Connah's Quay Low Carbon Power

Environmental Statement Volume IV Appendix 18-A: Marine Heritage Desk Based Assessment

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Summary

Wessex Archaeology have been commissioned by Uniper UK Limited to prepare a marine heritage desk-based assessment in relation to the marine heritage environment for the Connah's Quay Combined Cycle Gas Turbine (CCGT) fitted with Carbon Capture Plant (CCP) (hereafter referred to as the Proposed Development). This desk-based assessment supports **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**) of the Environmental Statement (ES).

The aim of this desk-based assessment is to assess the known and potential marine heritage resource within the study area. The assessment has established that there are the following marine heritage assets:

- potential for prehistoric archaeological material;
- potential for additional currently unknown maritime and aviation seabed features to exist; and
- the Historic Seascape Character of the area comprises areas of constantly shifting sandbanks with changing depths; hazards marked by numerous buoys, lights and fog horns, and a long standing importance for trade, defence and occupation.

The potential for the proposed activities to impact as yet unknown archaeological sites related to palaeogeography, shipwrecks and aircraft crash sites has been assessed in **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**). The need for, scale, scope and nature of any further assessment and / or archaeological works has been agreed through consultation and engagement with the statutory authorities, including the Clwyd Powys Archaeological Trust (CPAT), Cadw and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) (where relevant), and this is recorded in the **Overarching Written Scheme of Investigation for Terrestrial and Marine Heritage Mitigation** (**EN010166/APP/6.8**) which sets out a protocol for unexpected archaeological discoveries. It should be noted that it is the implementation of the Written Scheme of Investigation, not the document itself that comprises the mitigation.

Connah's Quay Marine Desk-Based Assessment

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology have been commissioned by Uniper UK Limited to prepare a marine heritage desk-based assessment for the proposed Connah's Quay CCGT Generating Plant fitted with CCP.

1.1.2 The proposed CCGT generating station would include natural gas, carbon dioxide (CO_2), electricity and water connections, and will be designed to operate with post-combustion carbon capture and compression plant installed such that the plant can be operated as a dispatchable, low-carbon generating station (Connah's Quay Low Carbon Power, referred to herein as 'the Proposed Development').

1.1.3 The Proposed Development is located on land at, and in the vicinity of, the existing Connah's Quay Power Station (Kelsterton Road, Connah's Quay, Flintshire, CH6 5SJ), North Wales adjacent to the River Dee. The study area for this assessment focusses on the Water Connection Corridor, above and below Mean High Water Springs (MHWS) as shown on **Figure 18-1: Marine Cultural Heritage Study Area** (**EN010166/APP/6.3**).

1.1.4 This report forms **Appendix 18-A: Marine Heritage Desk-Based Assessment** (**EN010166/APP/6.4**) with the marine heritage baseline for the assessment of temporary and permanent impacts on marine heritage which is presented in **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**).

1.1.5 Marine Heritage resource in this context is the overarching term for the heritage resource within Water Connection Corridor and the study area, the study area is the 1 km buffer placed around the centre of the Water Connection Corridor. It comprises archaeological remains / deposits, seabed features, prehistoric landscapes, seabed or riverbed prehistory, intertidal heritage receptors, maritime and aviation features including shipwrecks and aircraft crash sites and associated material / debris, and the Historic Seascape Character.

1.2 Development proposal

1.2.1 The Proposed Development is subject to ongoing technical studies, to provide flexibility and to align with the current grid connection, but is expected to comprise the development of up to two new integrated power generation and carbon capture 'trains' achieving a combined net electrical output capacity of up to a likely maximum of 1,380 megawatts (MW) onto the national electricity transmission network. More information about the proposed development can be found in **Chapter 4: The Proposed Development** (**EN010166/APP/6.2.4**).

1.2.2 The proposed development in the Water Connection Corridor is limited to the refurbishment and upgrades to existing intake structures, to provide new eel screens on the 28 existing cooling water intakes (2 mm eel screens) as well as undertake

minor repairs to surface concrete, metalwork and timbers. These works would be undertaken by divers and a support boat and/or barge. A working area would be established using scaffolding attached to the existing protect structure and both developments would not require interaction with the riverbed. As described in **Chapter 4 The Proposed Development** (**EN010166/APP/6.2.4**) a jet washing and/or air blast system would be required to keep the intake and outfall structure clear. These systems would only be used at falling tide to return the removed silt to the estuary sediment.

