glaciomarine or deltaic/prodeltaic conditions during this period, with potential for outwash deposits within the Site, associated with Unit II. Channels mapped by Fitch *et al.* (2011) to the west of the Site and extending into its western edge may represent glacial features (Figure 1.12). Fitch *et al.* (2011), indicate that those to the north-west of the Site are interpreted as 'end glacial channels in large floodplains. Such features could represent outwash deposits as have been identified elsewhere and may reflect the glacial environment identified by others.

While wholly glacial or marine environments have no potential for *in situ* material, the edges of aquatic environments can form attractive areas for human activity. However, the environmental conditions are not likely to have been favourable for human habitation, given the ice-proximal location of the Site during the late Devensian period. Though as the below discussion shows, while archaeological potential is limited it cannot be ruled out, and exposed surfaces of this unit may hold potential where post-glacial subaerial exposure may have occurred. Although the Liverpool Bay area was likely to have been periglacial in periods of subaerial exposure, with relict glacial landforms including eskers, the conditions may not have been prohibitive for human activity. The post-glacial geography may have provided strategic points for game-hunting, for example, Giant elk (Megaloceros) remains have been identified within the inshore part of the WCPS study area (c. 70 km northeast of the Site), demonstrating the presence of potential prey species (Fitch *et al.,* 2011). However, the landscape would have been afflicted by permafrost which would have substantially limited vegetation growth, thus it is unlikely that the area was a rich hunting ground during the early post-glacial period (Fitch *et al.,* 2011).

There is evidence of human activity in the UK throughout the Devensian. Flint artefacts and skeletal remains indicating human presence in the UK during parts of the Devensian have been identified in Kent's Cavern (Devon), Dartford (Kent), Gower (Wales), and Creswell (Derbyshire) (Higham *et al.,* 2011; Wenban-Smith *et al.,* 2010; Dinnis, 2012; Pike *et al.,* 2005). Palaeolithic cave sites have also been identified on the north coast of Wales. At Kendrick's Cave, Llandudno, (c. 18 km to the south-west of the Site) for example, a horse jaw with inscribed patterns was found, along with other artefacts such as bone beads. The site has been dated to the Loch Lomond Stadial indicating the presence of Upper Palaeolithic communities within the region during this cold phase (Wessex Archaeology, 2013). While this indicates general archaeological potential in this period the Site lies in a more exposed position, and the erosive forces of glacial and marine processes are likely to have had a greater impact on any archaeological remains within this area. Nevertheless, potential for such remains still exists, both for *in situ* and redeposited material.

Additionally, there is potential for palaeoenvironmental evidence. Palaeoenvironmental analysis of BH samples collected from c. 10 km to the east of the Rhiannon OWF site have yielded pollen sequences dating to the Upper Palaeolithic (c. 34,000 BP) (Wessex Archaeology, 2012; 2013). Although it is known that this material originated from c. 10 km eastward of the OWF site the exact position of the core from which this material was uncovered is not known as the original reports were not available at the time of writing (Wessex Archaeology, 2012). It is therefore not illustrated on Figure 1.9. Nevertheless, this demonstrates the potential for palaeoenvironmental remains to survive within sediments dating to the Upper Palaeolithic, close to the Site. These may be contained within Unit III, or Unit II (discussed further below).

The chronology of landscape changes in the area during the Upper Palaeolithic to Mesolithic have been discussed above; and it appears likely that the western half of the Site was submerged by 10 k BP (by the end of the Upper Palaeolithic), with eastern areas and the cable route being submerged from 8 k BP to 6 k BP.

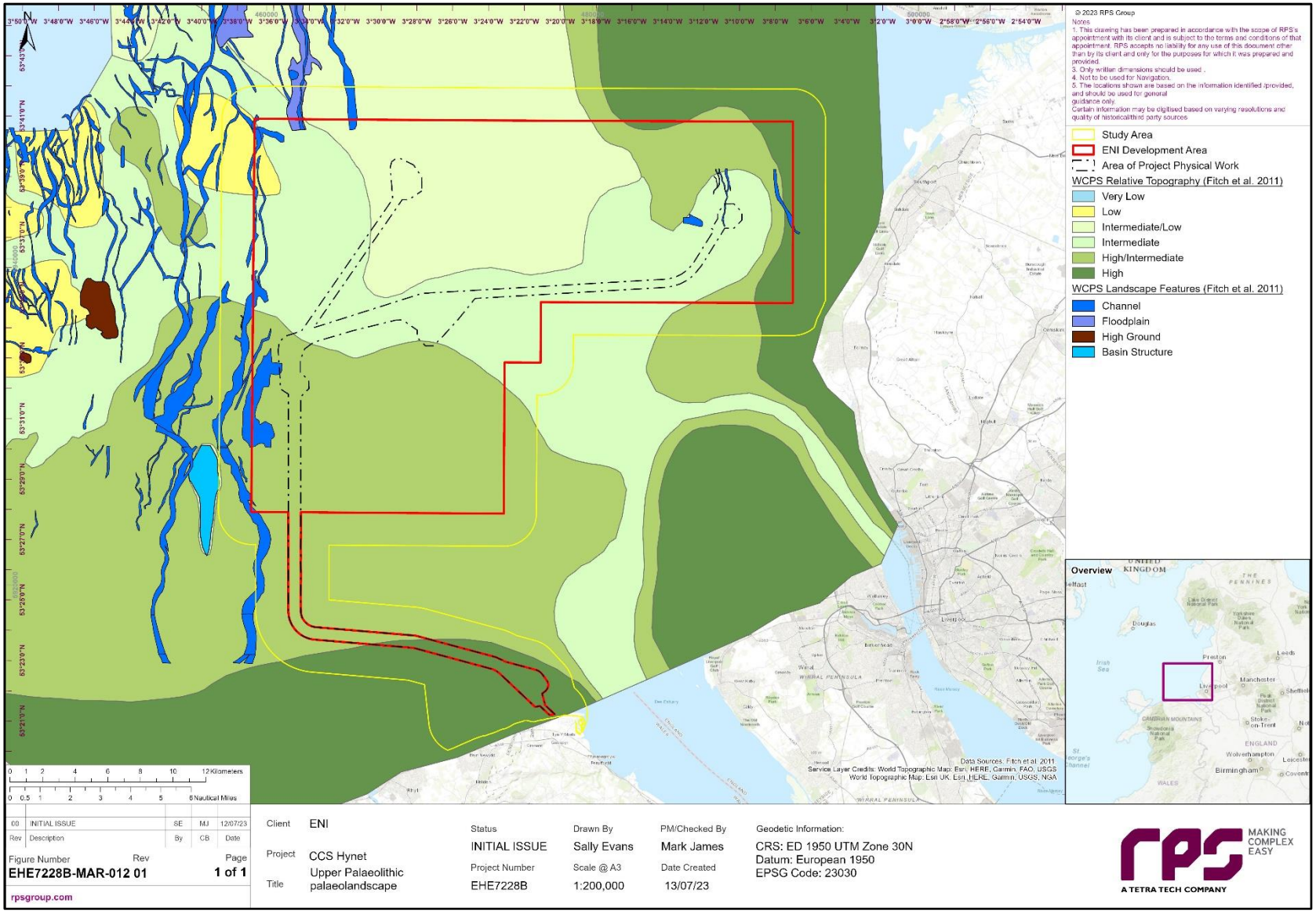


Figure 1.12: WCPS Upper Palaeolithic Landscape Reconstruction

Mesolithic (10 ka BP to 6 ka BP, MIS 1)

As the climatic conditions ameliorated during the onset of the Holocene, Mesolithic communities would have thrived in the Liverpool Bay area (Fitch *et al*., 2011). Woodland would have developed in areas which were not submerged. Indeed, the landscape modelling undertaken by the WCPS suggests the eastern part of the Site held fluvial channels (see Figure 1.11), which sea level data demonstrates may have remained active in the Mesolithic period. These features were mapped in seismic data, generally along a northeast-southwest alignment, and 'located relatively close to the seabed reflector in the seismic data' (Fitch *et al.,* 2011: 45).

These fluvial and adjacent environments create ideal conditions for human exploitation; available resources would have increased as the local flora and fauna became more diverse, and the range of environmental conditions would have presented more varied opportunities for exploitation. High ground, such as that recorded within the wider area could have provided ideal viewing points for monitoring prey (Fitch *et al.,* 2011). Evidence of Mesolithic activity has been recorded to the south of the Site, on the North Wales coast. At Rhyl for example, c. 3.5 km to the south-west of the cable route, intertidal footprints and a submerged forest have been identified along the coastal strip. An antler mattock embedded within the deposits provided a date of 6560 BP ± 80 BP (Bell, 2007). By this time much of the Site would have been submerged, leaving only the area at the nearshore end of the cable route (closest to these remains) exposed (Figure 1.11). Other remains from this area include coastal shell middens situated 1 km from the current coastline and dated to 5470 BP ± 80 BP (Bell, 2007). To the east of the Site, at Formby, comparable human footprints dating to the Late Mesolithic/very early Neolithic period have been identified in an area c. 2 km from the easternmost edge of the Site (Burns, 2021; Roberts, 2009; Appendix N: E_377), and others have also been recorded further south at Crosby (Eadie, 2017). Peat beds are also recorded between Liverpool and Preston (Boult, 1866; Hume, 1866), including within the Formby area (Cowell and Innes, 1994) and flint remains dating to the Mesolithic have been found along the coast (Stammers, 1994).

The evidence of Mesolithic activity in the wider area demonstrates potential for contemporary remains within the areas of the Site exposed during the Mesolithic period, though none are currently recorded. Fluvial features recorded within the Site could have been focal points for resource exploitation and indicate areas of particular potential.

It is not clear whether the fluvial features within the Site mapped by Fitch *et al*. (2011) are present in the upper parts of Units II or lower parts of Unit I, though the latter may be more likely as the SSF with which this Unit is equated is known to hold evidence of intertidal deposits, indicating potential for pre-inundation sediments and landscape evidence to survive. The SL2 member of this Formation is interpreted as a coastal/intertidal to marine deposit. Peat within the SL2 member was identified in a BGS BH (70/07), which is believed to represent a reed swamp dating to 9.2 ka BP (Jackson *et al.,* 1995; Mellett *et al.,* 2015) (Figure 1.9). There is potential for both palaeoenvironmental and archaeological remains to be present within this member, however, subsequent marine transgression eroded the upper parts of this deposit, thus affecting the preservation of any remains though some potential still exists (Jackson *et al*., 1995).

The later SL1 member (also contained within Unit I) is interpreted as an active marine deposit, and thus offers low potential for any *in situ* archaeological remains to be present, though redeposited remains may occur (Jackson *et al.,* 1995; Mellett *et al*., 2015).

1.5.4 Maritime and coastal remains

This section considers the potential for remains relating to coastal and maritime cultural landscapes to be present within the Site, defined as evidence of '*human utilisation of maritime space by boat, settlement, fishing, hunting, shipping and its attendant subcultures, such as pilotage, lighthouse and seamark maintenance*' (Westerdahl, 1992). Remains considered therefore range from shipwrecks or other durable evidence such as cargos and ballast, to features including navigational aids, sailing marks, ports, harbours and jetties. Navigational hazards such as shallow reefs or sand banks influence archaeological potential (particularly for wrecks), as does the preservation environment of the Site (see Section 0). All can inform our understanding of the potential of the Site. The full list of sources drawn on for this assessment is given in Section 0.

Other coastal remains which do not necessarily relate to boat use are also considered, including fish traps and other evidence of human interaction with the sea or coast. In addition, other coastal features are reported on where they inform the potential of the Site. This may include potential for eroded remains from nearby coastal features or settlements, or other evidence of coastal use which informs the potential of the Site.

The archaeological assessment of geophysical and hydrographic data is reviewed first (see MSDS Marine, 2023 for the original assessment), followed by desk-based sources (which contain evidence from previous geophysical assessments).

1.5.4.1 Archaeological assessment of geophysical and hydrographic data

The following sections give a breakdown of all geophysical anomalies identified by the archaeological assessment of geophysical and hydrographic data for the Site, covering parts of the APPW (MSDS Marine, 2023), and also of other known maritime remains derived from records held by the UKHO, Historic England, Cadw, the NRHE, RCAHMW, CPAT HER and Merseyside HER. Magnetic anomalies are dealt with separately below.

A total of 109 surface anomalies of potential archaeological interest were identified within the geophysical survey data extents. The anomalies are categorised by potential in Table 1.11. These anomalies are included within the counts given in Table 1.9, and are included within Appendix N.

Table 1.11: Distribution Of Archaeological Anomalies By Potential

Potential	Extents of geophysical data
Low	98
Medium	6
High	5
Total	109

The distribution of anomalies is shown in Figure 1.13, as can be noted the distribution is fairly uniform across the surveyed area. The ratios, and distribution, of high, medium, and low potential anomalies are relatively consistent with a typical archaeological assessment of data although the quantity of low potential anomalies is potentially higher that would be expected due to the existing infrastructure where clusters of anomalies can be noted around Douglas.

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

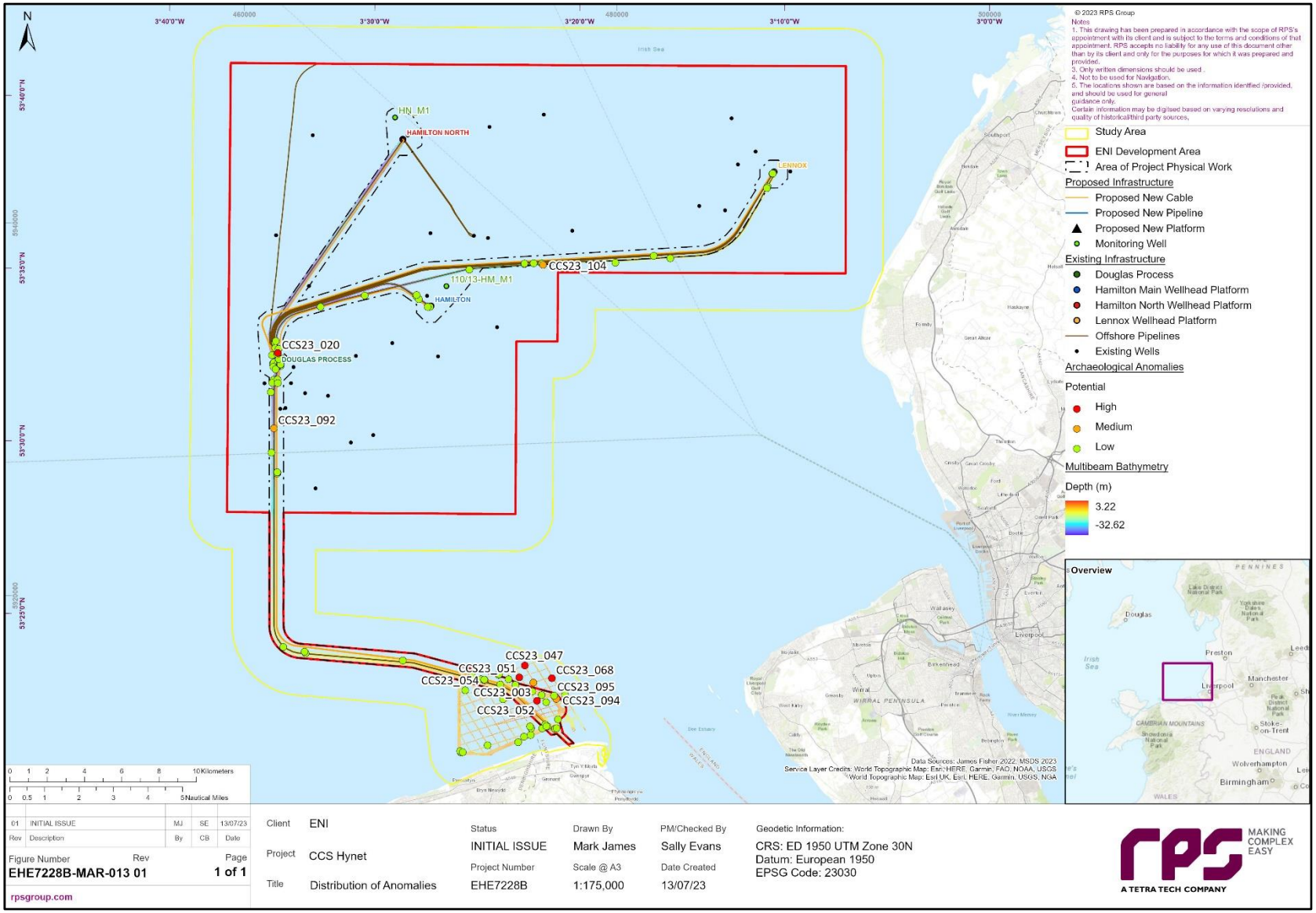


Figure 1.13: Distribution Of Archaeological Anomalies

Low potential anomalies

98 anomalies interpreted as of low archaeological potential were identified within the geophysical survey data extents. The anomalies can be categorised as follows in Table 1.12.

Table 1.12: Low Potential Anomaly Categories

Anomaly category	Extents of geophysical data
Debris	4
Potential debris	38
Debris – likely infrastructure	21
Chain, cable, or rope	5
Linear Feature	7
Fishing gear	3
Seabed disturbance	1
Mound	1
Unknown	1
Likely geological	17
Total	98

The anomalies interpreted as of low archaeological potential (Table 1.12) are a mixture of small features, often boulder-like, or likely to represent modern debris such as infrastructure, chain, cable, or rope, or small items of debris with no features indicating archaeological potential. Each anomaly was reviewed and interpreted to be of low archaeological potential. A further review was undertaken following the assessment of the survey area extents.

Table 1.13 below provides a brief justification for the interpretation of each category of low potential anomalies. To note, the descriptions below are generalised, and each anomaly is interpreted based on individual characteristics, other anomalies within the wider area, seabed characterisation, etc.

Low potential anomalies have been assessed against all available evidence and are deemed unlikely to be of archaeological significance and as such are not discussed further within the results section of this report. The identification of an anomaly as of low archaeological potential is commensurate with the mitigation for this category - Maintain an operational awareness of the anomaly's location and reporting through the agreed protocol should material of potential archaeological significance be encountered. Further information including positions and dimensions can be found in Appendix N (E_011, E_099-178).

Table 1.13: Low Potential Anomaly Descriptions

Anomaly category	Description
Debris	Features identified as debris are generally of a form that is likely to indicate anthropogenic debris with a higher level of certainty than potential debris. The characteristics of the anomaly do not indicate archaeological potential.
Potential debris	Features identified as potential debris will generally display characteristics indicating anthropogenic origin, such as straight or angular edges. Boulder like features, with associated magnetic anomalies can also be categorised as potential debris.
Likely infrastructure	Features identified as likely infrastructure are those found within proximity to, or association, to confirmed infrastructure, but where the identity cannot be fully confirmed.

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

Medium potential anomalies

Six anomalies interpreted as of medium archaeological potential were identified within the geophysical survey data extents. The anomalies can be categorised as follows in Table 1.14, the distribution is presented in Figure 1.14. Images of the individual anomalies can be found in MSDS Marine (2023).

Table 1.14: Medium Potential Anomaly Categories

Anomaly category	Survey data extents
Debris	4
Mound	2
Total	6

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

The identification of an anomaly as of medium archaeological potential is commensurate with the mitigation for this category - Avoidance of the anomaly's position and where appropriate an AEZ may be recommended. Ground truthing of the anomaly through the use of divers or an ROV would establish the archaeological potential.

Each medium potential anomaly is discussed, along with an image, within this section of this report. Further information, including positions and dimensions, can be found in the gazetteer (Appendix N).

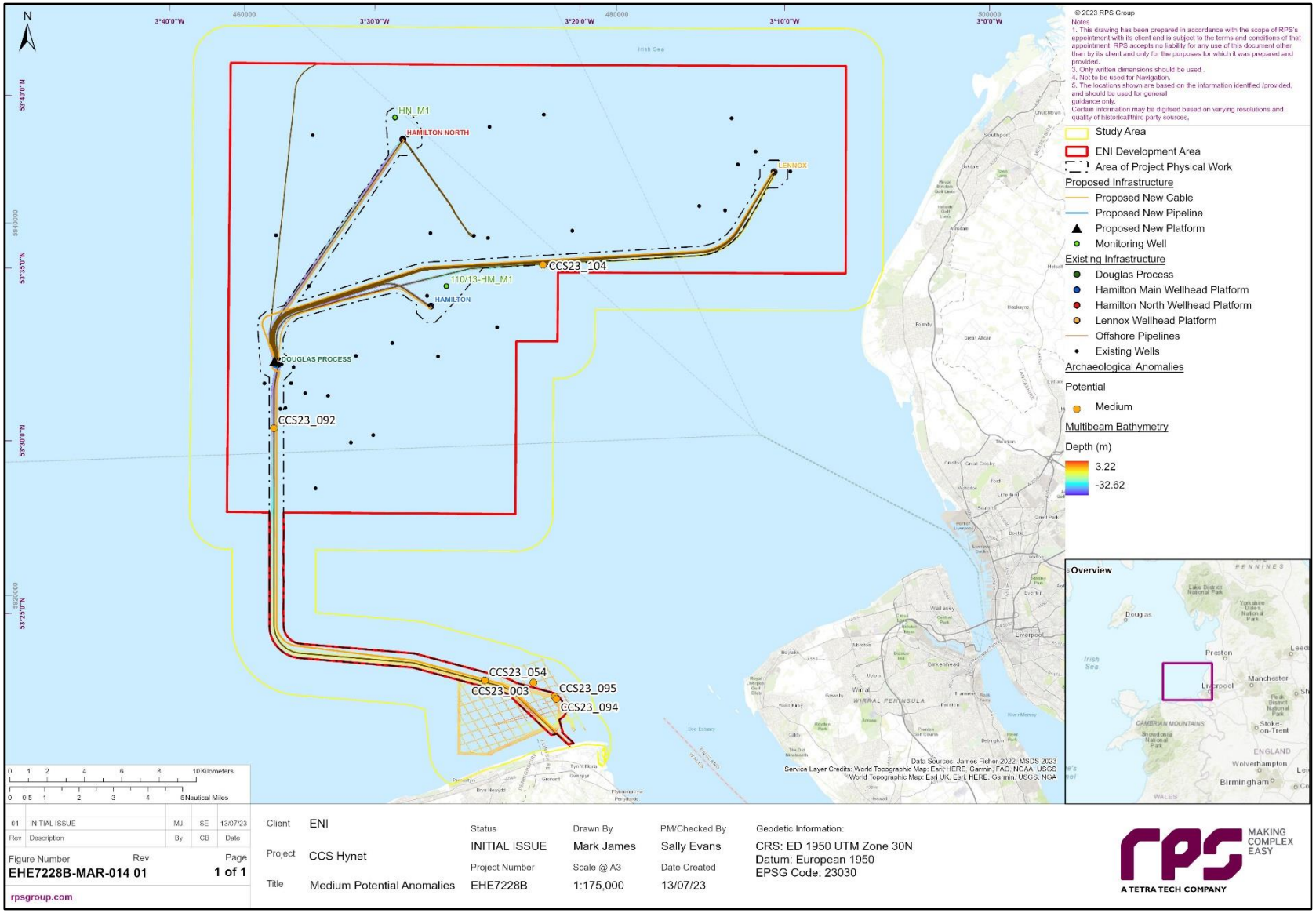


Figure 1.14: Distribution Of Medium Potential Archaeological Anomalies

Medium potential (Appendix N: E_009; geophysical ID CCS23_003)

Geophysical anomaly CCS23_003 lies within, and to the east of the Hoyle Spit extended area of survey, c. 525 m outside of the APPW and outside the Eni Development area. The anomaly lies c. 1.1 km from the closest proposed cable route, and c. 1.1 km from the closest pipeline (PL1033) (see MSDS Marine, 2023 for a review of nearby infrastructure). The anomaly is visible in the both the SSS and MBES data and has no associated magnetic anomaly. The anomaly corresponds with UKHO record 95849, but no RCAHMW, CPAT HER, or NRHE records.

The anomaly is visible as a mound measuring 7.9 m x 5.3 m, with a measurable height of 0.9 m. The mound is predominantly identifiable through the scour to the east due to the presence of mobile sandwaves, indicating a relatively solid mass. No further interpretation is possible with the data, as coverage in the area is limited.

The UKHO record the anomaly as a possible degraded wreck, identified in 2019, with little further information. Whilst mounds can represent buried material of anthropogenic origin, the current datasets do not necessarily support the interpretation as of a wreck. However, the data is not clear, and a precautionary approach means a medium potential rating is appropriate. Further assessment of Remotely Operated Vehicle (ROV) data would be required to better understand the origin, and therefore the archaeological potential.

Medium potential (Appendix N: E_010; geophysical ID ECCS23_054)

Geophysical anomaly CCS23_054 lies within the south-eastern section of the pipeline corridor within the APPW, c. 155 m from the north-eastern boundary. The anomaly lies c. 26 m from the closest proposed cable route, and c. 80 m from the closest pipeline (PL1033). The anomaly is visible in the both the SSS and MBES data, has an associated magnetic anomaly of 6.6 nT, and does not correspond with any UKHO, RCAHMW, CPAT HER, or NRHE records.

The anomaly is visible as a prominent mound, unique in the surrounding geophysical data, and measuring 13.1 m x 9.3 m, with a measurable height of 1.3 m. The mound is lozenge shaped, with an irregular surface, and slight protrusions to the south. The form of the anomaly is unusual in the surrounding area, and the association with a magnetic anomaly may indicate material of anthropogenic origin, conversely the anomaly could be geological in origin, as such a precautionary medium potential rating has been assigned due to proximity to the proposed cable route. Further assessment of ROV data would be required to better understand the origin, and therefore the archaeological potential.

Medium potential (Appendix N: E_095; geophysical ID CCS23_092)

Geophysical anomaly CCS23_092 lies within the APPW, c. 3.5 km south of Douglas Platform, and c. 240 m east of the western boundary. The anomaly lies c. 133 m from the closest proposed cable route, and c. 13 m from the closest pipeline (PL1030). The anomaly is visible in the both the SSS and MBES data, has no associated magnetic anomaly, and does not correspond with any UKHO, RCAHMW, CPAT HER, or NRHE records.

The anomaly measures 5.9 m x 2.9 m, with a measurable height of 0.1 m. The form of the anomaly is potential indicative of anthropogenic debris, visible in the SSS data as a number of parallel features, within the MBES data the anomaly is characterised by two small mounds to the west, and disturbed seabed to the east. The origin of the anomaly is unclear, however the proximity to the installed pipeline may suggest a relationship. However, this is uncertain and therefore a medium potential rating is considered appropriate. Further assessment of ROV data would be required to better understand the origin, and therefore the archaeological potential.

Medium potential (Appendix N: E_096; geophysical ID CCS23_094)

Geophysical anomaly CCS23_094 lies within, and to the east of the Hoyle Spit within the APPW. The anomaly lies c. 1.3 km from the closest proposed cable route, and c. 1.3 km from the closest pipeline (PL1033). The anomaly is visible in the both the SSS and MBES data, has no associated magnetic anomaly, and does not correspond with any UKHO, RCAHMW, CPAT HER, or NRHE records.

The anomaly is visible as a single, isolated, prominent, linear feature in amongst, and bisecting sandwaves. The anomaly measures 10.5 m x 1.3 m, with a measurable height of 0.9 m. The form of the anomaly strongly suggests anthropogenic origin, although the origin is unclear. The anomaly is similar in form to Medium potential CCS23_095 which lies c. 165 m to the north-north-west (discussed below). Whilst the origin of the anomaly could be a result of infrastructure installation, a section of pipeline for example, the distance of 1.3 km may preclude this, therefore a medium potential rating is considered appropriate. Further assessment of ROV data would be required to better understand the origin, and therefore the archaeological potential.

Medium potential (Appendix N: E_097; geophysical ID CCS23_095)

Geophysical anomaly CCS23_092 lies within, and to the east of the Hoyle Spit within the APPW. The anomaly lies c. 1.3 km from the closest proposed cable route, and c. 1.4 km from the closest pipeline (PL1033). The anomaly is visible in the both the SSS and MBES data, has no associated magnetic anomaly, and does not correspond with any UKHO, RCAHMW, CPAT HER, or NRHE records.

The anomaly is visible as a single, isolated, prominent, linear feature in amongst, and parallel with, sandwaves. The anomaly measures 13.3 m x 1.5 m, with a measurable height of 0.9 m. The form of the anomaly strongly suggests anthropogenic origin, although the origin is unclear. The anomaly is similar in form to Medium potential CCS23_094 which lies c. 165 m to the south-south-east (discussed above). Whilst the origin of the anomaly could be a result of infrastructure installation, a section of pipeline for example, the distance of 1.4 km may preclude this, therefore a medium potential rating is considered appropriate. Further assessment of ROV data would be required to better understand the origin, and therefore the archaeological potential.

Medium potential (Appendix N: E_098; geophysical ID CCS23_104)

Geophysical anomaly CCS23_104 lies within the Eni Development Area. The anomaly lies c. 227 m from the closest proposed cable route, and c. 22 m as its closest point from the closest pipeline (PL1036A). The anomaly is visible in the both the SSS and MBES data, has no associated magnetic anomaly, and does not correspond with any UKHO, RCAHMW, CPAT HER, or NRHE records. It should be noted that the anomaly lies close to the pipeline, and whilst magnetic anomalies were identified within the area, it is not possible to confidently assign these to the anomaly.

The anomaly is visible as an extended area of potential debris measuring 77.1 m x 20.3 m, with a measurable height of 0.3 m. Geological features are noted within the wider area, particularly to the east, however the overall form, and the individual components, are more consistent with anthropogenic debris. The distribution, and the extents of the features potentially indicate a wrecked vessel, in areas of seabed with less geological features it would be identified as such. However, there remains the potential for the anomaly to represent geology and as such has been assigned a medium potential rating. Further assessment of ROV data would be required to better understand the origin, and therefore the archaeological potential.

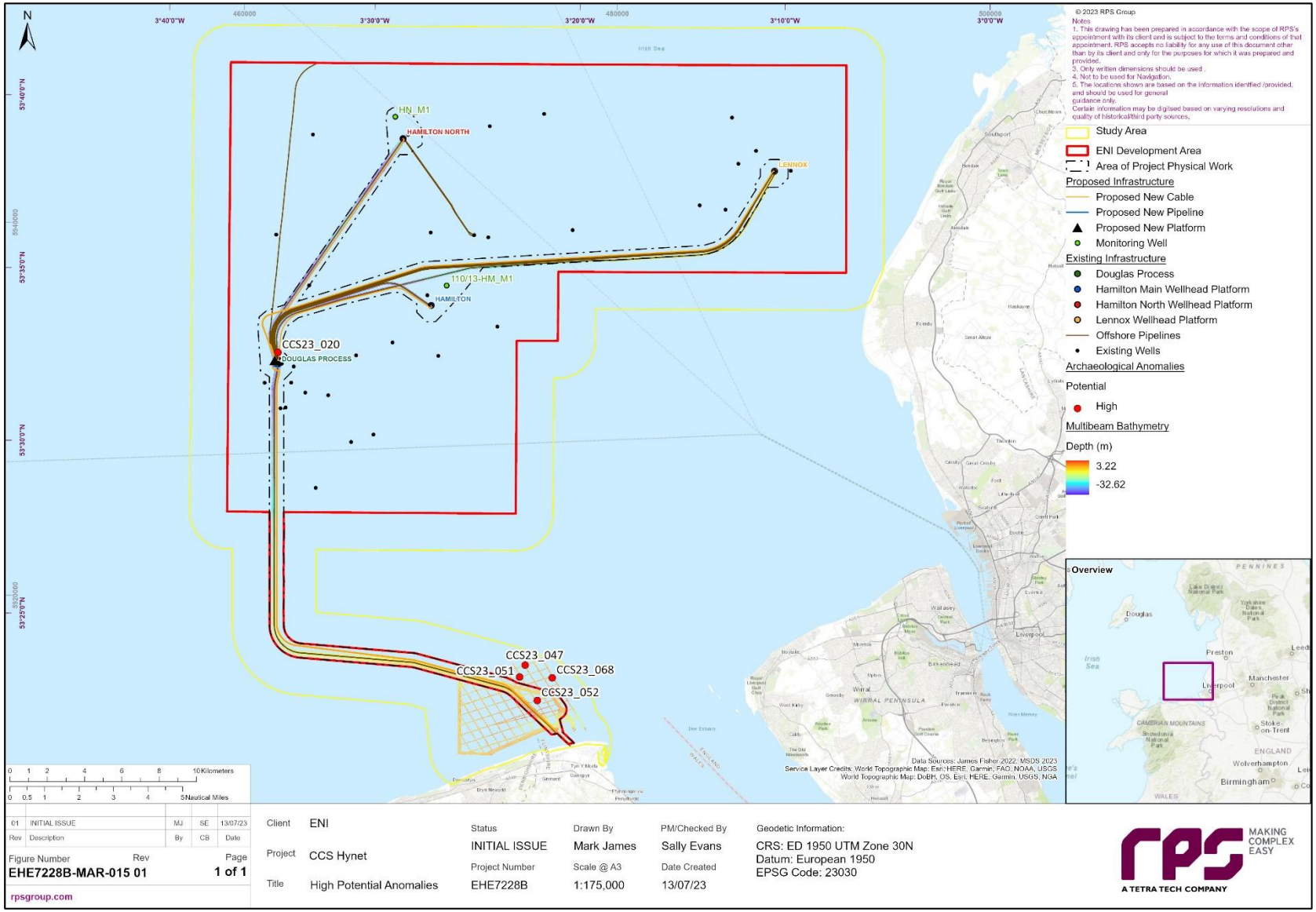


Figure 1.15: Distribution Of High Potential Archaeological Anomalies

1.5.4.1.1 High potential anomalies

Five anomalies interpreted as of high archaeological potential were identified within the geophysical survey data extents. The anomalies can be categorised as follows in Table 1.15 the distribution is presented in Figure 1.15. Images of the individual anomalies can be found in MSDS Marine (2023).

Table 1.15: High Potential Anomaly Categories

Anomaly category	Survey data extents
Wreck	2
Potential wreck	3
Total	5

The anomalies interpreted as of high archaeological potential have characteristics that indicate a high likelihood of representing anthropogenic material that has a high potential to be of archaeological interest, or where a precautionary approach has been taken for anomalies where the identification isn't clear.

The identification of an anomaly as of high archaeological potential is commensurate with the mitigation for this category - AEZs will be recommended based on the size of the anomaly, any outlying debris and the seabed dynamics as interpreted from the SSS and MBES data.

Each high potential anomaly is discussed, along with an image, within this section of this report. Further information, including positions and dimensions, can be found in the gazetteer (Appendix N).

High potential (Appendix N: E_006; geophysical ID CCS23_020)

Geophysical anomaly CCS23_020 lies within the APPW, c. 600 m north of the Douglas Platform. The anomaly lies c. 65.0 m from the closest proposed cable route, and c. 5.0 m from the closest pipeline (PL1036A). The anomaly is visible in the SSS and MBES data but falls outside the magnetometer data coverage. The anomaly corresponds with UKHO record 91551, RCAHMW record 506924, and NRHE record 892881.

The anomaly is characteristic of a heavily broken up wrecked vessel, the remains of which cover an area 56.5 m x 15.2 m, with a measurable height of 2.8 m. The main concentration of wreckage lies towards the centre of the distribution of material and measures 20.9 m x 14.1 m, to the north of this area lies a cylindrical object 2.7 m x 1.7 m, with a measurable height of 2.8 m, likely representing the boiler. The form of the debris, and the presence of a boiler, suggests a steel wreck. Debris lies to both the north and south of the concentration of wreckage.

The UKHO records the wreck as an area of wreckage with the boiler being the highest point, the NRHE record a probable late 19th century steamer, and the RCAHMW record a steel wreck, that has pots and earthenware recovered bearing the names of French town. No records suggest an identity for the wreck. The unknown origin, identity, and date of the wreck mean a high potential rating is considered appropriate.

High potential (Appendix N: E_007; geophysical ID CCS23_047)

Geophysical anomaly CCS23_047 lies within, and to the east of the Hoyle Spit extended area of survey, c. 1.3 km outside of the APPW and outside the Eni Development area. The anomaly lies c. 1.4 km from the closest proposed cable route, and c. 1.5 km from the closest pipeline (PL1033). The anomaly is visible in the SSS and MBES data and is associated with a magnetic anomaly of 3,649.0 nT. The anomaly corresponds with UKHO record 58577, RCAHMW record 240780, and CPAT HER record 64188.

The anomaly is predominantly visible with the MBES data, although there are data gaps (caused by shadow) which make a full description difficult. However, the anomaly appears to consist of two large sections of

material, separated in the middle, and measuring 13.9 m x 5.3 m, with a measurable height of 1.5 m. The characteristics of the anomaly indicate a wrecked vessel, however the material is not possible to identify within the data, although the significant magnetic anomaly potentially indicates steel. The anomaly lies within an area of scour extending up to 3.0 m on all sides, with the exception of the south-east where it extends c.13 m. A potentially related feature lies 8.2 m to the south, with some evidence of debris within the area of scour.

The UKHO record a wreck measuring 27 m x 8 m, potentially with two mast extending above the seabed in 2000. A diving inspection in 2010 identified only the boiler, with no evidence of any other wreckage, a possible interpretation of a steam flat (small coaster) with a wooden hull was made. A repeat survey in 2019 identified only the boiler, but with no evidence of scour. The changes in descriptions between the two surveys, and the diving inspection likely indicate an area of mobile seabed with covering and uncovering of the wreck, or substantial deterioration of the wreck between 2000 and 2010. The RCAHMW and CPAT HER records derive from the UKHO record and contain the same information. The unknown origin, identity, and date of the wreck mean a high potential rating is considered appropriate.

High potential (Appendix N: E_004; geophysical ID CCS23_051)

Geophysical anomaly CCS23_051 lies within, and to the east of the Hoyle Spit extended area of survey, c. 600 m outside of the APPW and outside the Eni Development area. The anomaly lies c. 765 m from the closest proposed cable route, and c. 835 m from the closest pipeline (PL1033). The anomaly is visible in the both the SSS and MBES data, has an associated magnetic anomaly of 16.1 nT, and does not correspond with any UKHO, RCAHMW, CPAT HER, or NRHE records.

The anomaly is visible as two broadly semi-circular features 7.0 m wide, and 20.0 m apart at the furthest points, with the area in between featureless. The overall form of the two features is interpreted as the low lying, but coherent, remains of a wrecked vessel. Whilst is it not possible to accurately determine the orientation it would appear that the stern lies to the west-south-west, and the bow to the east-north-east. Scour is present, predominantly to the south-east. Within the SSS data a small piece of potential debris lies c. 1.5 m off the potential bow.

The material of the wreck is not possible to determine, however the form, size, and small magnetic anomaly may indicate wooden construction. There remains the possibility that the anomaly is a geological feature, however the form, dimensions, and proportions likely indicate a wrecked vessel and therefore a high potential rating is considered appropriate.

High potential (Appendix N: E_005; geophysical ID CCS23_052)

Geophysical anomaly CCS23_052 lies within, and to the east of the Hoyle Spit extended area of survey, within the APPW and c. 360 m from the north-eastern boundary. The anomaly lies c. 494 m from the closest proposed cable route, and c. 547 m from the closest pipeline (PL1033). The anomaly is visible in the both the SSS and MBES data and has an associated magnetic anomaly of 12167.0 nT. The anomaly corresponds with UKHO record 91549, but no RCAHMW, CPAT HER, or NRHE records.

The anomaly is visible as a number of interconnecting, but incoherent, linear features with a mound towards the south-west, the overall form of which indicates a wrecked vessel. The visible material measures 22.6 m x 6.9 m with measurable height of 0.7 m. However, the anomaly lies within an area of mobile sandwaves and appears to go to bury to the south-west, whilst not possible to determine the exact extents the form may indicate as much as 50% is buried. Significant scour is visible to the south-east. Other than being able to identify what appears to be structure and a mound (possible boiler), very little other interpretation is possible. The form, and the significant magnetic anomaly, do however indicate a steel vessel.

The UKHO record the wreck as being first identified in 2019, with similar dimensions, and some structure clearly visible. The unknown origin, identity, and date of the wreck mean a high potential rating is considered appropriate.

High potential (Appendix N: E_008; geophysical ID CCS23_068)

Geophysical anomaly CCS23_068 lies within, and to the east of the Hoyle Spit extended area of survey, c. 1.0 km outside of the APPW and outside the Eni Development area. The anomaly lies c. 1.9 km from the closest proposed cable route, and c. 2.0 km from the closest pipeline (PL1033). The anomaly is visible in the SSS data but is outside the coverage of the MBES data. There is a potential correlation with a magnetic anomaly of 56.7 nT, however it lies on the closest track c. 50 m away. The anomaly corresponds with UKHO record 91551, but no RCAHMW, CPAT HER, or NRHE records.

The anomaly is only partially covered by the survey data, and being at the outer reaches of the SSS line it is not very clear. The anomaly is visible as a 'U' shaped outline consisting of clustered features, with further features within the centre, measuring 6.1 m x 5.8 m, with little measurable height. The form of the anomaly is not immediately indicative of a wrecked vessel; however, the form may suggest this. In addition, the anomaly is associated with a UKHO record which notes scattered parts of man-made construction or parts of wreck. One of the parts lying on the seabed is cylindrical in shape. The UKHO record is based on a wider dataset collected in 2019 and therefore is considered likely to be accurate.

The combined evidence suggests a potential wrecked vessel, of undetermined age, type, etc. therefore a high potential rating is considered appropriate. Further assessment of ROV or geophysical data would be required to better understand the origin, and therefore the archaeological potential, as well as the extents of the wreck and any associated debris.

Magnetic anomalies

674 magnetic anomalies, ranging between 5 nT and 7,925 nT, were identified within the geophysical survey data extents, of these 550 do not directly correlate with known, or visible, features or infrastructure. The distribution of anomalies by amplitude is shown below in Table 1.16 with their spatial distribution presented in Figure 1.16.

Table 1.16: Magnetic Anomalies

Intensity (nT)	Survey data extents
5 to 50	462
50 to 100	53
100 to 200	19
200 +	16
Total	550

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

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

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

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

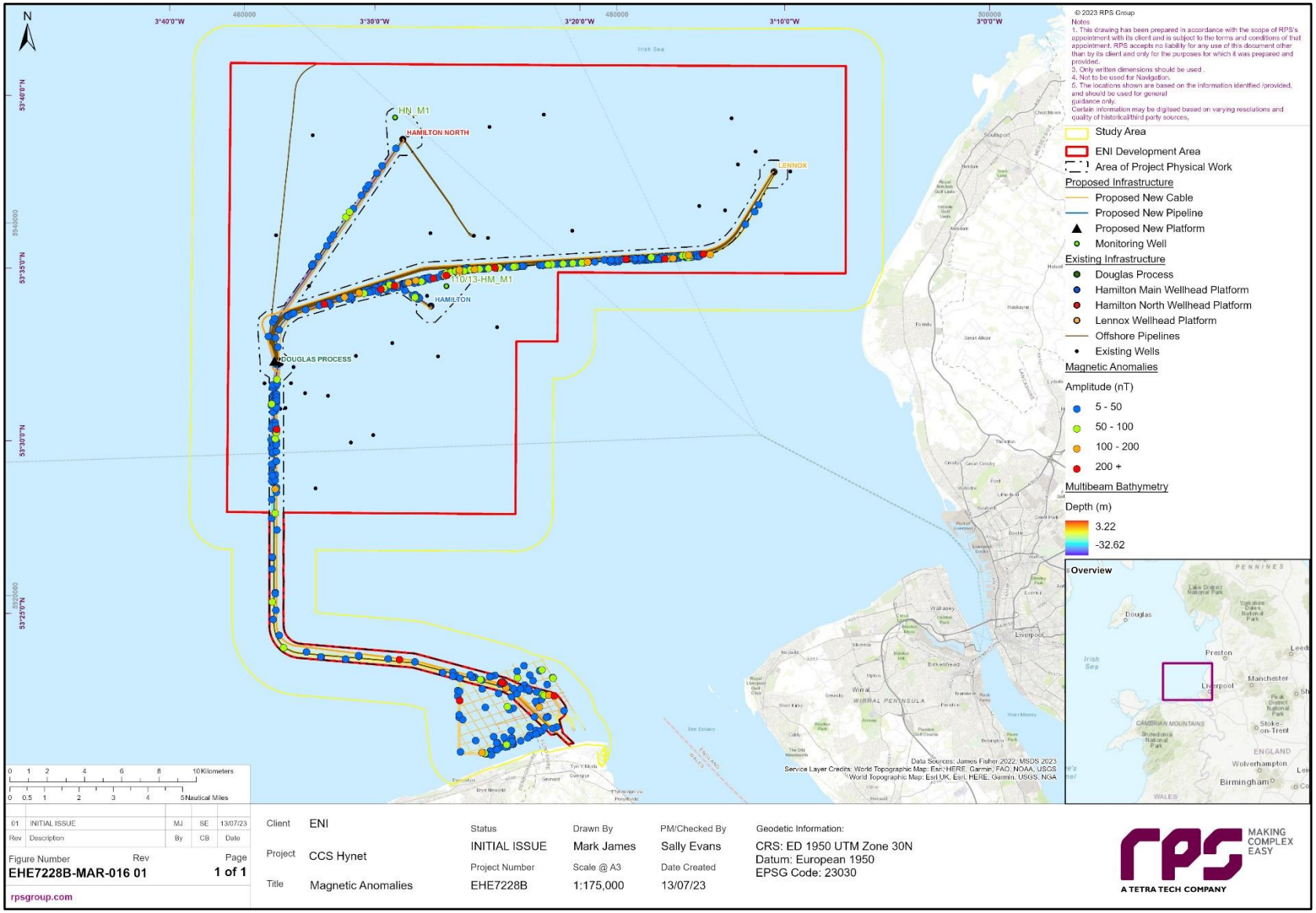


Figure 1.16: Distribution Of Magnetic Anomalies

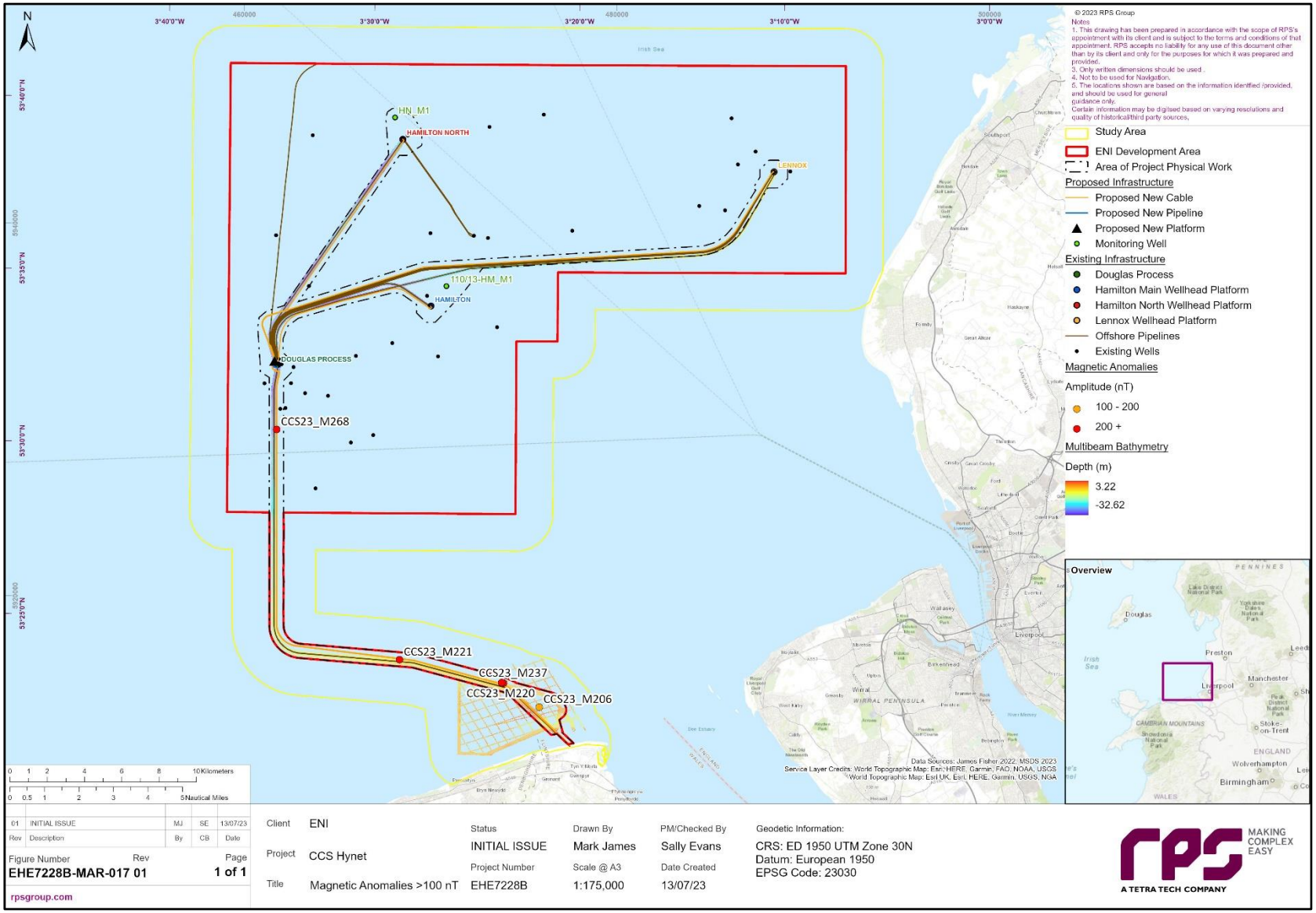


Figure 1.17: Distribution Of High and Medium Potential Magnetic Anomalies

Overview of magnetic anomaly distribution

The distribution of magnetic anomalies is fairly uniform within the geophysical survey data extents, primarily consisting of anomalies <50 nT. Due to the line spacing used during data collection this is a fairly typical distribution both geographically and in terms of recorded amplitude. The size (in nT) of a magnetic anomaly is dependent on both the amount (size/weight) of ferrous material, and the distance from the sensor. Therefore, unless there is a strong correlation between a magnetic anomaly and a seabed feature perpendicular to the track, it is not possible to accurately position or determine the size of an anomaly.

For example, an anomaly of <50 nT relating to a feature direct below the track could, and often does, represent small pieces of debris, steel cable, fishing gear, etc. whilst an anomaly of <50 nT 100 m from the track could indicate a much larger feature. If that feature is not visible in the other geophysical datasets (potentially due to being buried) then the position is unable to be reconciled. As such, a bias towards anomalies <50 nT is expected as the range to the sensor is greater than 10.0 m for 50% of the seabed at a 40 m line spacing.