1.2.3 As described in **Chapter 5: Construction Management and Programme** (**EN010166/APP/6.2.5**) construction to the existing Connah's Quay Surface Water Outfall would take place. This area is located within the Study Area of this Desk Based Assessment. The water outfall may require maintenance / minor upgrade works, including clearing debris and repairs to the structure would take place. Further, within the existing Surface Water Outfall Area construction of a new and permanent outfall structure for surface water drainage discharge from the Main Development Area (MDA) (the Proposed Surface Water Outfall) would be undertaken. According to **Chapter 13: Water Environment and Flood Risk** (**EN010166/APP/6.2.13**) requires a new discharge/outfall pipe adjacent to the existing discharge point. In order to construct the required pipeline an excavation is required and would cover an area of 380 m^2 with an overall approximate depth of 2 m within the Surface Water Outfall Area. The calculated area is based on a 10 m wide construction corridor to install a pipe with an approximate diameter of 1.35 m, along a 26 m length of the outfall pipe which sits within the salt marsh.

1.2.4 The scope of this assessment comprises the Proposed Development above and below MHWS within the Water Connection Corridor.

1.2.5 The area of the Proposed Development which is below MHWS comprises a section of the River Dee that flows through a large estuary into the Irish Sea. The area consists of coastal marshlands and sand. The area north from the River Dee consists of land reclaimed between 1749 and 1916. The Shotton steelworks complex was located in this area during the 20th century (FLNTHL743 2017).

1.3 Scope of document

1.3.1 The purpose of this assessment is to determine the nature, extent and significance of the known and potential marine heritage resource within the study area. This baseline informs the impact assessment which is presented in **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**).

1.3.2 This assessment focuses on the marine heritage resource located within the Water Connection Corridor only, above and below MHWS, plus the 1 km buffer placed around the centre of the Water Connection Corridor boundary. The 1 km buffer is the defined study area in this report. An assessment of the rest of the Proposed Development is set out in **Appendix 17-A: Terrestrial Heritage Desk Based Assessment** (**EN010166/APP/6.4**) and **Chapter 17: Terrestrial Heritage** (**EN010166/APP/6.2.17**).

1.4 Aims

1.4.1 The aim of this marine heritage desk-based assessment is to characterise the known and potential marine heritage baseline within the Water Connection Corridor and the study area to subsequently inform **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**).

1.4.2 The specific aims of this assessment are:

- to provide details of relevant legislation, national and local planning policy, and best practice guidance;
- to outline the known and potential marine heritage resources within the Water Connection Corridor and study area based on a review of existing information;
- to summarise the Historic Seascape Character within the study area; and
- to assess the significance of the known and potential marine heritage resource through weighted consideration of their valued components.

1.5 Copyright

1.5.1 This report may contain material that is non-Wessex Archaeology copyright (e.g. Ordnance Survey, British Geological Survey (BGS), Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licence, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the Copyright, Designs and Patents Act 1988 with regards to multiple copying and electronic dissemination of the report.

2 LEGISLATION, GUIDANCE AND POLICY

2.1 Introduction

2.1.1 A full overview of the legislative and policy context that is relevant to the Proposed Development is provided within **Chapter 7: Planning Policy and Need** (**EN010166/APP/6.2.7**). The legislation and planning policy context which is of the most relevance to this Appendix is summarised below and is provided in detail in **Appendix 7-A: Legislative, Policy and Guidance Framework for Technical Topics** (**EN010166/APP/6.4**).

2.2 Marine legislation

Jurisdiction

2.2.1 The Proposed Development is located in Welsh territorial waters (up to 12 nautical miles (nm) from the coast). The following legislation applies:

- Historic Environment (Wales) Act 2023 (Ref 1);
- The Applications for Scheduled Monument Consent (Wales) Regulations 2024 (Ref 2);

- The Scheduled Monuments (Partnership Agreements) (Wales); Regulations 2024 (Ref 3);
- Protection of Wrecks Act 1973: Section One and Two (Ref 4);
- Protection of Military Remains Act 1986 (Ref 5Ref 4);
- Merchant Shipping Act 1995 (Ref 6); and
- Marine and Coastal Access Act 2009 (MCAA) (Ref 7).

2.3 International conventions

- Convention on the Protection of the Underwater Cultural Heritage 2001 (UNESCO) (Ref 8);
- The United Nations Convention on the Law of the Sea (UNCLOS) (Ref 9); and

2.4 National Policy Statements (NPS) and plans

- UK Marine Policy Statement (Ref 10)
- National Policy Statement for Energy (EN-1) (Ref 11);
- National Policy Statement for Natural Gas Electricity Generating Infrastructure (EN-2) (Ref 12);
- National Policy Statement for Gas and Oil Pipelines (EN-4) (Ref 13);
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 14);
- Planning Policy Wales (PPW) (Ref 15);
- Welsh National Marine Plan (Ref 16);
- Future Wales: The National Plan to 2040 (Ref 17);
- The Technical Advice Note (TAN) 24: The Historic Environment (Ref 18).