Impact of infrastructure

The survey data were collected as part of the Liverpool Bay Asset Subsea Survey of LBA Pipelines and Wellheads campaign, and therefore directly targeted existing infrastructure (see MSDS Marine, 2023, Section 4.0). The infrastructure is predominantly ferrous, and of such a size that it impacts magnetic data from some distance away. The effects are potentially noted on magnetometer lines up to 100 m and thus are likely to represent a significant proportion of the identified anomalies.

All anomalies where there is a direct correlation with infrastructure have been removed from the dataset (see MSDS Marine 2023 for further details), however a significant number of remaining anomalies are likely to be infrastructure, or related to infrastructure. As such anomalies falling within 25 m, 50 m, 75 m, and 100 m of pipelines were categorised, and removed, to present the remaining magnetic anomalies in Table 1.17 below. To note, magnetic anomalies correlating with anomalies identified as of archaeological potential were retained and are discussed above and in MSDS Marine 2023 (Section 6.0).

Discussion of potential

Magnetic anomalies >100 nT are typically described as large and have the potential to be of archaeological significance. It should be noted that these anomalies, and any interpretations, are based on a magnetic signature rather than a visible image of the anomaly on the seabed. It is often the case that during intrusive investigations these anomalies are identified as modern marine debris, including cable, chain, modern anchors, fishing gear, and parts of modern vessels such as outboard engines, and other detritus either deliberately or accidentally, put overboard. Where anomalies are largely isolated, or relating to a single feature, the most commonly identified material of archaeological interest are isolated anchors, often of indeterminate age. The difficulties in determining the age of concreted anchors, and the lack of a wider context means these are often classed as of low or medium potential to be of archaeological significance. However, whilst the chances of isolated magnetic anomalies being of archaeological interest is potentially low, this does not reduce the potential of anomalies to be of archaeological significance, and both must be considered during the recommendation of mitigation (see MSDS Marine, 2023, Section 12.0).

As discussed, given the vagaries with positioning, size, and relationship to existing infrastructure, etc. it would not be proportional to assign potential, and therefore mitigation of avoidance, to all large anomalies especially where there is no corresponding seabed feature - the anomalies to which this section pertains. However, to ensure robust, but proportional protection for the historic environment ten large magnetic anomalies have been identified as requiring mitigation through exclusion zones due to their large size, and where they fall within the Area of Physical Project Work or Eni Development Area. The anomalies and their potential are presented in Table 1.17, and displayed in Figure 1.17.

Table 1.17: Magnetic Anomalies Of Archaeological Potential Within The Data Extents

Anomaly ID	Amplitude (nT)	Potential
CCS23_M199	103.7	Medium
CCS23_M206	130.5	Medium
CCS23_M211	152.9	Medium
CCS23_M215	205.5	High
CCS23_M268	237.2	High
CCS23_M220	265.7	High
CCS23_M221	280.1	High
CCS23_M225	361.4	High
CCS23_M235	1037.9	High
CCS23_M237	1064.0	High

Maritime archaeological potential and other known sites

This section contains an overview of coastal and maritime archaeological potential alongside records from the UKHO and other data sources. It is arranged chronologically, beginning with the earliest prehistoric periods and continuing to the modern period, and undated remains.

Preservation Environment and Seabed Features

The physical characteristics of an area can determine the rate of preservation of materials, and thus can affect archaeological potential. The Areas of Maritime Archaeological Potential two – Characterising the Potential for Wrecks (AMAP2) project assessed the environmental factors affecting the preservation of maritime archaeological remains on the seabed (Seazone, 2011). These factors included: sediment type, sediment thickness, water depth, and sediment transport. The project concluded that the best preservation environment was burial in fine-grained sediments. However, it was also concluded that this environment can cause instability in archaeological materials; as even low-energy sediment transport can cause the repeated covering and uncovering of remains by shifting sediment. The APPW and Eni Development Area are characterised by sands and gravels, with gravel content increasing further west within the area. Preservation levels are also documented within the AMAP2 dataset, on a scale of one to 19 with one representing the best preservation environment (Gregory, 2006). Preservation levels therefore vary according to gravel content, and within the site are between one and 14, with the best preservation levels seen at the eastern part of the area, and close to the landfall site. The majority of the area is between five to eight, representing a moderate preservation environment (Figure 1.18).

Other features such as sandbanks also influence potential and can mask features such as shipwrecks. The UKHO record sand waves within the area indicating potential for the masking of features and preservation of features within, and the assessment of geophysical survey data further corroborated that, showing evidence of partially buried wrecks in some locations (see Section 1.5.4.1).

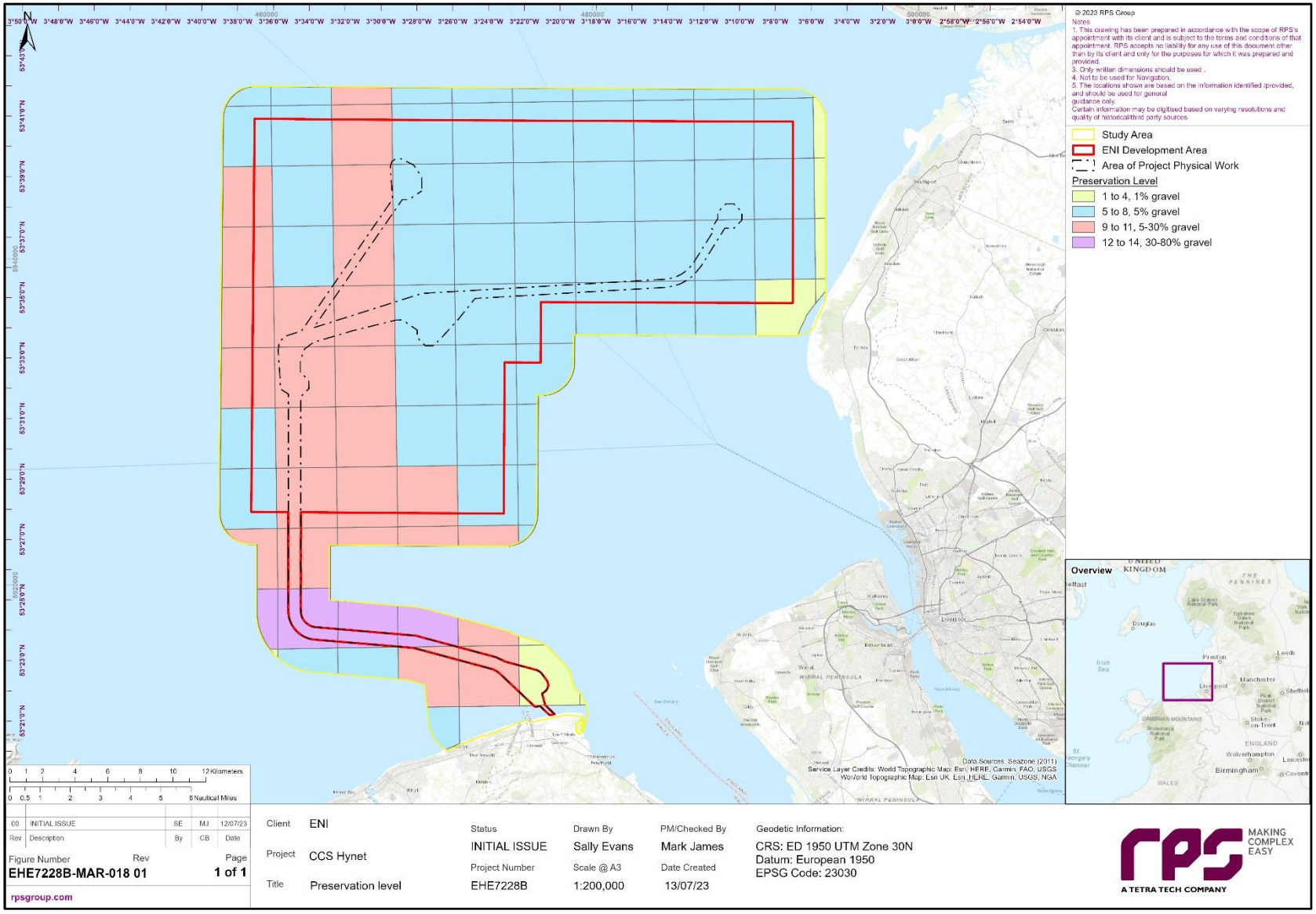


Figure 1.18: Preservation Level

Prehistoric to Romano-British

While trade networks and maritime travel are evidenced throughout prehistory by the movement of ideas, goods and people, faunal assemblages indicate that maritime activities such as fishing were focused in coastal areas during the prehistoric and Roman periods. Evidence also indicates that these activities were relatively restricted following the sharp decrease in marine exploitation which marked the onset of the Neolithic period; a pattern which persisted throughout prehistory (Cramp *et al.,* 2014; Richards *et al.,* 2003).

While there is evidence of trade networks, maritime travel and marine exploitation throughout prehistory (albeit at low levels), direct physical evidence in the form of vessels is extremely rare, though logboats and paddles are known from the Mesolithic period onward (Crumlin-Pedersen and Trakadas, 2000; Johnstone, 1980) and planked vessels were in use from the 1st millennium BC (the Bronze Age). Examples of Bronze Age log boats were recovered during the construction of docks at Preston, c. 25 km to the north-east of the Study Area (Middleton, 1996), though such evidence is rare nationally and no such finds have been made in the Site or Study Area.

Later Roman maritime activity is also attested by trading networks and empire expansion, though physical remains of this maritime activity around the UK coast is primarily through evidence of cargos and distributions of ceramic materials found on the seabed. None are known from the Site or Study Area, though finds from this period off the UK coast are known (e.g. Roman pottery recovered by a fishing vessel working in the Dogger Bank area, and the Pudding Pan wreck, off the north Kent coast (Walsh, 2017; Wessex Archaeology, 2004).

There have been no finds of maritime remains dating to the prehistoric or Romano-British periods within the APPW, Eni Development Area, or wider Study Area. Mesolithic and later footprints (Appendix N: E_377) and a findspot of a Roman brooch (Appendix N: E_361) are recorded from the wider Study Area, the former in the intertidal zone at Formby, and the latter at the mouth of the River Dee, indicating general activity in this period (further supported by the presence of major Roman centres such as at Chester, c. 30 km south-east of the Study Area, and other scattered settlement on the Wirral and North Wales coast (Allen *et al,* 2016), though given the rarity of maritime remains the potential for such remains to occur within the Site is extremely limited.

Early Medieval to Medieval

Maritime technology and activity continued to develop in the early medieval and medieval periods. Invaders, and then settlers from Scandinavia and other areas brought new boat building technologies and opportunities for trade which led to the growth of a number of major ports around the coast of the UK (Hutchinson, 1997; Friel, 2003).

Scandinavian settlers are thought to have been active in the north-west, and may have used river systems such as the Ribble and Mersey for maritime travel (Newman 1996: 95), with historical records indicating Viking attacks on Chester in the 9th century AD (Victoria County History, 2003), and place-name evidence suggesting wider Scandinavian influence in the north-west, for example at Formby and Crosby, the former just within the Study Area. Evidence of settlement and trading sites has been identified on the Wirral (e.g. at Meols, c. 10 km east of the Study Area), and a possible Norse ship, first identified in 1938 and then reinvestigated in 2023, has been identified in the area (University of Nottingham, 2023). The results of radiocarbon dating, and dendrochronology are awaited to confirm the date and origin of the vessel, however, its potential presence and the wider evidence of Scandinavian activity in the area demonstrates the potential for maritime activity in the area during this period.

Major medieval centres were active at Parkgate, Chester and Burton on the River Dee, and during the 13th century Liverpool, which had previously been a fishing village, developed trade routes across the Irish Sea, gradually increasing its dominance through trade, first with Ireland and later with other British colonies. More locally, the remains of the 12th century Prestatyn Caste (NPRN 92922) have been excavated c. 650 m south of the Study Area, indicating medieval activity in the area.

The early medieval and medieval periods were therefore characterised by increasing maritime activity within the area of the Site. However, while activity increased maritime finds from these periods are still rare.

Additionally, no remains dating to these periods are known from within the Site or Study Area, and the potential for any remains of maritime craft or coastal activity dating to these periods is considered to be limited.

Post medieval to modern

The recording of maritime history became common practice by the post medieval period, and as such our knowledge of maritime activity is much stronger than in earlier periods.

Maritime activity increased during the post medieval period, led by local trading ports such as Liverpool, which by the 17th century had seen vast expansion and was trading with British colonies around the world. Research into post-medieval ports and sailing routes between the mid 16th and 20th centuries (Alvarez-Palau and Dunn, 2019) demonstrates that the Study Area may have been crossed by a number of historic sailing routes. These former seaways were reconstructed based on bathymetry, historic navigation charts and pilots, in particular Great Britain's Coasting Pilot, first published in 1693, and parliamentary reports (Alvarez-Palau and Dunn, 2019). While the resultant dataset makes a number of assumptions in the reconstruction of routes, and is unlikely to be completely accurate, it gives an indication of likely shipping activity during the post medieval period. This is further supported by the HSC data which shows modern and historic (post-medieval) navigation routes crossing the Eni Development Area and APPW (Figure 1.19).

The increase in shipping activity was mirrored by the installation of structures to aid navigation. Within the Study Area the Grade II Listed Point of Ayr Lighthouse (Appendix N: E_003) is thought to have been constructed in c. 1776, and was one of the earliest such lights in Wales, marking the entrance to the Dee estuary 1 km west of the landfall site. Other structures are also associated with the lighthouse, including a lifeboat house, lifeboat station, lighthouse cottages and slipway (Appendix N: E_364-368). Later 19th century aids to navigation are also recorded in the area including records of navigational markers shown on 19th century charts of the region, which demonstrate a host of marker buoys used to aid the safe transit of vessels through the area (Appendix N: E_307-312). There is potential for remains of navigational aids and coastal navigation features within the site.

The last 200 years have seen a further boost in maritime activity. The advent of the steam engine, and the use of iron and steel in shipbuilding meant that ships were able to transport more cargo, travel faster and further, and do so more safely than wooden built ships. Although the steam and steel came to dominate shipping during the 19th century, there remained a strong local core of UK maritime activity which continued to use the more traditional, often wooden vessel types.

The transport of people for recreational purposes, the economic reliance on sea-trade, and the two World Wars increased the maritime traffic. During the wars Liverpool gained strategic importance, forming the focus for shipping and convoys using the Western Approaches. During the course of WWII over 1,000 convoys came into the Mersey (Liverpool War Museum, n.d.). Associated bombing raids were also felt in the area, and high numbers of shipping losses were suffered during the wars. Wartime losses, and others from the post-medieval and modern periods, are well represented within the known and potential wrecks recorded within the Study Area. Wrecks are discussed further below. In addition to the wrecks, evidence of wartime activity also survives onshore, within the Study Area, in particular represented by coastal defence features such as pillboxes (MSDS_E_369-374), the closest of which lies within c. 150 m of the landfall site. Anti-glider poles, 1.2 km from the landfall site, (MSDS_E_375) also demonstrate the wartime heritage of the area, and may be associated with an area of anti-personnel mines (Coflein, n.d., a record 544351). Many of the wartime features are associated with Talacre Warren, an area used for training Spitfire pilots, and also used as a registered camp during WWII, used for evacuees (History Points, n.d.). The Spitfire training camp is discussed further below (Section 1.5.5). There is potential for evidence of coastal wartime defences and other associated features within the site, in particular focused around the intertidal zone and nearshore area.

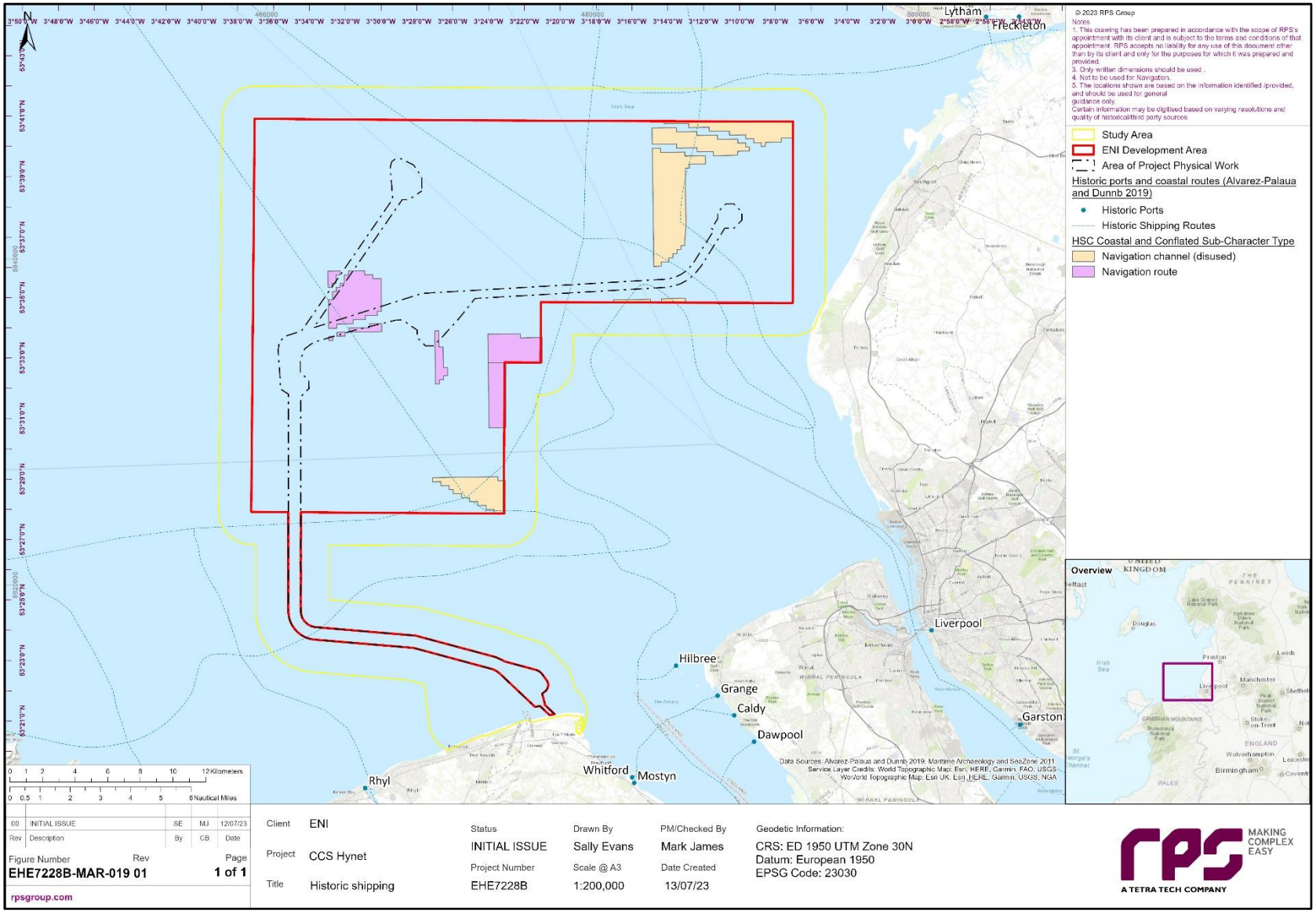


Figure 1.19: Historic Shipping Routes

Documented losses of thirty vessels are reported within the Study Area (Table 1.18). These are primarily records relating to the loss of 18th, 19th and 20th century vessels at NLOs, with those from the 19th century dominating the dataset. Further details on the documented losses can be found in Appendix N: E_317-346. These are reported at a variety of NLOs including West Hoyle Bank and Welch Channel (Appendix N: E316, E347, E348). These records are not expected to be associated with wrecks at the given locations, and the positions can be considered arbitrary, though they provide a general indication of potential across the wider area. In addition, two wrecks are reported in the UKHO wrecks database as sunk at particular locations, though seabed remains have not been found following surveys. The positions are considered dead, and the records are akin to the documented losses described above. This is the case for the wrecks of the *Magnum* and *My Mink*, both 20th century craft (Appendix N: _E314 and 315 respectively).

Table 1.18: Summary Of Documented Losses Within The Area Of Project Physical Work, Eni Development Area And Study Area By Loss Date

Period	Wreck (NLO)
18th century	1
19th century	21
20th century	7
Undated	1
Grand Total	**30**

19th and 20th century wrecks and other undated remains

In addition to the documented losses which give a general indication of potential, wreck sites and debris have been identified within the APPW, Eni Development Area and Study Area. The majority are undated, though some have been ascribed identities and associated dates. While in some cases these identities may be accurate, without in depth surveys and formal identification (typically from divers or ROV survey), the dates cannot be verified. Therefore potential 19th and 20th century wrecks and other undated remains are discussed here together. While dates and origins are largely unknown the wrecks are likely to reflect the history of maritime activity in the area, with increasing potential that the remains represent post-medieval and modern vessels. Wrecks are shown on Figure 1.20 to Figure 1.24, and other maritime remains on Figure 1.25 to Figure 1.28. Documented losses and geological features are excluded.

The remains which fall within the APPW and Eni Development Area are listed below by area, and further details can be found in Appendix N, along with details of those which lie within the Study Area. Identifiers which correlate to those within Appendix N are listed first, followed by details of the remains. Debris and possible debris within the geophysical survey extents (MSDS_E_95 – 178) have been discussed above, as have likely geological contacts (MSDS_E_404-420). The UKHO also record additional geological contacts (likely rocks and sand waves) (MSDS_E_388-403). They are not discussed further below.

Area of project physical work: wrecks and possible wrecks

- **MSDS_E_013:** Wreck, thought to be the *Lugar*. The wreck is intact and upright, with the bow to the west, and boiler prominent. Bow damage is evident. The wreck lies within the APPW but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8263).
- **MSDS_E_070:** Possible wreck-like structure or other man-made object, possibly partly buried. The possible wreck lies within the APPW and within the area of the geophysical data coverage, though nothing could be seen at this location in the latter and the record primarily relates to the UKHO details. The possible wreck is a live UKHO record (UKHO identifier 92433).

- **MSDS_E_071:** Possible wreck-like structure or other man-made object. The possible wreck lies within the APPW and within the area of the geophysical data coverage, though nothing could be seen at this location in the latter and the record primarily relates to the UKHO details. The possible wreck is a live UKHO record (UKHO identifier 92429).

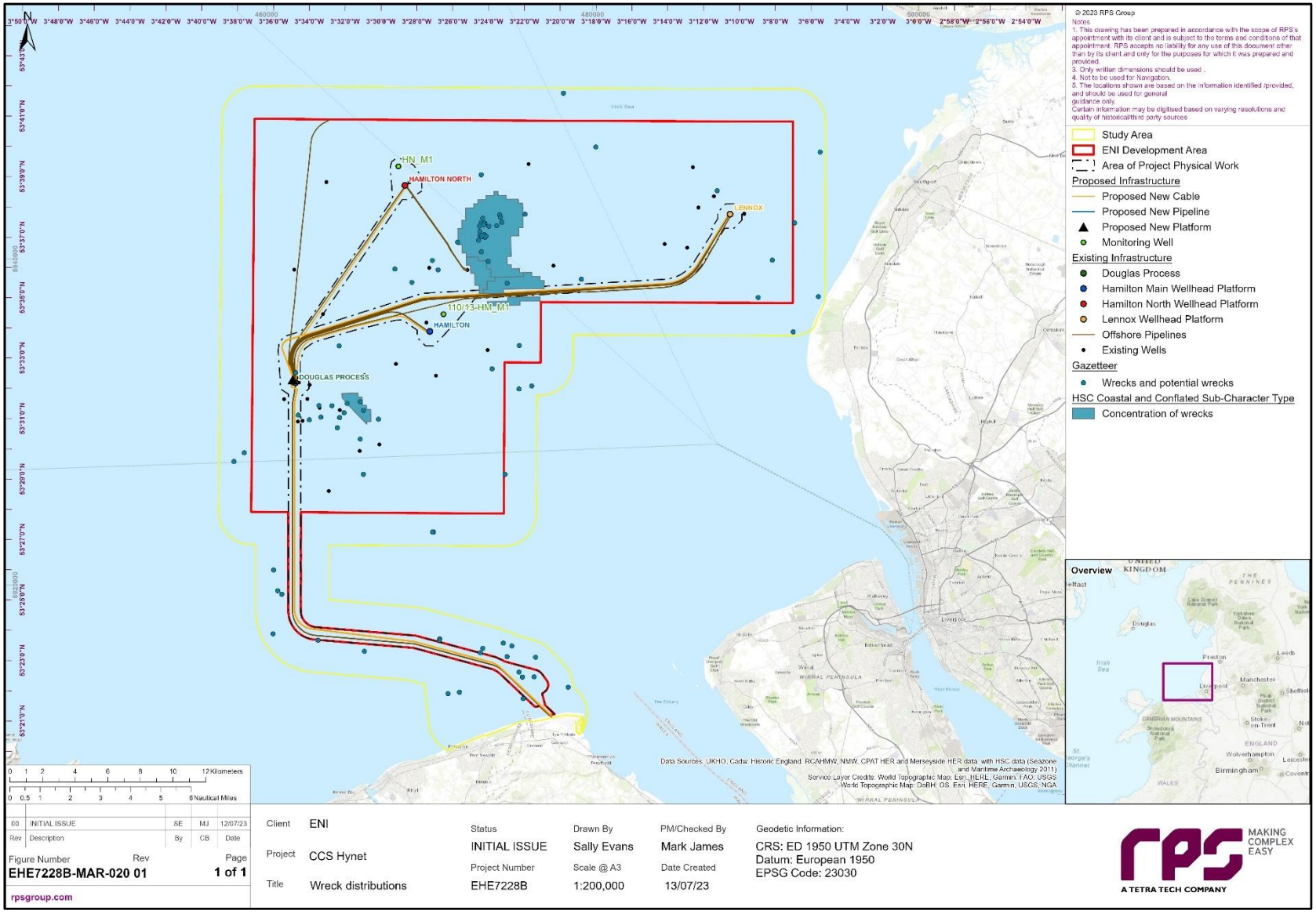


Figure 1.20: Distribution Of Wrecks, Possible Wrecks And Wreckage Within The Site And Study Area

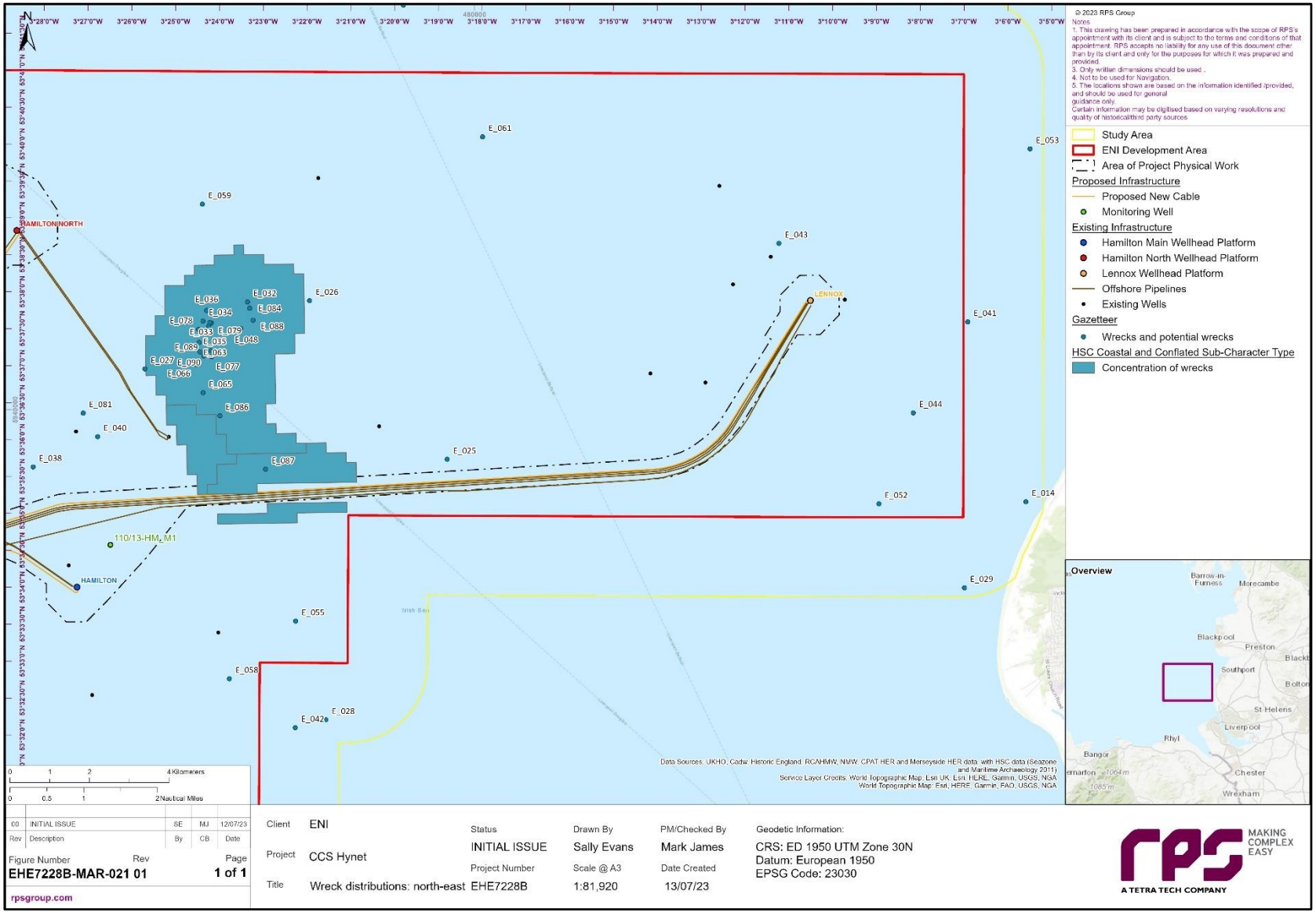


Figure 1.21: Distribution Of Wrecks, Possible Wrecks And Wreckage Within The North-eastern Part Of The Site And Study Area

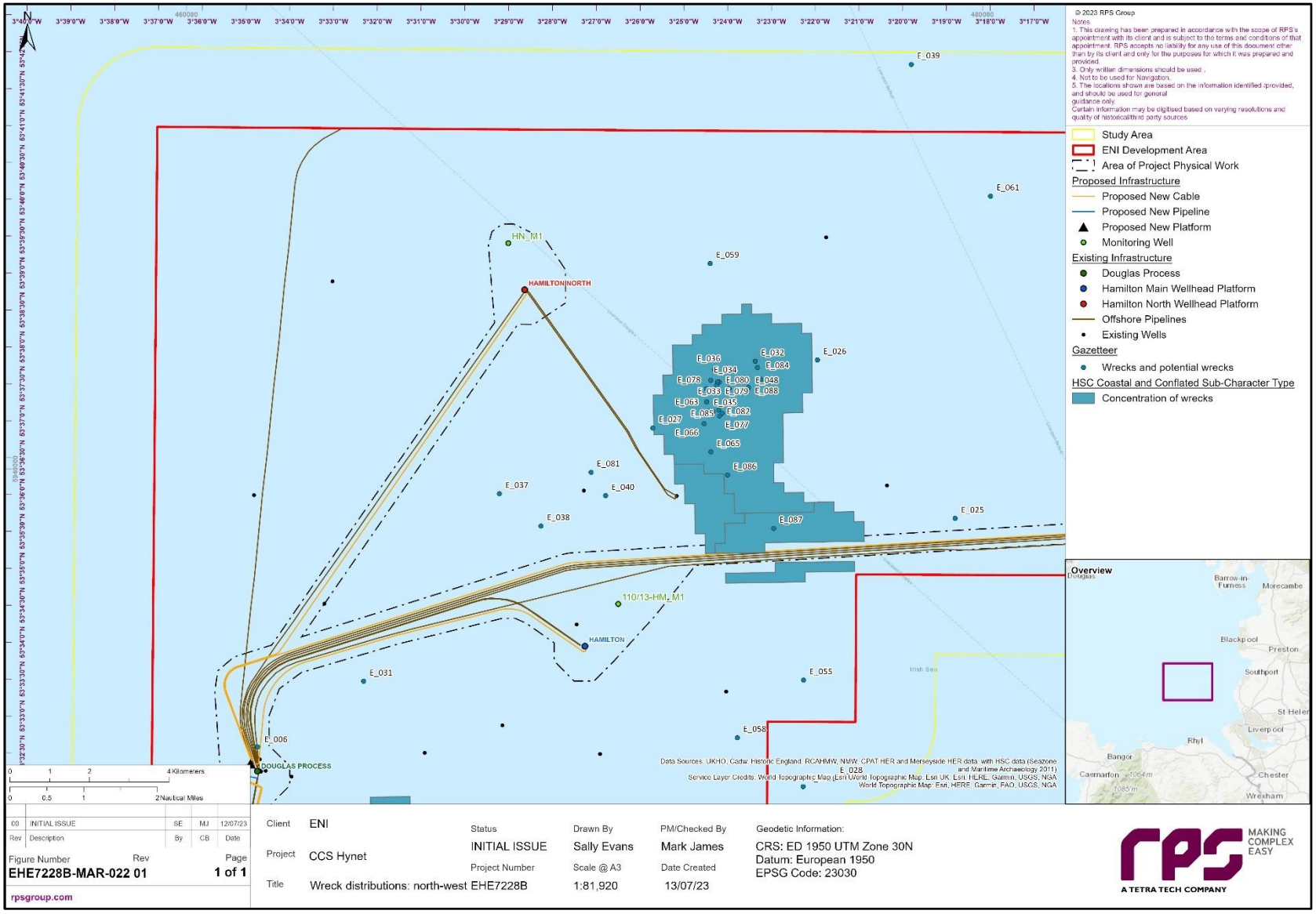


Figure 1.22: Distribution Of Wrecks, Possible Wrecks And Wreckage Within The North-western Part Of The Site And Study Area

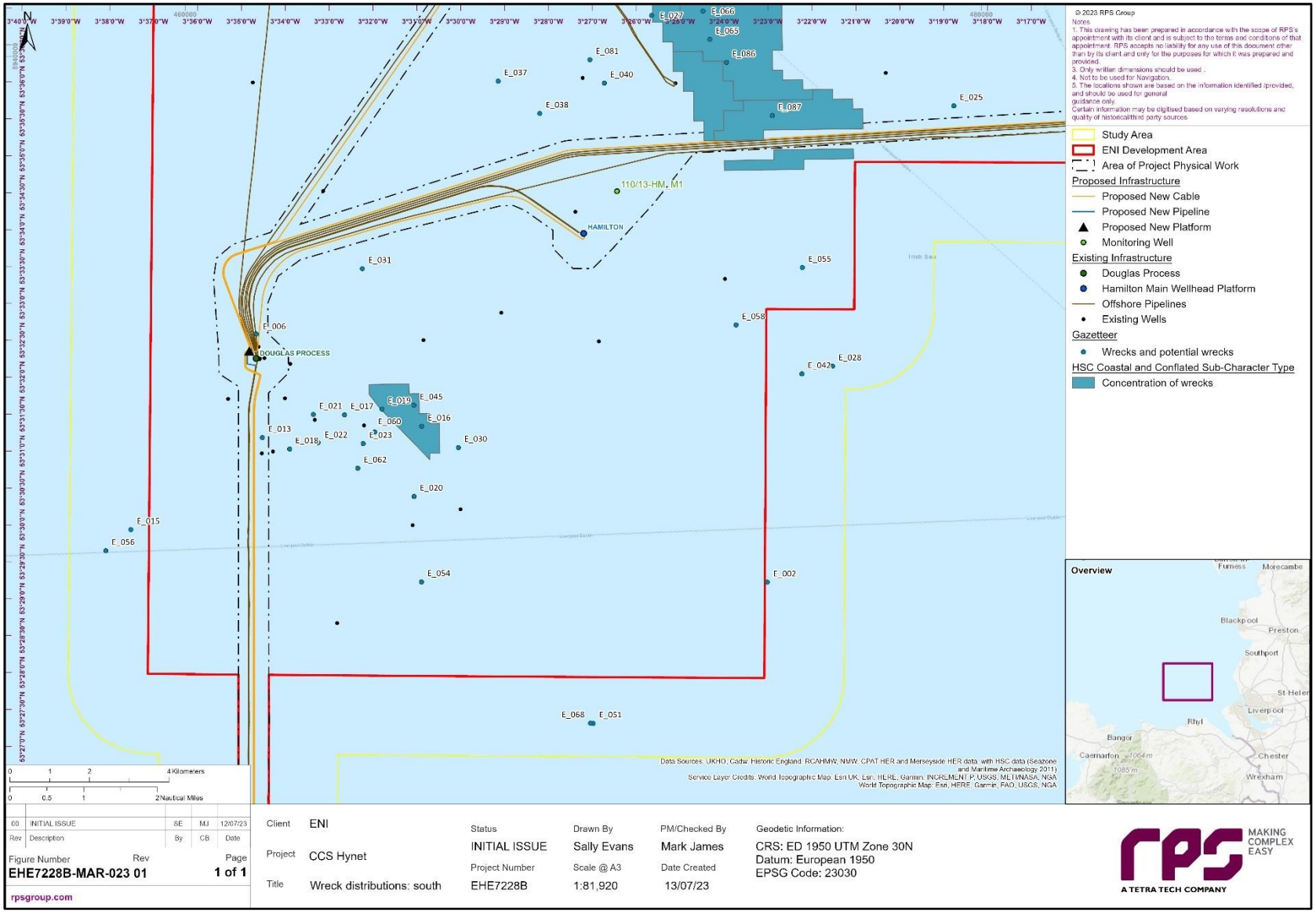


Figure 1.23: Distribution Of Wrecks, Possible Wrecks And Wreckage Within The Southern Part Of The Site And Study Area

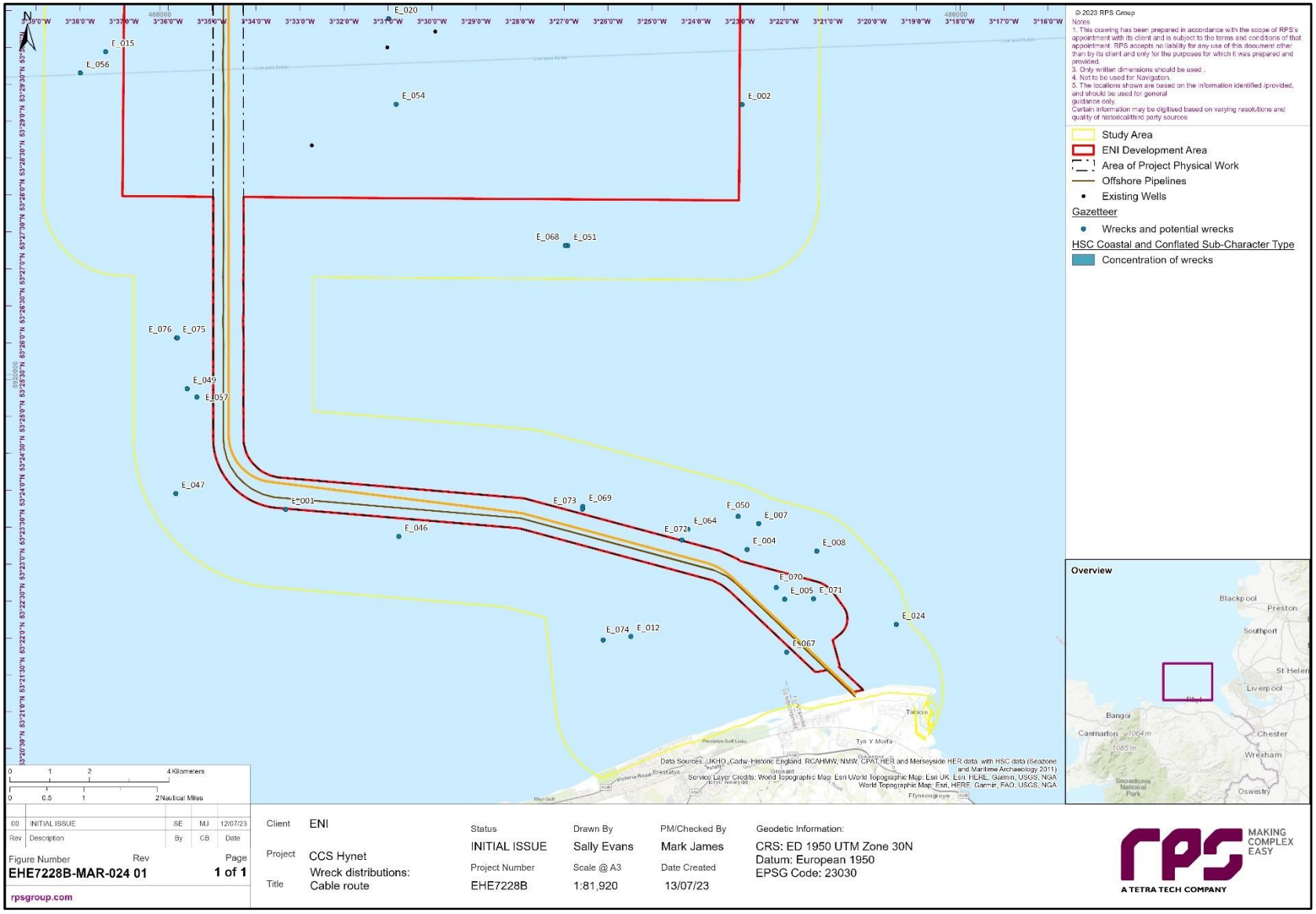


Figure 1.24: Distribution Of Wrecks, Possible Wrecks And Wreckage Within The Cable Route And Study Area

APPW : Debris and possible debris

Contacts MSDS_E_95-97, 99-100, 103-118, 120-126, 128-131, 134-158, 161-163, 165-166, 168, 171-172, 174-177 include a range of debris, potential debris, chain, cable rope, linear features and fishing gear. The majority are low potential geophysical anomalies, with the exception of MSDS_E_95 – 97, which are medium potential anomalies, and all are discussed above (Section 0).

In addition to the contacts noted within the archaeological assessment of geophysical survey data other data sources have recorded the following:

- **MSDS_E_199- 200:** Mattresses. Modern instalments associated with seabed infrastructure, recorded by the UHKO.
- **MSDS_E_217, 218, 221- 223, 226, 228 – 230**: Unidentified seabed obstructions reported by the NHRE as fisherman's fastenings.

In addition, records of Bronze Age material and peat cuttings (MSDS_E_382-383) also fall within the APPW However, review of the record details indicates that the positions have been inputted in error and these sites lie inland. They are mentioned here for completeness only, and no related remains are expected within the Site.

Eni development area: wrecks and possible wrecks

Within the Eni Development Area there are large number of further wrecks and possible wrecks, primarily recorded by the UHKO, and reflected in the national Welsh and English archaeological datasets (NHRE and RCAHMW). The wrecks represent concentrations in some areas, and these areas have been mapped by the National HSC data, noted for their concentrations of wreck sites (Figure 1.20). The details of the wrecks within the Eni Development Area are as follows:

- **MSDS_E_016:** Wreck, thought to be the *Alarm*. Intact. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7823).
- **MSDS_E_017:** Wreck, in two distinct parts. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8230).
- **MSDS_E_018:** Wreck. Intact and upright. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8264).
- **MSDS_E_019:** Wreck, intact. Unnamed concrete barge. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8177).
- **MSDS_E_020:** Wreck. Probably in two parts. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7737).
- **MSDS_E_021:** Wreck. Intact and upright. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8231).
- **MSDS_E_022:** Wreck, thought to be the 20th century *Cairnross*. Broken up. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7779).

- **MSDS_E_023:** Wreck. In two parts, with debris in between. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8321).
- **MSDS_E_025:** Wreck, thought to be the 19th century vessel, the *Speke* (possibly). Lying on its port side. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7961).
- **MSDS_E_026:** Wreck thought to be the 20th century *Counsellor III*, represented by an area of debris, with no distinct wreck remains. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7995).
- **MSDS_E_027:** Wreck thought to be the 20th century *Ystroom* (probable identification), represented by a broken area of wreckage. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7976).
- **MSDS_E_030:** Wreck, upright and intact. Diver surveys indicate there is a hole in the bow. Other features include a large winch and vertical steam boiler. The wreck has been interpreted as a light vessel/buoy servicing vessel (possibly). The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7811).
- **MSDS_E_031:** Wreck, thought to be the 19th century *City of Brussels*. The wreck is collapsed. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7938).
- **MSDS_E_032:** Wreck, well broken up and buried. The wreck has been swept clear, and the remains may now be covered in nets. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8185).
- **MSDS_E_033:** Wreck, lies with two parts broken off. The highest point is to the north. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8190).
- **MSDS_E_034:** Wreck. Well buried and probably intact. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8188).
- **MSDS_E_035:** Wreck, with remains distributed, representing a minor area of wreckage. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8354).
- **MSDS_E_036:** Wreck. Small and broken, collapsed and with the north end buried. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8189).
- **MSDS_E_037:** Wreck. Inverted, and with bows to the south-east. Thought to represent the remains of the 20th century *Stanleigh* (identified by divers and position recorded by geophysical survey). The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7963).
- **MSDS_E_038:** Wreck. Damaged along one third of its length. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8184).

- **MSDS_E_040:** Wreck interpreted as the remains of the 20th century *Muster*. Surveying details indicate the wreck is well broken and dispersed to seabed. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7962).
- **MSDS_E_043:** Wreck, thought to be the remains of the 19th century *Coniston* (probably). Dived on and found to be intact and upright, well buried, and within an iron hull and wooden deck. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7998).
- **MSDS_E_044:** Wreck. Remains of a wooden sailing vessel. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 58952).
- **MSDS_E_045:** Wreck. Remains of a concrete barge. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8178).
- **MSDS_E_048:** Wreck, thought to be the remains of *El Oso*, mined en route for Ellsmere. The wreck is well broken up and collapsed into own scour, it may have been dispersed in 1982, though this is not confirmed. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7985).
- **MSDS_E_052:** Wreck thought to be the 19th century *Nazarine*. Wreck dived and found to include large wooden components including deadeyes and rigging etc. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7957).
- **MSDS_E_054:** Wreck. Described as five dark reflectors in a linear orientation suggesting a buried wreck. The anomaly measures 18.5 m length x 2.7m width and has a height of 0.4 m. Identified by surveys ahead of aggregate extraction and protected by the aggregates company by a 50 m development exclusion zone. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the Hilbre Swash Aggregates Archaeological Assessment (Wessex Archaeology, 2011) and is not recorded by the UKHO, though the RCAHMW record the wreck (RCAHMW identifier 515165).
- **MSDS_E_055:** Wreck originally reported in 1941. Not shown on kingfisher charts dated to 1975, and the record has since been amended to dead. It is likely that the position is inaccurate and there is no indication of any remains being identified at this location. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a dead UKHO record, with the presence of remains therefore unverified (UKHO identifier 7939).
- **MSDS_E_058:** Wreck, thought to be the remains of the Letty. The vessel is in two parts, broken midships, and with bows on port side. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 7926).
- **MSDS_E_059:** Probable wreck, strong magnetic anomaly. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8361).
- **MSDS_E_060:** Probable wreckage, in one distinct piece and associated with a small magnetic anomaly. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8323).

- **MSDS_E_061:** Possible wreck of a sailing vessel, characterised by a heap of cargo or ballast, with few iron fittings on top. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 57191).
- **MSDS_E_062:** Wreck. Possibly part of the light vessel *Alarm*. The wreck lies within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details for the wreck and the wreck is a live UKHO record (UKHO identifier 8320).
- **MSDS_E_063:** Wreck or area of debris with a magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 7981).
- **MSDS_E_065:** Wreck or navigation beacon (dumped). The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8194).
- **MSDS_E_066:** Possible wreck. Previously interpreted as a possible navigation beacon, however, the most recent survey indicates a wreck. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8193).
- **MSDS_E_077:** Possible wreck or wreckage in two pieces, with no magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8349).
- **MSDS_E_078:** Broken and indistinguishable wreckage with small magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8191).
- **MSDS_E_079:** Probable piece of wreckage associated with small magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8357).
- **MSDS_E_080:** Single piece of wreckage. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8358).
- **MSDS_E_081:** Small area of wreckage. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8187).
- **MSDS_E_082:** Area of wreckage. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8355).
- **MSDS_E_083:** Small piece of wreckage, thought to possibly be associated with the wreck of the *El Oso*. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8234).
- **MSDS_E_084:** Circular area of wreckage. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8235).
- **MSDS_E_085:** Small area of wreckage. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8351).

- **MSDS_E_086:** Probable small area of wreckage, associated with a small magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8232).
- **MSDS_E_087:** Wreckage, associated with a small magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8343).
- **MSDS_E_088:** Area of broken wreckage close to a charted wreck. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8233).
- **MSDS_E_089:** Piece of wreckage, magnetic anomaly not reported. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8350).
- **MSDS_E_090:** Small piece of wreckage associated with small magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8353).
- **MSDS_E_091:** Interpreted as the dispersed remains of a wreck, surveying details indicate the presence of masonry and a small magnetic anomaly. The remains lie within the Eni Development Area but outside of the geophysical data coverage. The record primarily relates to the UKHO details, and the remains form a live UKHO record (UKHO identifier 8348).

Eni development area: debris and possible debris

In addition to the aforementioned wrecks, other seabed remains including debris, possible debris and obstructions are reported within the Eni Development Area.

- **MSDS_E_093-094, 098 and 160:** Debris and potential debris, reported by the UKHO or within the archaeological assessment of geophysical survey data.
- **MSDS_E_216, 219, 220, 224-225, 227, 231- 253, 255-261, 263-301, 305**: Unidentified seabed obstructions reported by the NHRE or UKHO as fisherman's fastenings.
- **MSDS_E_179-180:** Remains of tower bases. They are thought to be the remains of anti-aircraft forts dumped after WWII, reported by the UKHO. Both are live UKHO records.
- **MSDS_E_183, 184, 186:** Non submarine contacts noted as obstructions. The origins of all are uncertain but MSDS_E_186 extends from six cables in north-west direction indicating a possible link with infrastructure though this is unconfirmed. All are considered live by the UKHO.
- **MSDS_E_187:** Obstruction: A submerged object struck by a vessel in 1920. Later searches found nothing in this location and record has been amended by the UKHO to dead. Due to the date of the original record it is likely the position was in error.
- **MSDS_E_188:** Obstruction reported by the UKHO. No further details are given and the obstruction is considered live by the UKHO.
- **MSDS_E_207, 212, 213:** Geophysical anomalies identified as debris and possible debris by the Hilbre Swash Aggregates Archaeological Assessment (Wessex Archaeology, 2011).
- Other features including foul ground (MSDS_E_194- 195), spoil ground (MSDS_E_313) anchors and cable/chain (MSDS_E_196-197), Obstructions reported as collapsed platforms or oil rig legs, reported by the UKHO or NHRE (MSDS_E_191, 201 – 203) and disused navigation beacons and associated debris (MSDS_E_204- 206) are also reported within the Eni Development Area, as are geophysical anomalies with unknown origins (MSDS_E_211, E214, 215) reported by the Hilbre Swash Aggregates Archaeological Assessment (Wessex Archaeology, 2011).

As with the APPW there are also a number of records relating to geological features (MSDS_E_389, 393, 395-396, 398-403, 420); 'Test records' which do not relate to seabed remains (MSDS_E_384-387); and remains from a terrestrial site some way from the coast which has been given an incorrect position and therefore appears offshore (MSDS_E_381). None of these records indicate seabed remains and they will therefore not be discussed further.

Remains within the study area

Other remains within the Study Area, which lie beyond the Eni Development Area and APPW, follow a similar pattern to those within the Eni Development Area and APPW. Wrecks, debris, obstructions, fisherman's fasteners and other similar remains are noted. All are detailed within Appendix N.

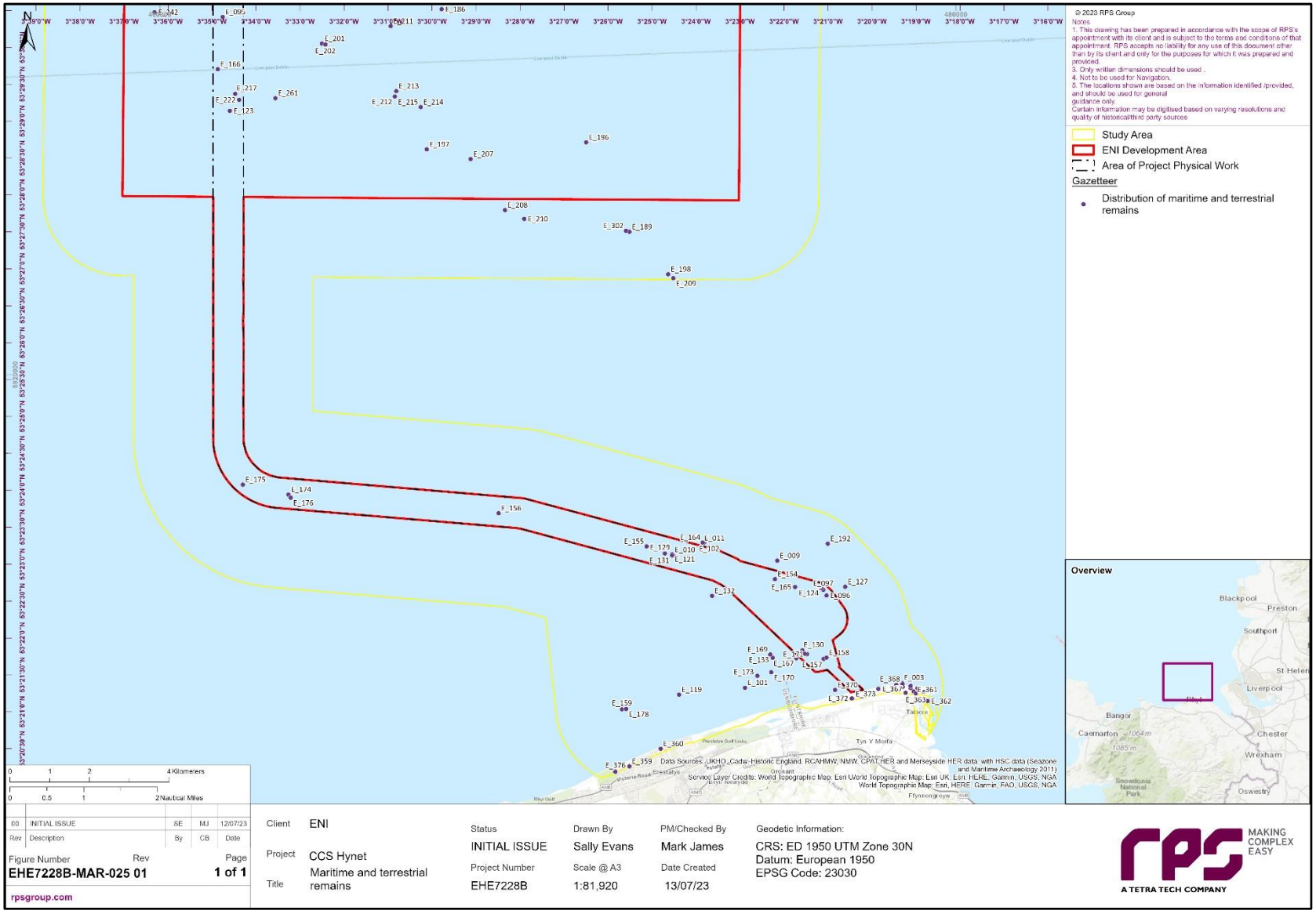


Figure 1.25: Maritime And Terrestrial Remains Along The Cable Route And Study Area

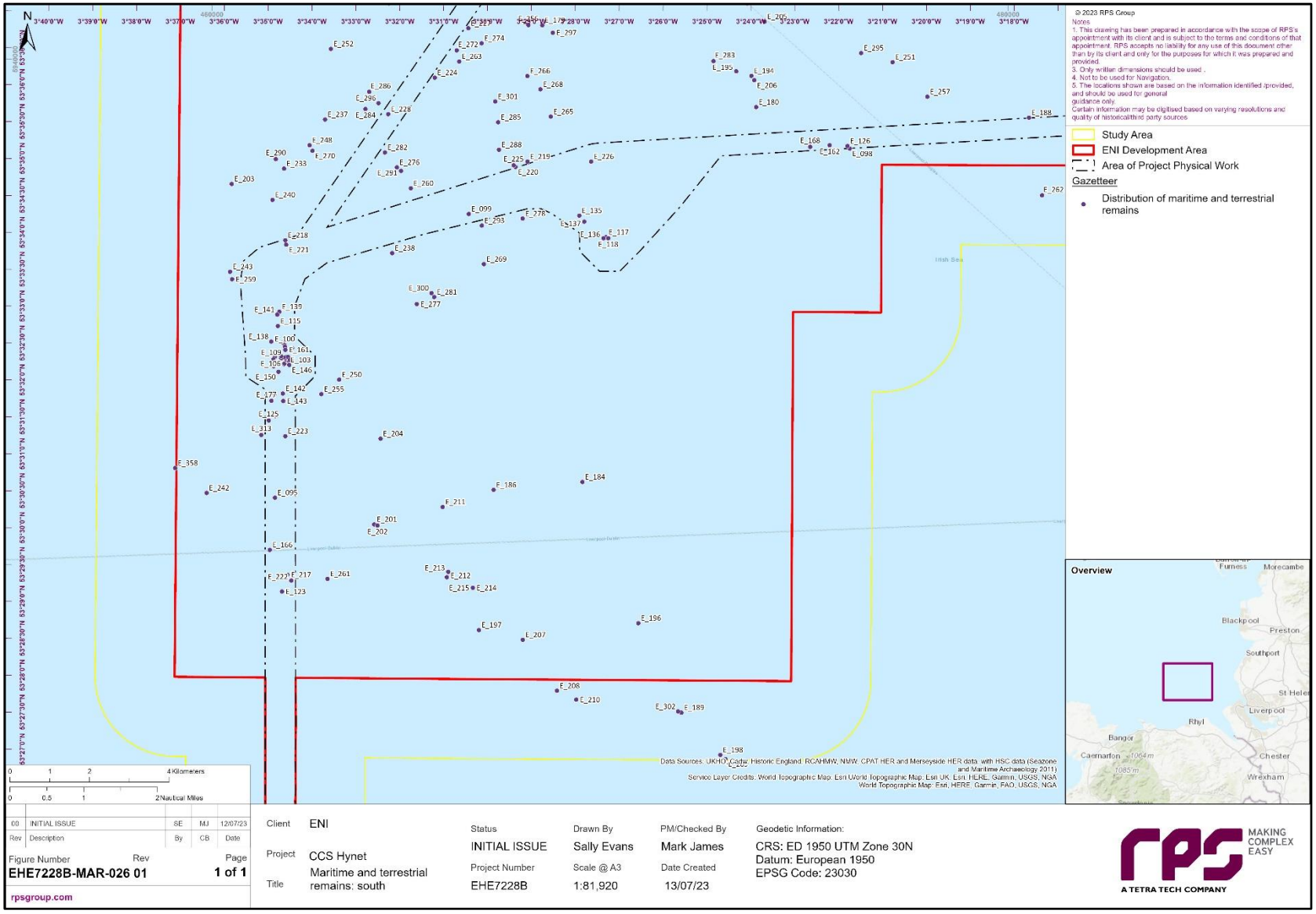


Figure 1.26: Maritime And Terrestrial Remains Within The Southern Part Of The Site And Study Area

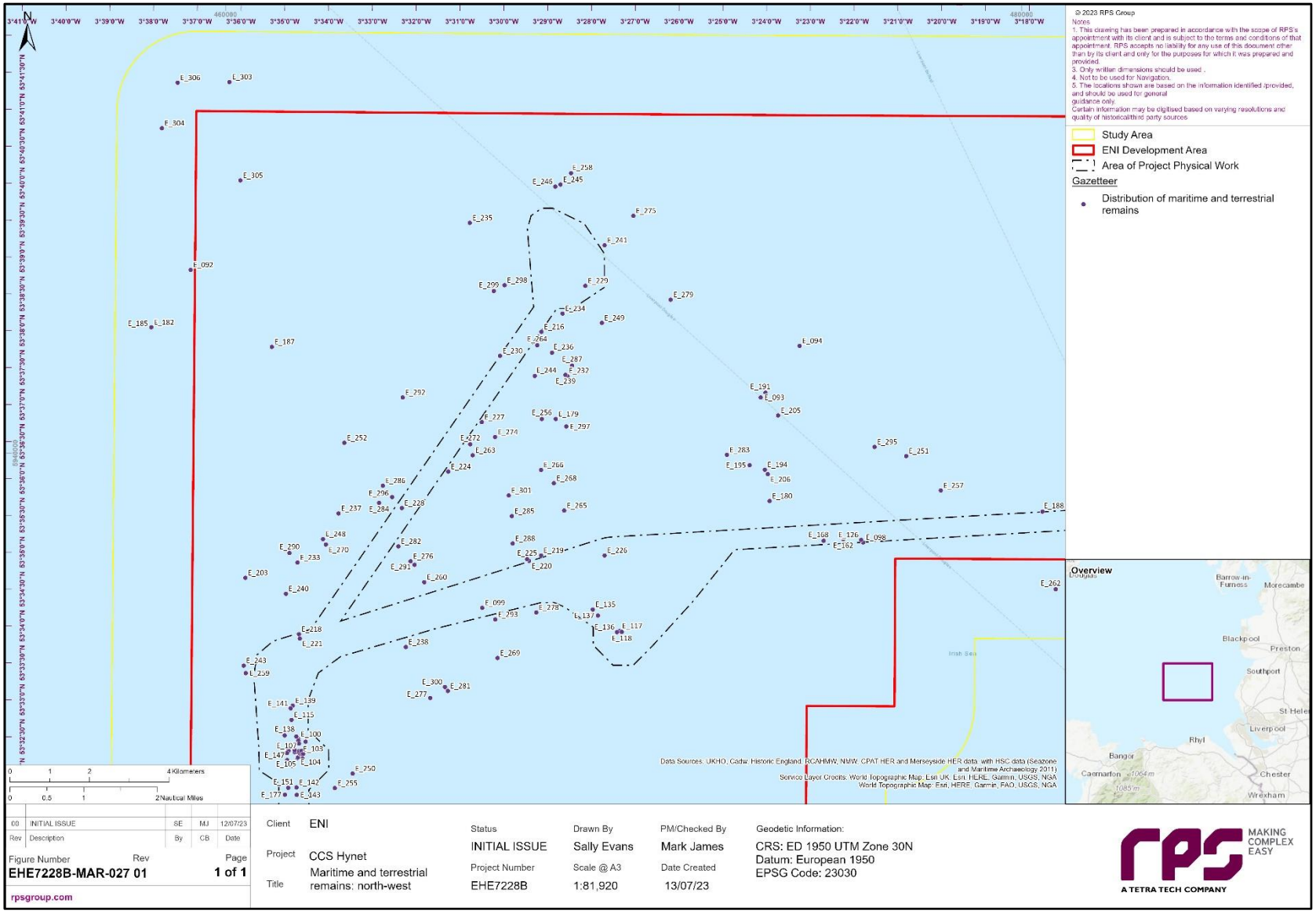


Figure 1.27: Maritime And Terrestrial Remains Within The North-western Part Of The Site And Study Area

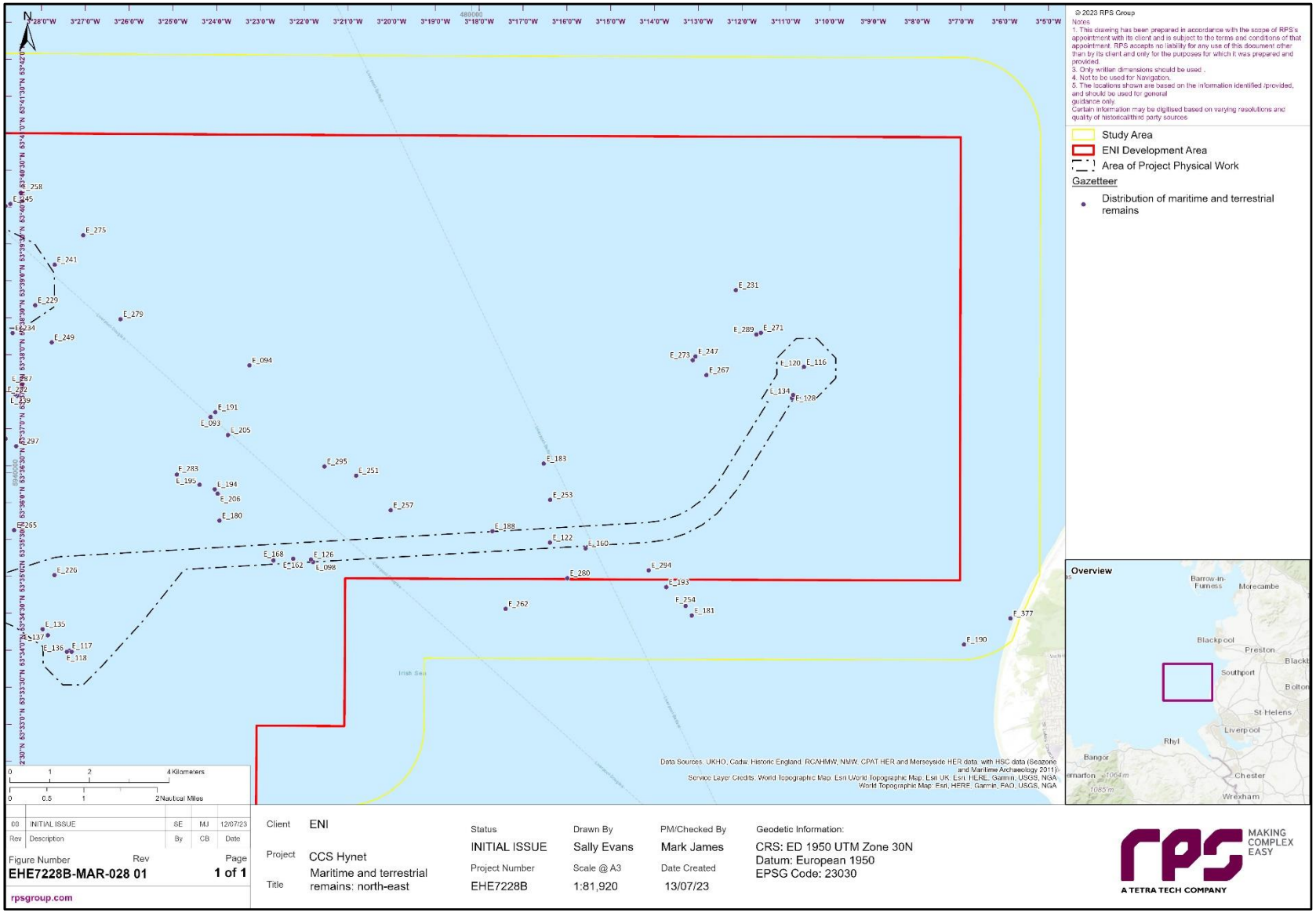


Figure 1.28: Maritime And Terrestrial Remains Within The North-eastern Part Of The Site And Study Area

1.5.5 Aviation remains

Aviation technology has been available since the early 20th century, though air travel became more prevalent after World War I. During the inter-war years commercial air travel boomed, and during World War II the skies were dominated by military aircraft. After the war, commercial aviation steadily increased and improved; in 1950, UK airports ran 195,000 flights and in 2018 they ran 2,215,000 flights (UK Government, 2018). The remains of thousands of aircraft casualties - both civil and military- are present in UK waters (Wessex Archaeology, 2008).

1.5.5.1 Aviation archaeological remains and potential

There are no known aviation remains within the APPW, Eni Development Area or Study Area. However, a number of aircraft have been reportedly lost within the area, their positions reported by the RCAHMW, CPAT, and the NMW as NLOs within the Study Area and Eni Development Area. These include:

- **MSDS_E_349:** Armstrong Whitworth Whitley V P5057, lost in 1942;
- **MSDS_E_350:** De Havilland Queen Bee V4794, shot down in 1941;
- **MSDS_E_351:** Supermarine Spitfire I K9994, lost in 1941;
- **MSDS_E_352:** Supermarine Spitfire I X4173, lost in 1944;
- **MSDS_E_353:** Supermarine Spitfire II a P7692, lost in 1943 following a crash into Prestatyn beach;
- **MSDS_E_354:** Supermarine Spitfire V P7692 lost in 1943 during training at Talacre Warren;
- **MSDS_E_355:** Avro Anson I N5050;
- **MSDS_E_356:** Miles Martinet I JN294; and
- **MSDS_E_357:** North American P-51 Mustang I AP216.

The records represent wartime losses, associated with the Second World War. While indicative of general aviation activity, the records relate to documented losses and do not indicate the presence of seabed remains at the recorded locations. However, there is a general potential for remains to occur within the APPW and Eni Development Area. In some cases, aircraft can be automatically designated under the Protection of Military Remains Act, thus identifying sites is of importance.

The potential for aircraft to occur within the Site is further demonstrated by the proximity to Talacre Warren (which lies 1.5 km to the east of the landfall site), a WWII Spitfire training camp, with nearby anti-invasion poles and a minefield (Coflein, n.d, b.: Record 544352). The use of Talacre Warren as a training camp for new pilots indicates heightens potential for remains of aircraft crash sites, particularly focused around the coast. This is borne out by the documented losses described above, many of which are for Spitfires using the training ground.

Aircraft casualties rarely result in articulated aircraft remains on the seabed. Due to the traumatic nature of an aircraft crashing into the sea, the remains of an aircraft are usually scattered on the seabed (Wessex Archaeology, 2008). Additionally, aircraft, particularly military aircraft, are typically small and built of light materials; crashed remains may travel on the sea surface before sinking and settling on the seabed. Therefore, it is rare for remains to be identified articulated and *in situ*.

While wartime and later aviation activity is known within the area, and documented losses are recorded in the area, there are no confirmed aviation remains within the APPW, Eni Development Area or Study Area. Additionally, the nature of aircraft crash sites leads to the majority representing disarticulated remains. The general background of aviation activity in the area, and the documented losses, indicates a general level of potential for aircraft remains to occur within APPW and Eni Development Area. However, any such remains may be disarticulated.

1.5.6 Historic seascape character

The HSC of the Study Area was assessed using the Historic Seascape Characterisation data, provided by Historic England. The current and past sub character types within the APPW and Eni Development Area are summarised in Table 1.19. Figure 1.29 to Figure 1.33 display the distribution of character types within the APPW and Eni Development Area.

Table 1.19: Historic Seascape Character (HSC) Data Within The Area Of Project Physical Work And Eni Development Area

Character Area	Character type within Area of Project Physical Work and Eni Development Area	Date	Figure
Coastal and Conflated	Hydrocarbon Field Hydrocarbon pipeline Aggregate dredging Submarine telecommunications cable Maritime debris Shellfish dredging Bottom trawling Potting Fishing ground Navigation route Navigation route (disused) Spoil and waste dumping Wreck hazard Shoals and flats Fine sediment plains	Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Post Medieval (AD1540 – 1750) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Early Modern (AD 1750 – 1900) Unknown	Figure 1.29
Sea Surface and Water Column	Bottom trawling Potting Shellfish dredging Fishing ground Hazardous water Hydrocarbon fields Navigation channel (disused) Navigation route Wreck hazard Shoals and flats	Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Unknown Modern (AD 1900 – Present) Post Medieval (AD1540 – 1750) Modern (AD 1900 – Present) Unknown Early Modern (AD1750 – 1900)	Figure 1.30

Character Area	Character type within Area of Project Physical Work and Eni Development Area	Date	Figure
Water Column	Bottom trawling Potting Shellfish dredging Fishing ground Hazardous water Hydrocarbon fields Navigation channel (disused) Navigation route Wreck hazard Shoals and flats	Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Unknown Modern (AD 1900 – Present) Post Medieval (AD 1540 – 1750) Modern (AD 1900 – Present) Unknown Early Modern (AD 1750 – 1900)	Figure 1.31
Sea Floor	Hydrocarbon Field Hydrocarbon pipeline Aggregate dredging Submarine telecommunications cable Maritime debris Shellfish dredging Bottom trawling Potting Fishing ground Navigation route (disused) Spoil and waste dumping Wreck hazard Shoals and flats Fine sediment plains	Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Post Medieval (AD 1540 – 1750) Modern (AD 1900 – Present) Unknown Early Modern (AD 1750 – 1900) Unknown	Figure 1.32
Sub-sea Floor	Hydrocarbon Field Hydrocarbon pipeline Aggregate dredging Submarine telecommunications cable Navigation route (disused) Spoil and waste dumping Shoals and flats Fine sediment plains	Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Modern (AD 1900 – Present) Post Medieval (AD 1540 – 1750) Modern (AD 1900 – Present)	Figure 1.33

Character Area	Character type within Area of Project Physical Work and Eni Development Area	Date	Figure
		Early Modern (AD 1750 – 1900) Unknown	
Previous (Sub types)	Drying Hazard	Early Modern (AD 1750 – 1900)	

The sub-character types are varied, and can be broken down into the following categories:

- modern installations and activities such as hydrocarbon wells, pipelines, submarine cables, aggregate extraction, spoil and waste dumping;
- a range of fishing methods used in the modern period;
- navigation routes, both modern and post medieval;
- wrecks and maritime debris (in some cases undated); and
- seabed types and characteristics including shoals and flats and fine sediment plains.

The HSC therefore reflects the general patterns seen within the desk-based datasets discussed above, which record potential for evidence of modern industry and seabed development, data derived from fishermen indicating fishing activity in the area, evidence of navigation routes passing through the area from the post-medieval period (and possibly earlier), wrecks and debris, and a range of sediment types.

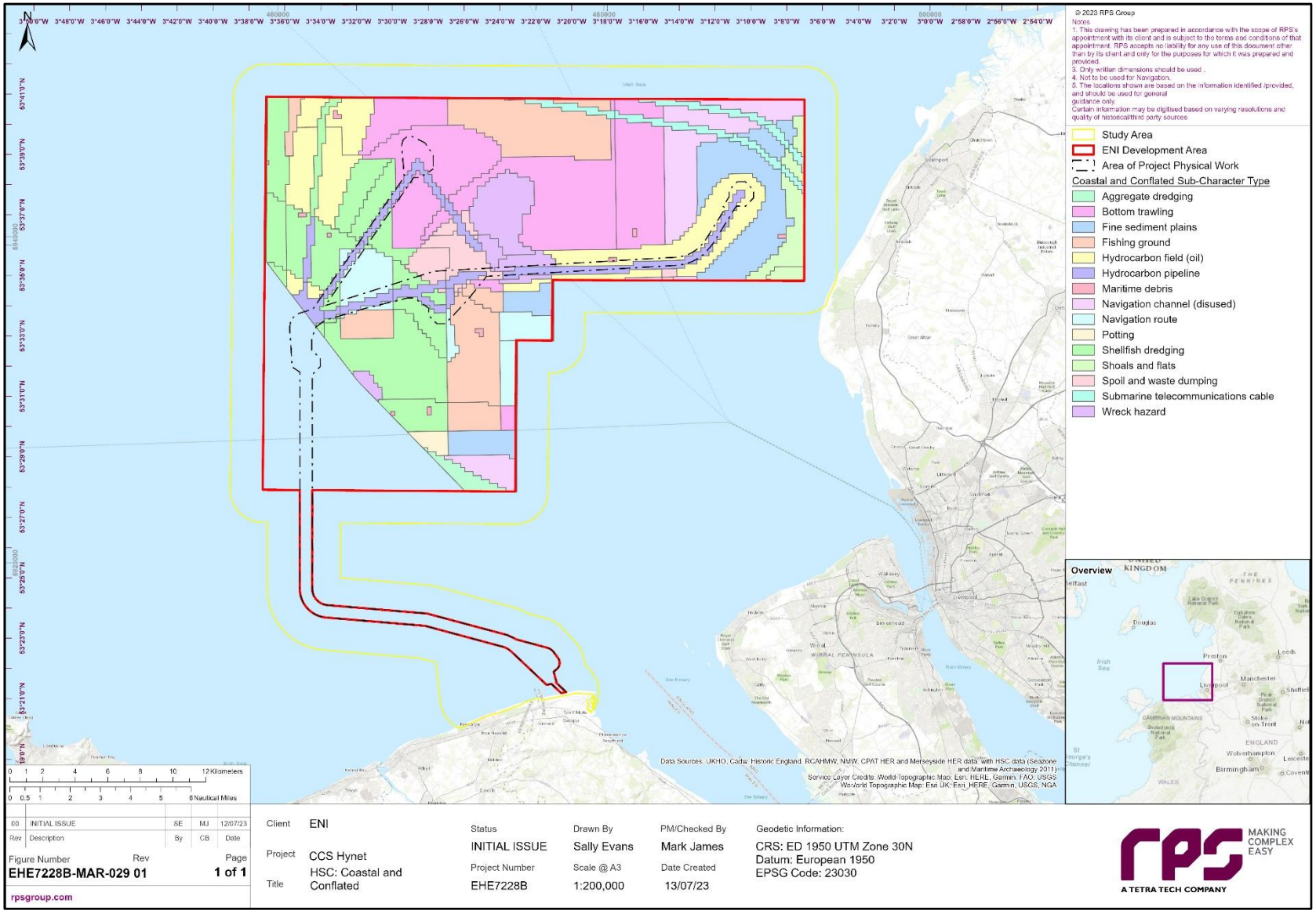


Figure 1.29: Historic Seascape Characterisation Data: Coastal and Conflated

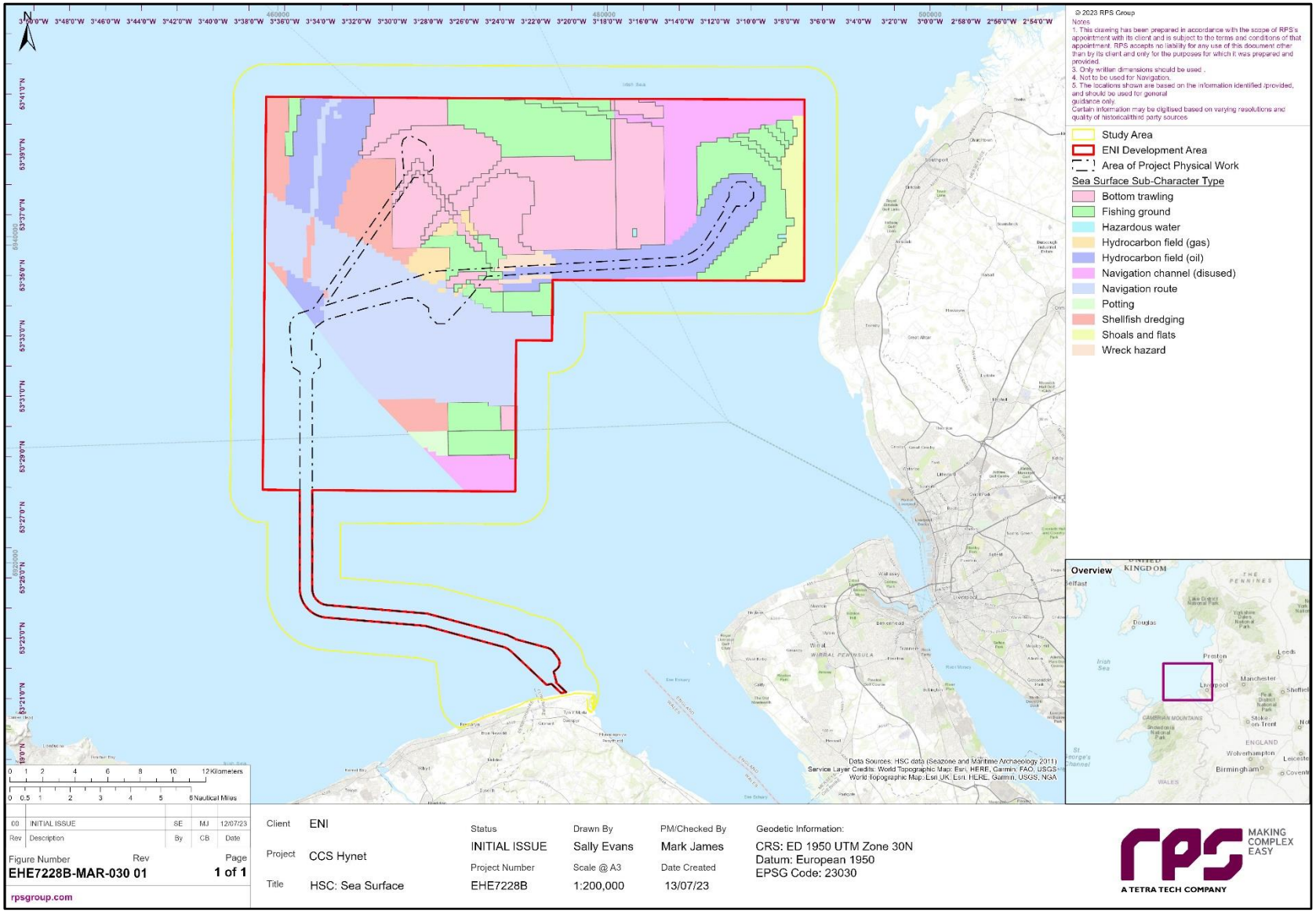


Figure 1.30: Historic Seascape Characterisation Data: Sea Surface

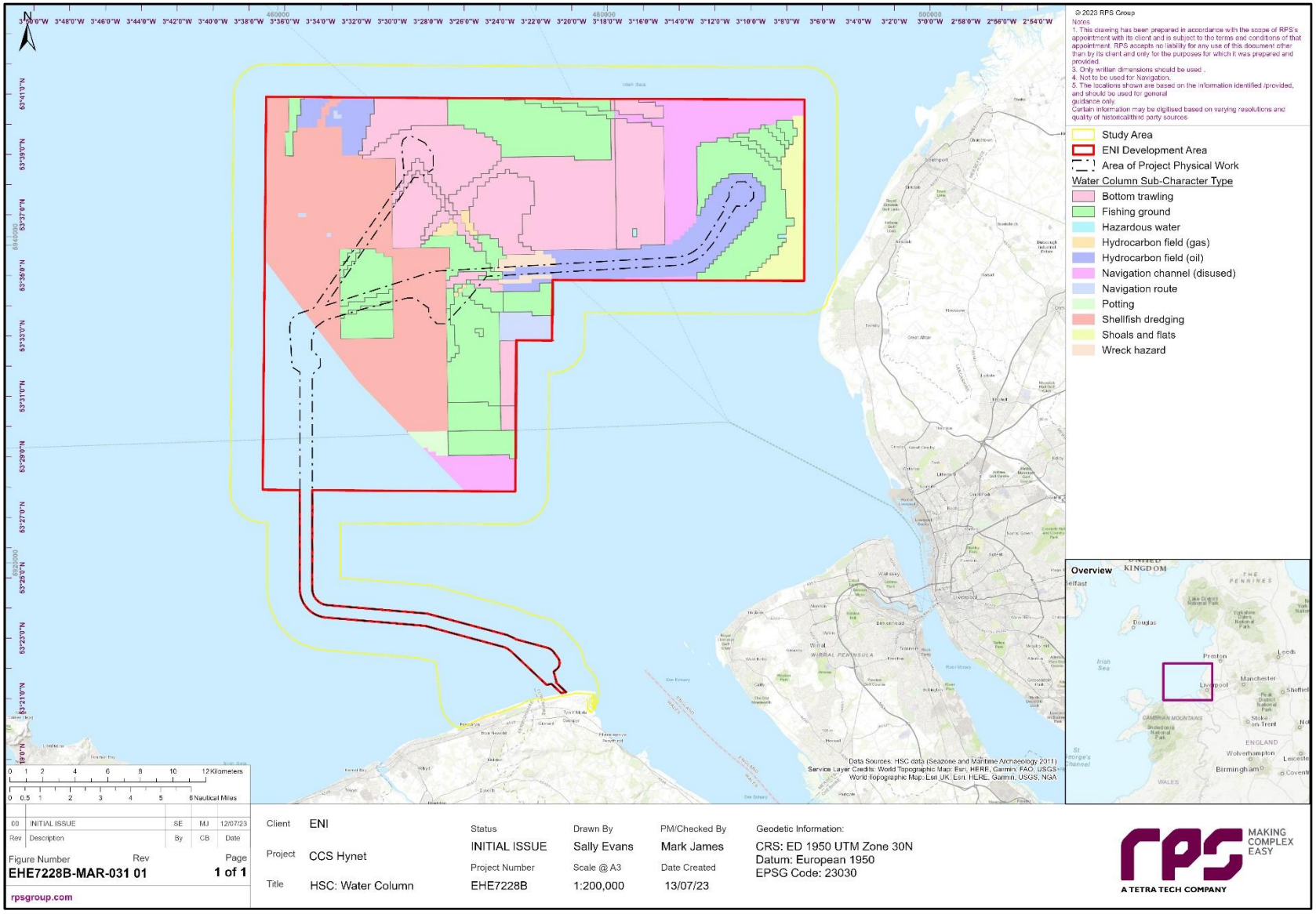


Figure 1.31: Historic Seascape Characterisation Data: Water Column

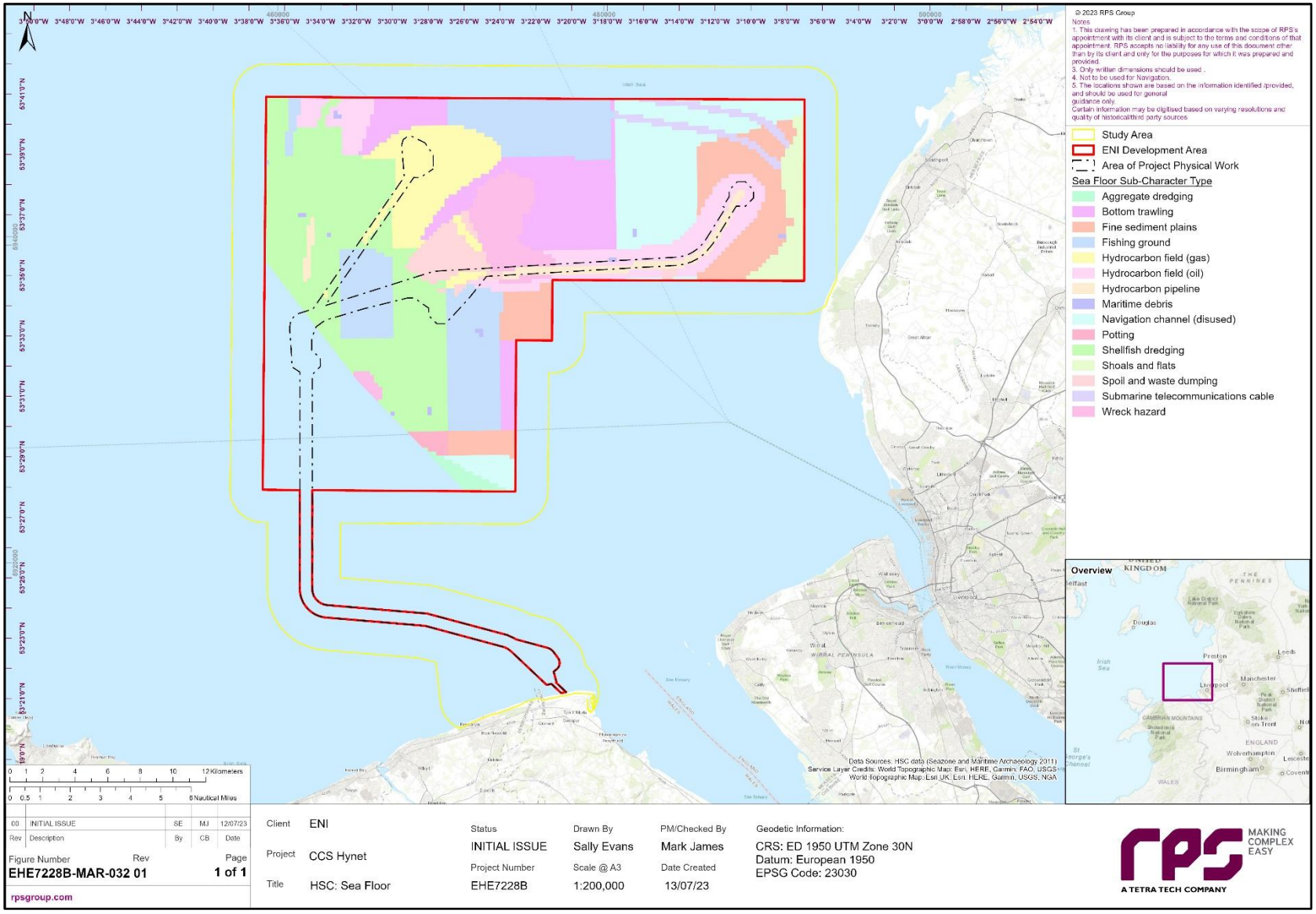


Figure 1.32: Historic Seascape Characterisation Data: Sea Floor

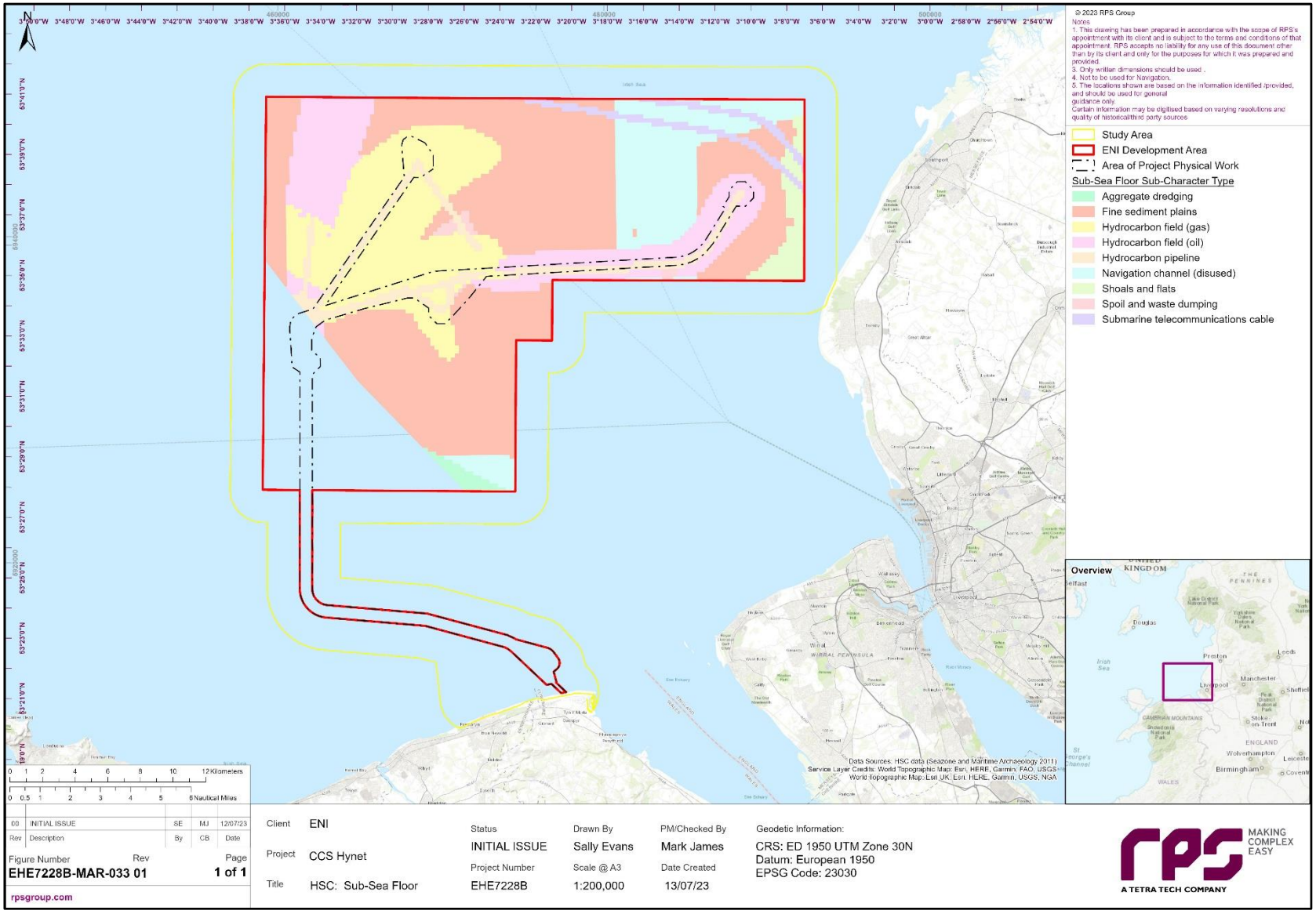


Figure 1.33: Historic Seascape Characterisation Data: Sub-sea Floor

1.6 Summary

In summary, the desk-based assessment and assessment of geophysical and hydrographic data has found evidence of designated and non-designated heritage assets within the APPW, Eni Development Area and Study Area.

Designated heritage assets within the area include the Protected Wreck of the *Resurgam*. The wreck itself lies within the Study Area, but the designated circle extends to within the APPW and Eni Development Area. The Scheduled wreck of the *Lelia* also lies within the Study Area, as does the Grade II Listed Point of Ayr Lighthouse.

The assessment has also found evidence of known and potential non-designated heritage assets, summarised below.

1.6.1 Submerged prehistory

Assessment of geophysical, geotechnical and desk-based sources has led to the identification of three main Quaternary units within the Site, representing the environmental shift from glacially and proglacially dominated conditions of the Devensian (represented by Unit III and II), to later potentially pre-transgressional environments (possibly represented by Units II and I), followed by the modern active marine environment which characterises the Site today (Unit I). In summary the units and archaeological potential are as follows:

- Unit III is a glacial deposit associated with the CBF, thought to have been laid down as a sub glacial deposit in the Wolstonian or Devensian glaciation. Unit III holds very limited archaeological potential. However, material may survive on the surface of the unit where later subaerial exposure may have occurred.
- Unit II represents the late Devensian WIS-A Formation. This unit is thought to reflect glacial, glaciomarine or deltaic/prodeltaic conditions during the Devensian, and evidence of channelling to the west of the Site may reflect outwash deposits or other glacial features which may extend to within the Site. The inhospitable conditions represented by the bulk of the unit indicate limited archaeological potential, though the surface of the unit (if subaerially exposed following glacial retreat) may hold archaeological potential where not eroded by later forces.
- Unit I is interpreted as the SSF. This formation includes two members. The lower (earlier) SL2 member, represents intertidal to marine environments. A BH taken to the south-west of the Site produced evidence of reed beds dating to 9.2 k BP within this member, indicating a potential pre-inundation land surface dating to the early Mesolithic. Landscape modelling by Fitch *et al*. (2011) also indicate potential for fluvial features within this Unit, which (when coupled with current sea level curve data) indicate potential within the eastern half of the Site from 10 k BP. The southern part of the cable route also holds potential for Mesolithic remains. There is potential for both palaeoenvironmental and archaeological remains to be present within this unit, however, subsequent marine transgression has eroded the upper parts of this deposit, potentially affecting preservation. The Unit may also hold evidence of the modern marine sediments represented by the SL1 member of the SSF. There is potential for redeposited archaeological remains in this member.

1.6.2 Maritime and coastal remains

The desk-based assessment has identified limited potential for maritime archaeological remains dating to the prehistoric to medieval periods. Potential increases from the post-medieval period onward with the development of ports along adjacent coastlines, such as Liverpool, and increases in the number of shipping routes crossing the area. The modern period, with its increase in trade, transport and two World Wars also marks a period in which potential is increased, and the role of Liverpool in convoy system in addition to other wartime activity increases potential in the area.

Assessment of geophysical data and desk-based sources has demonstrated the presence of maritime and aviation remains across the APPW, Eni Development Area and Study Area. The assessment has found evidence of wrecks and possible wreck sites, other maritime remains (ranging from debris, mounds potentially indicating wreck sites, remains of tower bases which are thought to represent the remains of anti-aircraft forts dumped after WWII, to modern infrastructure and unidentified obstructions), terrestrial and coastal features with evidence of wartime activity, navigational aids, documentary records demonstrating the loss of vessels within the area, and geological features. Of particular note, are the presence of:

- five sites indicating wreck remains within APPW;
- 51 sites indicating wreck remains within the Eni Development Area; and
- 31 sites indicating wreck remains within the wider Study Area. The latter includes the position of a Protected Wreck (the *Resurgam*), the designated circle for which extends to within the APPW and Eni Development Area;
- in addition to the aforementioned features, ten magnetic anomalies of potential archaeological significance were identified (Table 1.17). These include ten high potential anomalies and three medium potential anomalies. The origin of the anomalies is unknown, but they have potential to be of archaeological significance.

Other maritime remains may also indicate the presence of wreck sites in some instances (e.g. where mounds have been identified in geophysical survey data). The majority of the wrecks are undated, but where dates are indicate they demonstrate a focus on 19th and 20th century craft, which is also borne out by the documented losses within the area. All maritime and coastal remains are summarised within Table 1.9 and detailed within Appendix N.

The assessment has also found potential for other remains, including wartime coastal features and navigational aids.

1.6.3 Aviation remains

There are no known aircraft crash sites within the APPW, Eni Development Area or Study Area. However, the assessment has identified potential for aircraft crash sites to occur, in particular associated with the use of Talacre Warren (which lies 1.5 km to the east of the landfall site) as a WWII Spitfire training camp. This potential is further demonstrated by records of nine documented losses of aircraft within the Study Area and Eni Development Area, of which around half are Spitfires. While aircraft crashes tend to result in disarticulated remains, there is potential for remains of aircraft within the APPW, Eni Development Area or Study Area.

1.6.4 Historic seascape character

The assessment identified a variety of characteristics within the Eni Development Area and APPW. These can be summarised as:

- modern installations and activities such as hydrocarbon wells, pipelines, submarine cables, aggregate extraction, spoil and waste dumping;
- a range of fishing methods used in the modern period;
- navigation routes, both modern and post medieval;
- wrecks and maritime debris (in some cases undated); and
- seabed types and characteristics including shoals and flats and fine sediment plains.

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Appendix N1: Gazetteer of archaeological sites and geophysical anomalies

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_001		8119	DW5			405760				*Resurgam.* Protected Wreck. Submarine	Wreck	19th century	Live	No	463157.66	5916617.68	SA
E_002		7692		1464554						*Lelia*. Wreck (scheduled). Paddle Steamer	Wreck	19th century	Live	No	474625.66	5926786.95	SA
E_003			520			34231	102784			Point of Ayr Lighthouse;Y Parlwr Du. Listed (Grade II). Thought to have been constructed c. 1776	Lighthouse	18th century	N/A	No	478659.60	5912249.44	SA
E_004	CCS23_051									Wreck	Wreck	Undated	N/A	Yes	474754.40	5915612.10	SA
E_005	CCS23_052	91549								Wreck	Wreck	Undated	N/A	Yes	475696.80	5914362.70	APPW
E_006	CCS23_020	8179			892881	506924				Potential wreck	Potential wreck	Undated	N/A	Yes	461786.60	5933019.50	APPW
E_007	CCS23_047	58577				240780	64188			Potential wreck	Potential wreck	Undated	N/A	Yes	475045.60	5916258.60	SA
E_008	CCS23_068	91551								Potential wreck	Potential wreck	Undated	N/A	Yes	476503.30	5915570.70	SA
E_009	CCS23_003	95849								Mound	Mound	Undated	N/A	Yes	475510.10	5915328.90	SA
E_010	CCS23_054									Mound	Mound	Undated	N/A	Yes	472907.10	5915455.10	APPW
E_011	CCS23_060									Mound	Mound	Undated	N/A	Yes	473646.00	5915748.90	SA
E_012		8156			892691	506947	64182			Probable wreck	Wreck	Undated	Live	No	471833.98	5913428.17	SA
E_013		8263			892841	506925				Wreck, thought to be the *Lugar.* Intact and upright, bow to the west, boiler prominent. Bow damage evident.	Wreck	Undated	Live	No	461936.41	5930419.47	APPW
E_014								MME15856		Unidentified Wreck Site, Ainsdale Sands, Formby. Recorded by the NW RCZAS, 2007-2009. Bow and stern surviving, along with single mast. May be schooner type vessel.	Wreck	Undated	N/A	No	493850.25	5937690.43	SA
E_015		7701				271172				Wreck, thought to be the Penstone. Intact and bows upright	Wreck	20th century	Live	No	458635.08	5928109.00	SA
E_016		7823				271170				Wreck, thought to be the *Alarm.* Intact.	Wreck	Undated	Live	No	465945.89	5930704.11	EDA
E_017		8230			892849	506927				Wreck, in two distinct parts.	Wreck	Undated	Live	No	464004.01	5930992.88	EDA
E_018		8264			892835	515795				Wreck. Intact and upright. 2m sandwave close by.	Wreck	Undated	Live	No	462622.61	5930132.12	EDA
E_019		8177				518449				Wreck. Intact. Unnamed concrete barge. Undated but concrete barges became common in the 20th century	Wreck	20th century (probable)	Live	No	464944.29	5931135.99	EDA
E_020		7737				506933				Wreck. Probably in two parts.	Wreck	Undated	Live	No	465748.98	5928944.17	EDA
E_021		8231			892850	506926				Wreck. Intact and upright.	Wreck	Undated	Live	No	463219.55	5931000.80	EDA
E_022		7779			906906	271182				Wreck, thought to be the *Cairnross*. Broken up.	Wreck	20th century	Live	No	463335.60	5930295.26	EDA
E_023		8321				506929				Wreck. In two parts, debris in between	Wreck	Undated	Live	No	464473.68	5930268.00	EDA
E_024		7511								Record indicates a wreck but not reported since 1927. Position considered dead. Position likely inaccurate.	Wreck	Undated	Dead	No	478501.13	5913728.07	SA

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_025		7961			907029					Wreck, thought to be the *Speke* (possibly). Lying on its port side. Dimensions of wreck not given. Original dimensions for *Speke* recorded, however the identification is not verified thus dimensions may differ	Wreck	19th century	Live	No	479313.15	5938753.40	EDA
E_026		7995								Wreck thought to be the *Counsellor III*. Area of debris, no distinct wreck remains.	Wreck	20th century	Live	No	475854.12	5942736.87	EDA
E_027		7976								Wreck thought to be the *Ystroom* (Probably). Broken area of wreckage.	Wreck	20th century	Live	No	471718.37	5941023.76	EDA
E_028		7908								Unknown wreck. Dimensions unknown, last detected 1981.	Wreck	Undated	Live	No	476265.52	5932216.87	SA
E_029		8176								Wooden wreckage reported. No further details given and no dimensions.	Wreck	Undated	Live	No	492304.15	5935531.54	SA
E_030		7811								Wreck, upright and intact. Diver surveys indicate there is a hole in the bow. Other features include a large winch, vertical steam boiler. Interpreted as a light vessel/ buoy servicing vessel (possibly). Diver sighting is the reported sensor and details indicate this wreck may be reported at a different position. Uncertainty with position	Wreck	Undated	Live	No	466862.89	5930172.27	EDA
E_031		7938			906998	271209				Wreck thought to be the *City of Brussels*. Collapsed.	Wreck	19th century	Live	No	464452.73	5934664.68	EDA
E_032		8185								Wreck, well broken up and buried. Swept clear, may be covered in nets	Wreck	Undated	Live	No	474292.18	5942705.61	EDA
E_033		8190								Wreck. Lies with two parts broken off. The highest point is to the north.	Wreck	Undated	Live	No	473631.37	5942010.22	EDA
E_034		8188								Wreck. Well buried, probably intact	Wreck	Undated	Live	No	473171.83	5942226.08	EDA
E_035		8354								Distributed remains of wreck. Minor area of wreckage	Wreck	Undated	Live	No	473101.25	5941451.39	EDA
E_036		8189								Small, broken wreck. Collapsed, N. end buried	Wreck	Undated	Live	No	473268.12	5942491.94	EDA
E_037		7963			892895					Wreck. Thought to represent the remains of the *Stanleigh* (identified by divers and position recorded by geophysical survey). Wreck. Bows SE and Inverted, Stern on Port Side	Wreck	20th century	Live	No	467864.91	5939373.83	EDA
E_038		8184			892894					Unidentified Wreck. Damaged along one third of length	Wreck	Undated	Live	No	468907.26	5938563.40	EDA
E_039		8283								Wreck reported using Decca, resurveyed in 1999 and no remains found at this location. Position likely in error.	Wreck	Undated	Dead	No	478208.01	5950160.79	SA

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E_040		7962			907030					Wreck interpreted as the remains of the Muster. Surveying details indicate the wreck is well broken and dispersed to seabed. No dimensions given for sonar contact. The Muster measured 107 m in length and 15 m in width.	Wreck	20th century	Live	No	470529.80	5939325.49	EDA
E_041		7989								Reported as a wreck, however, surveying details indicate that this is an unknown wreck with the record 'for filing only'. There may not be seabed remains at this location, though it is still considered 'Live'. There are no details which indicate that the wreck has been identified on surveys.	Wreck	Undated	Live	No	492388.54	5942205.83	SA
E_042		7905								Wreck, thought to be the *Gorsethorn*. Upright, bow covered with sand	Wreck	20th century	Live	No	475496.26	5932020.47	SA
E_043		7998			907034					Wreck, thought to be the remains of the *Coniston* (probably). Dived on and found to be intact and upright, well buried, iron hull, wooden deck	Wreck	19th century	Live	No	487647.24	5944174.28	EDA
E_044		58952								Remains of a wooden sailing vessel, dimensions by diver.	Wreck	Undated	Live	No	491021.93	5939923.43	EDA
E_045		8178				518449				Unnamed Concrete Barge. Undated but concrete barges became common in the 20th century	Wreck	Undated	Live	No	465747.16	5931230.86	EDA
E_046		91157								Wreck, identified on geophysical surveys in 2019 and then dived. Found to be the wreck of a sailing vessel or dumb barge, cargo of cut slates reported.	Wreck	Undated	Live	No	466003.85	5915936.42	SA
E_047		94835								Possible wreck reported by divers, concretion at one end may be anchor chain.	Wreck	Undated	Live	No	460400.82	5917013.74	SA
E_048		7985								*El Oso.* Wreck, thought to be the remains of *El Oso*, mined en route for Ellsmere with oil. Well broken up and collapsed into own scour. May have been dispersed in 1982, though this is not confirmed.	Wreck	20th century	Live	No	474120.98	5942040.87	EDA
E_049		8237				271692				Wreck thought to be the *Ocean Monarch,* emigrant ship lost after a fire. 178 lives lost. Little of the wooden hull remains, and the cargo is concreted. Evidence of copper sheathing. Dived regularly. Wreck now degraded and may have been partially salvaged in *1987.*	Wreck	19th century	Live	No	460687.24	5919648.70	SA
E_050		91533								Wreck, identified by geophysical survey and dived. Found to be a wooden vessel	Wreck	Undated	Live	No	474527.08	5916443.42	SA

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
										with irregularly shaped stones (possible cargo or ballast)							
E_051		91537								Wreck located by geophysical survey in 2019, found to primarily be the cargo which is represented (slates).	Wreck	Undated	Live	No	470249.50	5923243.51	SA
E_052		7957								Wreck thought to be the *Nazarine*. Wreck dived and found to include large wooden components including deadeyes and rigging etc. As built dimensions given as no surveyed dimensions available	Wreck	19th century	Live	No	490156.38	5937636.74	EDA
E_053		8029								Wreck, thought to be the *Zealandia*, lost 1917. parts of which (engines) dry at low water. As built dimensions given as no surveyed dimensions available	Wreck	20th century	Live	No	493956.29	5946547.62	SA
E_054						515165				Unnamed Wreck. Described as five dark reflectors in a linear orientation and hence suggesting a buried wreck. The anomaly measures 18.5 m length x 2.7m width and has a height of 0.4m. Protected by the aggregates company by a 50 m development exclusion zone.	Wreck	Undated	N/A	No	465936.15	5926795.95	EDA
E_055		7939								Wreck originally reported in 1941. Not shown on kingfisher charts dated to 1975, and the record has since been amended to dead. It is likely that the position is inaccurate and there is no indication of any remains being identified at this location on geophysical surveys.	Wreck	Undated	Dead	No	475505.24	5934692.79	EDA
E_056		7693				271169				Wreck thought to be the Dublin. Upright and intact.	Wreck	19th century	Live	No	458004.55	5927578.68	SA
E_057		94490								Wreck. Diver reports indicate the wreck is small with planks on the seabed. Possible cargo of bricks, tiles and metal tubes.	Wreck	Undated	Live	No	460931.74	5919436.69	SA
E_058		7926								Letty. Wreck. IN two parts, broken midships, bows on port side	Wreck	20th century	Live	No	473841.37	5933249.41	EDA
E_059		8361								Probable wreck, strong magnetic anomaly	Wreck	Undated	Live	No	473159.97	5945159.62	EDA
E_060		8323				506930				Probable wreckage, one distinct piece. Small magnetic anomaly.	Wreck (probable)	Undated	Live	No	464763.21	5930562.51	EDA
E_061		57191								Possible wreck of a sailing vessel, characterised by a heap of cargo (ballast?) with few iron fittings on top.	Wreck or Ballast mound	Undated	Live	No	480201.19	5946851.51	EDA
E_062		8320				506931				Wreck. Possibly part of the light vessel *Alarm.*	Wreck or debris	Undated	Live	No	464336.38	5929649.70	EDA
E_063		7981								Wreck or area of debris with magnetic anomaly.	Wreck or debris	Undated	Live	No	473072.83	5941685.19	EDA

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_064		91153								Anomaly identified by geophysical survey and dived. Found to be a pile of stones with some wooden components. May be debris or wreckage.	Wreck or debris	Undated	Live	No	473264.00	5916118.95	SA
E_065		8194								Wreck or navigation beacon (dumped)	Wreck or beacon	Undated	Live	No	473179.16	5940423.67	EDA
E_066		8193								Previously interpreted as a possible navigation beacon. Most recent survey indicates wreck.	Wreck or beacon	Undated	Live	No	473009.02	5941134.83	EDA
E_067		8154			892687	240196	64181			Geology or MY *Mink*	Wreck/Geology	Undated	Live	No	475744.57	5913030.11	SA
E_068						515156				Described as a mound or large discrete anomaly partially buried with linear edges. The mound measures 14m length x 3.6m width.	Wreck (possible)	Undated	N/A	No	470183.28	5923249.14	SA
E_069		91156								Possible degraded wreck.	Possible wreck	Undated	Live	No	470625.87	5916690.64	SA
E_070		92433								Possible wreck-like structure or other man-made object, possibly partly buried.	Possible wreck	Undated	Live	Yes	475487.92	5914655.71	APPW
E_071		92429								Possible wreck-like structure or other man-made object, difficult to see.	Possible wreck	Undated	Live	Yes	476423.40	5914374.67	APPW
E_072		91154								Possible wreck identified in 2019 geophysical survey	Possible wreck	Undated	Live	No	473114.88	5915847.32	SA
E_073		91155								Possible wreck identified in 2019 geophysical survey. May be degraded/ broken up	Possible wreck	Undated	Live	No	470614.80	5916622.72	SA
E_074		8157				506948	64183			Possible wreck. Much longer than in previous listed position.	Possible wreck	Undated	Live	No	471134.74	5913337.81	SA
E_075		81978				421351				Pile of stacked slates. No dimensions given. Remains may be evidence of a wreck or cargo.	Possible wreck or cargo	Undated	Live	No	460422.45	5920924.98	SA
E_076		81977								Pile of stacked slates. No dimensions given. Remains may be evidence of a wreck or cargo.	Possible wreck or cargo	Undated	Live	No	460442.40	5920926.68	SA
E_077		8349								Two pieces, 10mtrs by 3mtrs. Possible wreck/ wreckage. No magnetic anomaly	Wreck or Wreckage (possible)	Undated	Live	No	473394.94	5941332.89	EDA
E_078		8191								Broken and indistinguishable wreckage, with small magnetic anomaly	Wreckage	Undated	Live	No	473064.82	5942019.01	EDA
E_079		8357								Probable piece of wreckage associated with small magnetic anomaly	Wreckage	Undated	Live	No	473389.80	5942176.62	EDA
E_080		8358								Single piece of wreckage	Wreckage	Undated	Live	No	473345.74	5942182.43	EDA
E_081		8187			892897					Small area of wreckage.	Wreckage	Undated	Live	No	470165.92	5939914.90	EDA
E_082		8355								Area of wreckage	Wreckage	Undated	Live	No	473371.50	5941477.66	EDA
E_083		8234								Small piece of wreckage, thought to possibly be	Wreckage	Undated	Live	No	473320.94	5942089.94	EDA

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
										associated with *El Oso*. No dimensions provided.							
E_084		8235								Circular area of wreckage. Dimensions not given	Wreckage	Undated	Live	No	474352.15	5942547.71	EDA
E_085		8351								Small area of wreckage.	Wreckage	Undated	Live	No	473458.15	5941397.43	EDA
E_086		8232			892896					Probable small area of wreckage, small magnetic anomaly	Wreckage	Undated	Live	No	473598.25	5939846.47	EDA
E_087		8343								Wreckage, small magnetic anomaly	Wreckage	Undated	Live	No	474751.24	5938506.90	EDA
E_088		8233								Area of broken wreckage close to charted wreck	Wreckage	Undated	Live	No	474431.87	5942248.70	EDA
E_089		8350								Piece of wreckage, magnetic anomaly not reported	Wreckage	Undated	Live	No	473195.50	5941352.57	EDA
E_090		8353								Small piece of wreckage associated with small magnetic anomaly	Wreckage	Undated	Live	No	473230.14	5941433.96	EDA
E_091		8348								Interpreted as the dispersed remains of a wreck, surveying details indicate the presence of masonry and a small magnetic anomaly.	Possible wreckage	Undated	Live	No	473391.01	5941223.51	EDA
E_092		8332								Length of pipe on the seabed, now removed.	Debris	Undated	lifted	No	459124.22	5944602.23	SA
E_093		8352								Possible debris, associated with a magnetic anomaly	Debris	Undated	Live	No	473446.03	5941399.36	EDA
E_094		8359								Well buried debris, with magnetic anomaly	Debris	Undated	Live	No	474424.38	5942693.76	EDA
E_095	CCS23_092									Debris	Debris	Undated	N/A	Yes	461580.30	5928986.40	APPW
E_096	CCS23_094									Debris	Debris	Undated	N/A	Yes	476748.40	5914455.30	APPW
E_097	CCS23_095									Debris	Debris	Undated	N/A	Yes	476667.20	5914598.30	APPW
E_098	CCS23_104									Debris	Debris	Undated	N/A	Yes	476023.90	5937756.20	EDA
E_099	CCS23_101									Debris	Debris	Undated	N/A	Yes	466452.60	5936114.70	APPW
E_100	CCS23_030									Debris	Debris	Undated	N/A	Yes	461828.60	5932813.90	APPW
E_101	CCS23_086									Debris	Debris	Undated	N/A	Yes	474702.40	5912138.10	SA
E_102	CCS23_111									Debris	Debris	Undated	N/A	Yes	473673.70	5915786.80	SA
E_103	CCS23_001									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461884.30	5932446.80	APPW
E_104	CCS23_004									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461822.20	5932368.40	APPW
E_105	CCS23_005									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461810.20	5932341.50	APPW
E_106	CCS23_006									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461820.50	5932356.30	APPW
E_107	CCS23_002									Debris - likely infrastructure	Debris - likely	Undated	N/A	Yes	461854.30	5932524.00	APPW

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
											infrastructure						
E_108	CCS23_008									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461815.90	5932500.50	APPW
E_109	CCS23_015									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461807.00	5932506.60	APPW
E_110	CCS23_017									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461876.60	5932434.60	APPW
E_111	CCS23_019									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461908.50	5932421.10	APPW
E_112	CCS23_026									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461933.90	5932402.30	APPW
E_113	CCS23_027									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461933.00	5932418.00	APPW
E_114	CCS23_010									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461738.70	5932489.50	APPW
E_115	CCS23_038									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461656.90	5933297.60	APPW
E_116	CCS23_039									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	488347.20	5942649.40	APPW
E_117	CCS23_042									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	469900.40	5935531.70	APPW
E_118	CCS23_043									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	469956.70	5935506.50	APPW
E_119	CCS23_083									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	473044.80	5911964.20	SA
E_120	CCS23_040									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	488353.30	5942656.50	APPW
E_121	CCS23_056									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	472871.80	5915492.40	APPW

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_122	CCS23_105									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	481973.80	5938247.00	APPW
E_123	CCS23_099									Debris - likely infrastructure	Debris - likely infrastructure	Undated	N/A	Yes	461758.30	5926628.40	APPW
E_124	CCS23_112									Potential debris	Potential debris	Undated	N/A	Yes	476618.30	5914644.90	APPW
E_125	CCS23_088									Potential debris	Potential debris	Undated	N/A	Yes	461424.60	5930927.70	APPW
E_126	CCS23_103									Potential debris	Potential debris	Undated	N/A	Yes	475968.30	5937820.70	APPW
E_127	CCS23_096									Potential debris	Potential debris	Undated	N/A	Yes	477218.10	5914674.70	SA
E_128	CCS23_106									Potential debris	Potential debris	Undated	N/A	Yes	488051.00	5941872.40	APPW
E_129	CCS23_053									Potential debris	Potential debris	Undated	N/A	Yes	472689.50	5915513.10	APPW
E_130	CCS23_049									Potential debris	Potential debris	Undated	N/A	Yes	476141.00	5913075.80	APPW
E_131	CCS23_055									Potential debris	Potential debris	Undated	N/A	Yes	472867.10	5915467.30	APPW
E_132	CCS23_057									Potential debris	Potential debris	Undated	N/A	Yes	473874.90	5914447.80	SA
E_133	CCS23_058									Potential debris	Potential debris	Undated	N/A	Yes	475396.30	5912890.00	SA
E_134	CCS23_041									Potential debris	Potential debris	Undated	N/A	Yes	488086.10	5941952.30	APPW
E_135	CCS23_044									Potential debris	Potential debris	Undated	N/A	Yes	469227.60	5936070.10	APPW
E_136	CCS23_045									Potential debris	Potential debris	Undated	N/A	Yes	469838.60	5935504.50	APPW
E_137	CCS23_046									Potential debris	Potential debris	Undated	N/A	Yes	469356.60	5935921.00	APPW
E_138	CCS23_037									Potential debris	Potential debris	Undated	N/A	Yes	461487.10	5932908.30	APPW
E_139	CCS23_034									Potential debris	Potential debris	Undated	N/A	Yes	461692.70	5933656.80	APPW
E_140	CCS23_031									Potential debris	Potential debris	Undated	N/A	Yes	461780.20	5932881.90	APPW
E_141	CCS23_032									Potential debris	Potential debris	Undated	N/A	Yes	461637.80	5933586.60	APPW
E_142	CCS23_028									Potential debris	Potential debris	Undated	N/A	Yes	461782.20	5931602.40	APPW
E_143	CCS23_029									Potential debris	Potential debris	Undated	N/A	Yes	461790.60	5931416.40	APPW
E_144	CCS23_007									Potential debris	Potential debris	Undated	N/A	Yes	461584.50	5932525.80	APPW
E_145	CCS23_011									Potential debris	Potential debris	Undated	N/A	Yes	461737.10	5932537.00	APPW
E_146	CCS23_012									Potential debris	Potential debris	Undated	N/A	Yes	461942.20	5932323.50	APPW

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_147	CCS23_013									Potential debris	Potential debris	Undated	N/A	Yes	461549.90	5932287.80	APPW
E_148	CCS23_014									Potential debris	Potential debris	Undated	N/A	Yes	461545.10	5932467.80	APPW
E_149	CCS23_016									Potential debris	Potential debris	Undated	N/A	Yes	461909.00	5932522.90	APPW
E_150	CCS23_021									Potential debris	Potential debris	Undated	N/A	Yes	461670.00	5932150.20	APPW
E_151	CCS23_022									Potential debris	Potential debris	Undated	N/A	Yes	461577.00	5931590.90	APPW
E_152	CCS23_024									Potential debris	Potential debris	Undated	N/A	Yes	462013.70	5932750.00	APPW
E_153	CCS23_025									Potential debris	Potential debris	Undated	N/A	Yes	461830.80	5932776.40	APPW
E_154	CCS23_062									Potential debris	Potential debris	Undated	N/A	Yes	475453.20	5914866.90	APPW
E_155	CCS23_063									Potential debris	Potential debris	Undated	N/A	Yes	472228.80	5915689.20	APPW
E_156	CCS23_064									Potential debris	Potential debris	Undated	N/A	Yes	468509.40	5916520.90	APPW
E_157	CCS23_070									Potential debris	Potential debris	Undated	N/A	Yes	476675.50	5912863.20	APPW
E_158	CCS23_071									Potential debris	Potential debris	Undated	N/A	Yes	476751.10	5912894.10	APPW
E_159	CCS23_074									Potential debris	Potential debris	Undated	N/A	Yes	471609.90	5911593.50	SA
E_160	CCS23_067									Potential debris	Potential debris	Undated	N/A	Yes	482866.90	5938102.10	EDA
E_161	CCS23_018									Unknown	Unknown	Undated	N/A	Yes	461844.50	5932702.30	APPW
E_162	CCS23_091									Chain, Cable, or Rope	Chain, Cable, or Rope	Undated	N/A	Yes	475520.90	5937838.80	APPW
E_163	CCS23_009									Chain, Cable, or Rope	Chain, Cable, or Rope	Undated	N/A	Yes	461950.20	5932446.90	APPW
E_164	CCS23_048									Chain, Cable, or Rope	Chain, Cable, or Rope	Undated	N/A	Yes	473641.30	5915788.40	SA
E_165	CCS23_085									Chain, Cable, or Rope	Chain, Cable, or Rope	Undated	N/A	Yes	475957.40	5914669.20	APPW
E_166	CCS23_087									Chain, Cable, or Rope	Chain, Cable, or Rope	Undated	N/A	Yes	461454.10	5927674.50	APPW
E_167	CCS23_077									Linear feature	Linear feature	Undated	N/A	Yes	475990.90	5912878.20	SA
E_168	CCS23_089									Linear feature	Linear feature	Undated	N/A	Yes	475028.60	5937798.30	APPW
E_169	CCS23_059									Linear feature	Linear feature	Undated	N/A	Yes	475333.00	5912973.90	SA
E_170	CCS23_078									Linear feature	Linear feature	Undated	N/A	Yes	475362.90	5912524.70	SA
E_171	CCS23_079									Linear feature	Linear feature	Undated	N/A	Yes	476260.60	5912983.50	APPW

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_172	CCS23_080									Linear feature	Linear feature	Undated	N/A	Yes	476204.50	5912990.80	APPW
E_173	CCS23_081									Linear feature	Linear feature	Undated	N/A	Yes	475010.20	5912437.10	SA
E_174	CCS23_108									Fishing gear	Fishing gear	Undated	N/A	Yes	463232.00	5916991.70	APPW
E_175	CCS23_065									Fishing gear	Fishing gear	Undated	N/A	Yes	462086.50	5917241.00	APPW
E_176	CCS23_069									Fishing gear	Fishing gear	Undated	N/A	Yes	463289.30	5916910.70	APPW
E_177	CCS23_023									Seabed disturbance	Seabed disturbance	Undated	N/A	Yes	461494.00	5931420.80	APPW
E_178	CCS23_110									Potential Debris	Potential Debris	Undated	N/A	Yes	471715.60	5911603.80	SA
E_179		7977								Remains of a tower base. Appears as almost circular wreckage	Tower	Undated (possibly WWII)	Live	No	468297.63	5940854.15	EDA
E_180		8344								Remains of a tower base. Similar to other towers in the area. Thought to be the remains of anti-aircraft forts dumped after WWII.	Tower	Undated (possibly WWII)	Live	No	473671.77	5938796.54	EDA
E_181		7948								Formby tower (remains of), light buoy. Not found on most recent survey (2009) and amended to dead. Remains may be buried.	Disused wartime tower	20th century	dead	No	485537.22	5936412.66	SA
E_182		7999								Non submarine contact located in 1940/1941. Origin uncertain	Obstruction: Non-submarine contact	Undated	Live	No	458138.23	5943158.50	SA
E_183		7970			892898					Non submarine contact located in 1940/1941. Origin uncertain	Obstruction: Non-submarine contact	Undated	Live	No	481818.85	5940226.28	EDA
E_184		7754								Non submarine contact located in 1946. Origin uncertain	Obstruction: Non-submarine contact	Undated	Live	No	469307.17	5929383.23	EDA
E_185		66895								Non submarine contact located in 1940, thought to relate to fisherman's fastenings. Origin uncertain. Amended to dead.	Obstruction: Non-submarine contact	Undated	dead	No	458138.23	5943158.50	SA
E_186		7739								Non submarine contact located in 1946. Origin uncertain but extends from 6 cables in NW direction.	Obstruction: Non-submarine contact	Undated	Live	No	467076.99	5929181.94	EDA
E_187		7993								Submerged object struck by vessel in 1920. Later searches found nothing in this location and record has been amended dead. Due to the date of the original record it is likely the position was in error.	Obstruction	Undated	dead	No	461164.68	5942669.01	EDA
E_188		7960								Obstruction	Obstruction	Undated	Live	No	480525.48	5938531.92	EDA
E_189		7625								Obstruction, nature unknown. Reported by fishing drifter.	Obstruction	Undated	Live	No	471796.11	5923589.35	SA
E_190		7944								Obstruction, stone, masonry or rubble. Dries.	Obstruction	Undated	Live	No	492377.98	5935685.92	SA
E_191		8192								Mass of broken wreckage, described in 1992 as a	Obstruction	Undated	Live	No	473564.67	5941519.31	EDA

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										collapsed platform supported by large round legs with large concrete blocks on the site.							
E_192		92431								Unidentified object. No indication that this represents a wreck.	Unidentified object	Undated	Live	No	476781.68	5915756.48	SA
E_193		7952								Pieces of masonry thought to have been dumped in the spoil ground (based on Liverpool wreck records).	Masonry	Undated	Live	No	484896.17	5937125.37	SA
E_194		8345								Indistinct contact, interpreted as foul ground. No magnetic anomaly.	Foul	Undated	Live	No	473550.44	5939581.58	EDA
E_195		8346								Interpreted as foul ground. No magnetic anomaly.	Foul	Undated	Live	No	473170.61	5939698.69	EDA
E_196		8271								Foul. Anchor and cable lost and recovered. No remains expected on seabed	Anchor and cable	Undated	Lifted	No	470712.72	5925836.21	EDA
E_197		94741								Anchor chain	Anchor chain	Undated	Live	No	466704.45	5925662.39	EDA
E_198		86602								Drag pipe. Surveyed in 2016.	Pipe	Undated	Live	No	472771.07	5922523.81	SA
E_199		82787								Mattresses	Mattresses	Modern	Live	Yes	461606.60	5931032.20	APPW
E_200		82786								Mattresses	Mattresses	Modern	Live	Yes	461593.31	5931034.17	APPW
E_201						506932				Collapsed Exploration Platform reported by the UKHO in 1992. No UKHO record now in the vicinity. No remains expected on the seabed at this location.	Collapsed platform	Modern	N/A	No	464075.09	5928317.62	EDA
E_202		8267								Obstruction collapsed platform concrete blocks. Not identified in this position on repeat surveys. Position assumed in error and amended to dead.	Platform	Undated	Dead	No	464159.78	5928291.60	EDA
E_203		90234								Obstruction. Possible oil rig leg. UK NM 5557/18	Possible oil rig leg	Undated	Live	No	460496.92	5936866.89	EDA
E_204		8322				506928				Debris - collapsed beacon (possible)	Beacon	Undated	Live	No	464233.19	5930470.08	EDA
E_205		7975								Video footage following UKHO surveys indicates this is a discarded navigation beacon, in own scour, with lines of metal plating.	Beacon	Undated	Live	No	473884.05	5940943.44	EDA
E_206		8186								Anomaly interpreted as demolished beacon.	Beacon	Undated	Live	No	473624.82	5939471.75	EDA
E_207						515159				Described as an area containing circular and curvilinear anomalies. The debris scatter measures 22.4m length x 23.5m width.	Geophysical anomaly - debris	Undated	N/A	No	467810.22	5925416.55	EDA
E_208						515160				Described as an area of seabed disturbance with numerous dark reflectors with shadows or heights above the seabed. The area of debris extends some 17.2m length x 38.9m width.	Geophysical anomaly - debris	Undated	N/A	No	468669.06	5924135.73	SA
E_209						515153				Described as a linear shaped dark reflector in an area of sand ridges and hence partially	Geophysical anomaly - potential	Undated	N/A	No	472902.45	5922423.42	SA

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										buried. This anomaly, which may be a discarded anchor cable, measures 15m length x 2.6m width.	anchor cable						
E_210						515151				Described as debris in an area of sandwave. This anomaly measures 1.8m length x 1.2m width x 0.3m height.	Geophysical anomaly - debris	Undated	N/A	No	469153.11	5923913.63	SA
E_211						515166				Described as an oval shaped reflector within an area of sand ridges. The anomaly possibly shows evidence of structure and measures 4.7m length x 2.7m width.	Geophysical anomaly - origin unknown	Undated	N/A	No	465798.69	5928753.71	EDA
E_212						515163				Described as a curvilinear anomaly within an area of sandwaves, possibly debris. The debris measures 4.6m length x 0.3m width x 0.2m height above the seabed.	Geophysical anomaly - possible debris	Undated	N/A	No	465901.48	5926986.42	EDA
E_213						515164				Described as a curvilinear anomaly with associated scarring, as if the debris has been dragged. The debris measures 1.4m length x 1.1m width.	Geophysical anomaly - possible debris	Undated	N/A	No	465938.53	5927124.99	EDA
E_214						515161				Described as a square shaped object measuring 2.3m length x 0.4m width x 0.4m height above the seabed.	Geophysical anomaly - origin unknown	Undated	N/A	No	466553.10	5926721.69	EDA
E_215						515162				Described as a rectilinear dark reflector measuring 2.4m length x 0.3m width.	Geophysical anomaly - origin unknown	Undated	N/A	No	466553.10	5926721.69	EDA
E_216					1004580					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467937.56	5943048.17	EDA
E_217					1005159					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461892.47	5927053.81	APPW
E_218					1004866					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461844.53	5935452.80	APPW
E_219					1004775					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467926.56	5937428.19	EDA
E_220					1004782					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467628.45	5937294.00	EDA
E_221					1004871					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461866.07	5935343.11	APPW
E_222					1005169					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461994.55	5926905.25	APPW
E_223					1005043					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461843.63	5930532.99	APPW
E_224					1004709					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	465597.02	5939535.38	EDA
E_225					1004781					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467577.90	5937333.29	EDA
E_226					1004770					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	469526.48	5937430.67	APPW

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E_227					1004667					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466439.54	5940777.18	EDA
E_228					1004735					Unidentified obstruction	Unidentified obstruction	Undated	N/A	Yes	464429.94	5938619.01	APPW
E_229					1004530					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	469041.28	5944203.66	APPW
E_230					1004606					Unidentified obstruction	Unidentified obstruction	Undated	N/A	Yes	466896.10	5942443.55	APPW
E_231					1004521					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	486645.73	5944581.22	EDA
E_232					1004628					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468593.30	5941927.42	EDA
E_233					1004788					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461809.25	5937252.23	EDA
E_234					1004637					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468471.11	5943505.66	EDA
E_235					1004482					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466139.16	5945782.79	EDA
E_236					1004602					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468204.95	5942521.95	EDA
E_237					1004738					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	462841.86	5938486.69	EDA
E_238					1004877					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464528.96	5935130.52	EDA
E_239					1004626					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468542.75	5941966.71	EDA
E_240					1004823					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461520.28	5936468.20	EDA
E_241					1004505					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	469526.97	5945220.46	EDA
E_242					1005091					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	459863.76	5929105.25	EDA
E_243					1004895					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	460455.68	5934663.32	EDA
E_244					1004629					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467773.21	5941935.89	EDA
E_245					1004452					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468415.56	5946744.78	EDA
E_246					1004455					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468286.29	5946692.97	EDA
E_247					1004582					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	485629.13	5942916.93	EDA
E_248					1004754					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	462450.95	5937841.22	EDA
E_249					1004567					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	469454.41	5943269.49	EDA
E_250					1005024					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	463193.65	5931951.89	EDA
E_251					1004701					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	477101.23	5939927.07	EDA
E_252					1004688					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	462986.95	5940258.66	EDA
E_253					1004714					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	481979.77	5939315.64	EDA

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E_254					1004808					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	485377.16	5936653.40	SA
E_255					1005026					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	462748.81	5931585.65	EDA
E_256					1004664					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467948.35	5940858.39	EDA
E_257					1004719					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	477973.41	5939059.34	EDA
E_258					1004440					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468681.56	5947028.52	EDA
E_259					1004903					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	460508.34	5934474.07	EDA
E_260					1004807					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464996.09	5936757.03	EDA
E_261					1005165					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	462903.91	5926948.01	EDA
E_262					1004813					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	480858.22	5936579.90	SA
E_263					1004703					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466211.26	5939944.00	EDA
E_264					1004597					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467832.37	5942706.70	EDA
E_265					1004736					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468510.69	5938556.36	EDA
E_266					1004708					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467926.35	5939578.12	EDA
E_267					1004599					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	485905.68	5942450.81	EDA
E_268					1004716					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468251.05	5939242.69	EDA
E_269					1004888					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466832.78	5934852.90	EDA
E_270					1004758					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	462522.90	5937702.24	EDA
E_271					1004554					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	487270.79	5943510.01	EDA
E_272					1004690					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466147.34	5940223.09	EDA
E_273					1004589					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	485560.41	5942825.96	EDA
E_274					1004684					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466774.80	5940401.91	EDA
E_275					1004473					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	470246.54	5945960.56	EDA
E_276					1004784					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464648.72	5937282.13	EDA
E_277					1004943					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	465146.93	5933849.25	EDA
E_278					1004843					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467806.68	5935996.54	EDA
E_279					1004545					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	471186.14	5943853.83	EDA
E_280					1004773					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	482407.37	5937351.67	EDA

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E_281					1004928					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	465584.44	5934025.39	EDA
E_282					1004762					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464343.45	5937657.83	EDA
E_283					1004702					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	472600.94	5939953.81	EDA
E_284					1004747					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	463858.11	5938750.97	EDA
E_285					1004739					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467192.68	5938417.84	EDA
E_286					1004718					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	463952.04	5939182.27	EDA
E_287					1004617					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468709.48	5942199.05	EDA
E_288					1004757					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467212.37	5937728.14	EDA
E_289					1004557					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	487161.37	5943468.47	EDA
E_290					1004771					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	461605.92	5937489.36	EDA
E_291					1004789					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464749.96	5937193.56	EDA
E_292					1004647					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464450.86	5941399.20	EDA
E_293					1004847					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466779.16	5935822.11	EDA
E_294					1004764					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	484454.56	5937550.43	EDA
E_295					1004693					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	476308.03	5940155.91	EDA
E_296					1004725					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	464186.06	5938895.57	EDA
E_297					1004670					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	468561.02	5940667.01	EDA
E_298					1004529					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467011.18	5944215.11	EDA
E_299					1004537					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	466743.21	5944071.34	EDA
E_300					1004921					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	465513.05	5934124.38	EDA
E_301					1004723					Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	467115.39	5938936.74	EDA
E_302						240572				Unidentified obstruction	Unidentified obstruction	Undated	N/A	No	471709.90	5923615.55	SA
E_303		8045								Fisherman's fastener in an area of sand waves. Position by Decca. Amended to dead	Fisherman's fastener	Undated	dead	No	460100.73	5949321.87	SA
E_304		8041								Fisherman's fastener in an area of sand waves. Position by Decca. Amended to dead	Fisherman's fastener	Undated	dead	No	458402.95	5948162.31	SA
E_305		8030								Snag reported in 1940 (may be fisherman's fastening). Area searched but no wreck found. Sandwave in the area. The snag is interpreted as a	Fisherman's fastener	Undated	dead	No	460373.34	5946847.38	EDA

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										fisherman's fastening and has been amended to dead.							
E_306		8044								Fisherman's fastener in an area of sand waves. Position by Decca. Amended to dead	Fisherman's fastener	Undated	dead	No	458798.25	5949302.21	SA
E_307						518906				A float (small unpowered vessel) with a beacon superstructure is shown anchored at this location.	Navigational aid shown on historic maps	19th century	N/A	No	478856.94	5913224.23	SA
E_308						518924				Chester Bar Buoy shown at this location.	Navigational aid shown on historic maps	19th century	N/A	No	469030.66	5917188.35	SA
E_309						518923				Middle Patch Buoy, Welch Channel	Navigational aid shown on historic maps	19th century	N/A	No	469867.11	5915799.16	SA
E_310						518922				Southwest Hoyle Buoy	Navigational aid shown on historic maps	19th century	N/A	No	468884.19	5915011.39	SA
E_311						518921				Earwig Buoy	Navigational aid shown on historic maps	19th century	N/A	Yes	473924.92	5912305.09	SA
E_312						518920				South Hoyle buoy	Navigational aid shown on historic maps	19th century	N/A	Yes	474881.68	5913747.42	SA
E_313						544194				Spoil ground, south of Douglas oil field. Marked as 'disused' on modern charts and shown to north of its earlier position. This dumping ground is one of three in the approaches to Liverpool characterised by concentrations of sunken concrete barges in addition to the dumping of sewage, industrial waste and spoil from dredged channels.	Spoil ground	Undated		No	461239.01	5930563.47	EDA
E_314		8008								*Magnum.* Reported sinking but no seabed remains have since been identified. Position dead and likely inaccurate.	Wreck (not found)	20th century	Dead	No	474011.71	5944094.63	EDA
E_315		5346				271158				MY *Mink*. Reported sinking, remains not identified at this location.	Wreck (not found)	20th century	Dead	Yes	475736.38	5913378.74	APPW
E_316						240014				West Hoyle Bank Maritime Named Location	NLO	Multiperiod	N/A	No	470074.97	5923271.63	SA
E_317						271152				*Bat*	Wreck (NLO)	19th century	N/A	No	471190.79	5925623.92	EDA
E_318						240706				*Burmese*	Wreck (NLO)	Undated	N/A	No	478478.61	5912462.86	SA
E_319						518558				Wreck of the Flint. Documented Loss	Wreck (NLO)	19th century	N/A	No	473038.58	5911260.72	SA
E_320						271370				Wreck of the Friends. Documented Loss	Wreck (NLO)	19th century	N/A	No	472634.26	5911212.97	SA

MSDS TR ID	Geophysical ID	UKHO	Cadw	HE	NHRE	RCAHMW	CPAT	Merseyside HER	NMW	Description	Type	Date	UKHO Status	Within data	X	Y	Location
E_321						271391				*Helen and Ernest*	Wreck (NLO)	20th century	N/A	No	479316.75	5912380.57	SA
E_322						271366				*Jane and Margaret*	Wreck (NLO)	19th century	N/A	No	474540.61	5911613.77	SA
E_323						271365				*Jessie*	Wreck (NLO)	19th century	N/A	No	474907.44	5911767.89	SA
E_324						271381				*Joah*	Wreck (NLO)	20th century	N/A	No	474255.09	5911793.75	SA
E_325						271566				*John Horrocks*	Wreck (NLO)	19th century	N/A	No	479136.96	5912437.10	SA
E_326						271696				*Lord Blaney*	Wreck (NLO)	19th century	N/A	No	478731.38	5912550.39	SA
E_327						271556				*Mary*	Wreck (NLO)	19th century	N/A	No	460146.99	5919963.85	SA
E_328						271630				*Myosotis*	Wreck (NLO)	19th century	N/A	No	476826.23	5912136.70	SA
E_329						525173				*Ranger*	Wreck (NLO)	19th century	N/A	No	473775.15	5911362.06	SA
E_330						271201				*Rockingham*	Wreck (NLO)	19th century	N/A	No	479536.06	5912357.70	SA
E_331						271379				*Corby Castle*	Wreck (NLO)	20th century	N/A	No	478298.29	5913842.33	SA
E_332						271364				*Elizabeth*	Wreck (NLO)	19th century	N/A	No	467188.10	5916020.58	SA
E_333						271384				*Varinger*	Wreck (NLO)	20th century	N/A	No	478984.70	5912527.00	SA
E_334						525172				*Wave*	Wreck (NLO)	19th century	N/A	No	476840.05	5912291.94	SA
E_335						271691				*Town*	Wreck (NLO)	19th century	N/A	No	479063.48	5912471.02	SA
E_336						506922				Unnamed Wreck - stranded vessel reported in 1928.	Wreck (NLO)	20th century	N/A	No	478500.91	5913726.15	SA
E_337					1526188					*My Mink*	Wreck (NLO)	20th century	N/A	Partly			APPW
E_338						271367				*May*	Wreck (NLO)	19th century		No	465887.65	5916341.41	SA
E_339						271071				*Rainbow*	Wreck (NLO)	18th century		No	476439.83	5914875.29	SA
E_340						271361				*Mary Ann*	Wreck (NLO)	19th century		Yes	474550.26	5912921.80	SA
E_341						271627				*Clare*	Wreck (NLO)	19th century		Yes	476377.48	5914330.47	APPW
E_342						271129				*Charming Nancy*	Wreck (NLO)	20th century		Yes	475188.20	5915849.70	SA
E_343						271250				*Saint Patrick*	Wreck (NLO)	19th century		No	476056.29	5915199.96	SA
E_344						271147				*Hannah and Joseph*	Wreck (NLO)	19th century		Yes	475757.94	5915367.69	SA
E_345						271163				Unknown wreck	Wreck (NLO)	19th century		Yes	476241.80	5915020.46	SA
E_346						524799				*Four Brother*	Wreck (NLO)	19th century		No	472828.53	5912763.71	SA
E_347						518915				West Hoyle Bank	Seascape	Multi-period	Multi-period	No	475691.25	5916344.83	SA

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E_348						518913				Welch Channel	Seascape	Multi-period	Multi-period	No	473808.99	5913441.39	SA
E_349						544299				Armstrong Whitworth Whitley V P5057	Aircraft (NLO)	20th century	N/A	No	464444.23	5932290.25	EDA
E_350						515761				De Havilland Queen Bee V4794	Aircraft (NLO)	20th century	N/A	No	464305.69	5925993.22	EDA
E_351						515851	130294			Supermarine Spitfire I K9994	Aircraft (NLO)	20th century	N/A	No	472145.85	5910815.20	SA
E_352						544351				Supermarine Spitfire I X4173	Aircraft (NLO)	20th century	N/A	No	477845.27	5912132.04	SA
E_353						515564	130245			Supermarine Spitfire II a P7692	Aircraft (NLO)	20th century	N/A	No	472366.15	5910936.29	SA
E_354						544352				Supermarine Spitfire V P7692	Aircraft (NLO)	20th century	N/A	No	477810.69	5912387.52	SA
E_355									130262	AVRO ANSON I N5050	Aircraft (NLO)	20th century	N/A	No	476563.84	5911949.99	SA
E_356						515413	130234			Miles Martinet I JN294	Aircraft (NLO)	20th century	N/A	Yes	472543.98	5911803.80	SA
E_357						544353				North American P-51 Mustang I AP216	Aircraft (NLO)	20th century	N/A	No	478196.39	5913121.88	SA
E_358						516109				Liverpool Bay Palaeolandscapes Glacial Tunnel Valley	Glacial tunnel valley	Palaeolithic	N/A	No	459075.10	5929729.14	SA
E_359						300218				Prestatyn Holiday Camp; Tower Beach Holiday Village, Pontins, Roddfa Wynn, Prestatyn. Built during the 1930s	Terrestrial asset - holiday park	20th century	N/A	No	471796.01	5910162.33	SA
E_360						416241				Open-Air Swimming Baths, Prestatyn, originally opened in 1923	Terrestrial asset - Swimming baths	20th century	N/A	No	472582.78	5910605.28	SA
E_361						122734				A copper alloy trumpet brooch from the Roman period, dating to c.1st to 2nd centuries AD.	Findspot	Roman	N/A	No	478942.49	5912043.31	SA
E_362						39822				Point of Ayr boundary stone II	Terrestrial - boundary stone	Post-medieval	N/A	No	479290.88	5911801.20	SA
E_363						89787				Point of Ayr boundary stone III	Terrestrial - boundary stone	Post-medieval	N/A	No	478992.18	5911994.01	SA
E_364						544026				Point of Ayr Lifeboat House shown on 19th century maps	Terrestrial - Lifeboat house	19th century	N/A	No	479209.64	5912031.16	SA
E_365						37873				Point of Ayr Lifeboat Station	Terrestrial - lifeboat station	Modern	N/A	No	479063.22	5912134.00	SA
E_366						39820				Point of Ayr Lighthouse Cottage	Terrestrial - lighthouse cottages	Post-medieval	N/A	No	478664.81	5912163.42	SA
E_367						89751				Flagstaff and Lighthouse cottages	Terrestrial asset - lighthouse cottages	19th century	N/A	No	478737.94	5912011.45	SA
E_368						26552				Point of Ayr Slipway	Terrestrial-slipway	Post-medieval	N/A	No	478659.89	5912229.35	SA

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E_369						26575				Point of Ayr, pill box II	Terrestrial - Pillbox	20th century	N/A	No	478502.19	5912208.14	SA
E_370						26576				Point of Ayr, pill box III	Terrestrial - Pillbox	20th century	N/A	No	476961.93	5912085.56	SA
E_371						26574				Point of Ayr, Pillbox I	Terrestrial - Pillbox	20th century	N/A	No	478861.25	5912132.17	SA
E_372						167157				Talacre Beach, The Warren, Pillbox I	Terrestrial - Pillbox	20th century	N/A	No	477384.92	5911871.49	SA
E_373						167158				Talacre Beach, The Warren, Pillbox II	Terrestrial - Pillbox	20th century	N/A	No	478051.56	5912110.83	SA
E_374						167156				Point of Ayr, Pillbox II	Terrestrial - Pillbox	20th century	N/A	No	479031.35	5912124.55	SA
E_375						26573				Point of Ayr anti glider poles	Terrestrial - Anti-glider poles	20th century	N/A	No	478860.55	5912182.16	SA
E_376						132172				Prestatyn, Warrington Summer Camp	Terrestrial - Summer camp	20th century	N/A	No	471446.26	5910028.94	SA
E_377								MME21513		Human and animal footprints, Formby beach, Formby	Footprints	Mesolithic and later	N/A	No	493543.23	5936339.63	SA
E_378								EME3314		Borehole survey of Sefton coastal dunes near Formby - 1990s	Event	N/A	N/A	N/A	493581.76	5935753.71	SA
E_379								EME3314		Borehole survey of Sefton coastal dunes near Formby - 1990s	Event	N/A	N/A	N/A	494142.61	5936984.84	SA
E_380								EME2554		Northwest Rapid Coastal Zone Assessment, Phase 2 - 2007-2009	Event	N/A	N/A	N/A	493333.68	5936149.68	SA
E_381									36281-83, 36289, 36936-36958, 36999-37020, 37027-37032, 37034-37039, 37121-37124, 37126, 37131-37171, 37174, 37334	Neolithic to medieval finds including animal remains, metal objects, weaving artefacts, whetstones, flakes and knapping debris. Description indicates the finds are from the Brenig Valley Reservoir, Clwyd and the positions are therefore in error.	Terrestrial - position in error			No	464930.55	5925543.51	EDA
E_382									8442	Bronze Age flint discoidal knife (replica). Description indicates the finds are from the Trefeglwys, Powys and the positions are therefore in error.	Terrestrial - position in error			No	463496.70	5916766.72	APPW
E_383						534707				Blaen Trawsnant, Peat Cutting. Description indicates the site is onshore and the positions are therefore in error.	Terrestrial - position in error			No	461415.63	5923538.06	APPW
E_384						420886				Test record. Void.	Test record. Void.			No	466172.02	5926731.29	EDA

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E_385						420887				Test record. Void.	Test record. Void.			No	466260.73	5926822.55	EDA
E_386						420883				Test record. Void.	Test record. Void.				466260.73	5926822.55	EDA
E_387						420885				Test record. Void.	Test record. Void.				466260.73	5926822.55	EDA
E_388		8340								Rock	Geology	Undated	Live	No	476585.79	5938287.85	APPW
E_389		8334								Rock	Geology	Undated	Live	Yes	474142.87	5937609.04	EDA
E_390		8337								Rock	Geology	Undated	Live	No	476110.29	5938065.89	APPW
E_391		8335								Rock	Geology	Undated	Live	No	473300.17	5937852.96	APPW
E_392		8336								Rock	Geology	Undated	Live	No	475023.43	5938038.17	APPW
E_393		8339								Rock	Geology	Undated	Live	No	476173.15	5938278.80	EDA
E_394		8338								Rock	Geology	Undated	Live	No	476177.40	5938245.41	APPW
E_395		7978								Fisherman's fastener now identified as a sand wave. Position by Decca.	Geology	Undated	dead	No	461484.66	5941368.50	EDA
E_396		7967								Fisherman's fastener now identified as a sand wave. Position by Decca.	Geology	Undated	dead	No	463128.24	5940088.36	EDA
E_397		8010								Fisherman's fastener now identified as a sand wave. Position by Decca.	Geology	Undated	dead	No	457636.81	5944584.49	SA
E_398		7928								Classified as a band of rough seabed	Geology	Undated	dead	No	472374.14	5934122.98	EDA
E_399		8342								Possible rock, no magnetic anomaly.	Geology	Undated	Live	No	474075.53	5938403.03	EDA
E_400		8341								Possible rock, no magnetic anomaly.	Geology	Undated	Live	No	474479.24	5938391.55	EDA
E_401		8360								Possible rock, no magnetic anomaly.	Geology	Undated	Live	No	474250.10	5943071.15	EDA
E_402		8347								Possible rock	Geology	Undated	Live	No	473844.51	5939904.42	EDA
E_403		8356								Possible rock, no magnetic anomaly.	Geology	Undated	Live	No	474804.36	5942027.88	EDA
E_404	CCS23_082									Likely geological	Likely geological	Undated	N/A	Yes	476829.50	5913360.70	APPW
E_405	CCS23_035									Likely geological	Likely geological	Undated	N/A	Yes	461762.60	5932974.00	APPW
E_406	CCS23_036									Likely geological	Likely geological	Undated	N/A	Yes	461831.70	5933241.90	APPW
E_407	CCS23_050									Likely geological	Likely geological	Undated	N/A	Yes	474184.40	5915506.90	APPW
E_408	CCS23_093									Likely geological	Likely geological	Undated	N/A	Yes	469244.50	5936132.10	APPW
E_409	CCS23_066									Likely geological	Likely geological	Undated	N/A	Yes	464085.70	5935505.50	APPW
E_410	CCS23_075									Likely geological	Likely geological	Undated	N/A	Yes	471581.50	5911654.40	SA
E_411	CCS23_076									Likely geological	Likely geological	Undated	N/A	Yes	474554.50	5915222.20	APPW
E_412	CCS23_061									Likely geological	Likely geological	Undated	N/A	Yes	472408.40	5915440.10	APPW
E_413	CCS23_072									Likely geological	Likely geological	Undated	N/A	Yes	471844.80	5914914.60	SA

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E_414	CCS23_073									Likely geological	Likely geological	Undated	N/A	Yes	476194.50	5914289.30	APPW
E_415	CCS23_090									Likely geological	Likely geological	Undated	N/A	Yes	475032.50	5937819.80	APPW
E_416	CCS23_097									Likely geological	Likely geological	Undated	N/A	Yes	461766.60	5926549.10	APPW
E_417	CCS23_098									Likely geological	Likely geological	Undated	N/A	Yes	461769.50	5926605.50	APPW
E_418	CCS23_109									Likely geological	Likely geological	Undated	N/A	Yes	473731.70	5915228.40	APPW
E_419	CCS23_102									Likely geological	Likely geological	Undated	N/A	Yes	472079.10	5937501.20	APPW
E_420	CCS23_107									Likely geological	Likely geological	Undated	N/A	Yes	479911.50	5937874.50	EDA