2.5 Marine archaeological guidance

2.5.1 This assessment was carried out in a manner consistent with available guidance as described below:

- Cadw, Heritage Partnership Agreements in Wales (2021) (Ref 19);
- Cadw, Caring for Coastal Heritage (1999) (Ref 20);
- Cadw, Caring for Military Sites of the Twentieth Century (2009) (Ref 21);

- Cadw, Conservation Principles for the Sustainable Management of the Historic Environment in Wales (2011) (Ref 22);
- Cadw, Setting of Historic Assets in Wales (2017) (Ref 23);
- Cadw, Managing the Marine Historic Environment of Wales (2020) (Ref 24);
- Welsh Government (2017) Managing Heritage Impact Assessment in Wales (Ref 25);
- Welsh Government (2017) Managing Historic Character in Wales (Ref 26);
- Dredging and Port Construction: Interaction with Features of Archaeological or Heritage Interest (Ref 27);
- Our Seas – A shared resource: High level marine objectives (HM Government 2009) (Ref 28);
- The Code of Practice for Seabed Development (Joint Nautical Archaeology Policy Committee (Ref 29);
- The Assessment and Management of Marine Archaeology in Port and Harbour Development (Ref 30);
- Charter on the Protection and Management of Underwater Cultural Heritage The International Council on Monuments and Sites (ICOMOS) 1996 (Ref 31);
- Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Advice by Historic Environment Services (2020) (Ref 32); and
- CIfA Standard and Guidance for Historic Environment Desk-based Assessment (2020) (Ref 33).

3 METHODOLOGY

3.1 Study Area(s)

Scope

3.1.1 The area assessed in this report is defined by the areas of the Proposed Development within the Water Connection Corridor, situated below and above MHWS and a 1 km study area (**Figure 18-1: Marine Cultural Heritage Study Area** (**EN010166/APP/6.3**)).

Study Area

3.1.2 The study area comprises a 1 km buffer placed around the centre of the Water Connection Corridor. This buffer is considered to provide an appropriate search area for obtaining records from relevant archive databases, which provided not only context for the discussion and interpretation of the known and potential marine heritage resources within the search area, but also allowed for potential

inaccuracies in positional data that could be present in archival records. The 1 km buffer is in line with the 1 km study area applied for the assessment of non-designated heritage assets within the Terrestrial Heritage desk-based assessment (**Appendix 17-A: Terrestrial Heritage**).

Assessing the archaeological potential

3.1.3 Archaeological potential assesses the possibility that unknown marine heritage assets may exist within the Water Connection Corridor and Study Area in addition to the known archaeological resource identified in the baseline. The potential for unrecorded archaeological remains to exist within the Water Connection Corridor and Study Area has been determined by professional judgement guided by an assessment of the existing heritage resource and the impact of previous modern development or ground disturbance within the Water Connection Corridor and Study Area. The potential for an area to contain archaeological remains is rated 'high', 'medium', 'low' or 'negligible'. This rating is based on an understanding of the archaeological resource as a whole and takes into account its national, regional and local context. The rating also considers the number and proximity of known and predicted archaeological/historical sites or find spots within the Water Connection Corridor and the surrounding study area. In addition, in the assessment of the archaeological potential the preservation of the area and the (archaeological) history of Connah's Quay are taken into account as well.

3.2 Archaeological desk-based assessment

Key themes

3.2.1 The methodology follows the best practice professional guidance outlined by the Chartered Institute for Archaeologists' (CIfA) Standard and Guidance for Historic Environment Desk-Based Assessment (Ref 32).

3.2.2 The main themes relevant to marine heritage baseline as assessed in this report are:

- seabed or riverbed prehistory (for example, palaeochannels and other features that contain prehistoric sediment, and derived Palaeolithic artefacts e.g. handaxes);
- seabed features, including maritime sites (such as shipwrecks and associated material including cargo, debris, obstructions and fishermen's fasteners) and aviation sites (aircraft crash sites and associated debris);
- archaeological remains and/or deposits;
- intertidal heritage assets; and
- Historic Seascape Character.

Data sources

3.2.3 Baseline conditions have been established by undertaking a desktop review of published information and through engagement with relevant organisations. The data sources used to inform the baseline description and assessment include:

- United Kingdom Hydrographic Office (UKHO) data for charted wrecks and obstructions;
- National Heritage List maintained by Cadw comprising data of designated heritage assets including sites protected under the PMRA 1986 and the PWA 1973;
- National Monuments Record of Wales (NMRW) maintained by Coflein and derived from information by RCAHMW, comprising data for terrestrial and marine archaeological sites, find spots and archaeological events;
- Lle Geo-Portal;
- the relevant Historic Environment Record(s) (HER) particularly from CPAT;
- relevant mapping including Admiralty Charts, historic maps and Ordnance Survey;
- relevant documentary sources and grey literature held by Wessex Archaeology, and those available through the Archaeological Data Service and other websites; and
- Welsh Research Frameworks.

Data structure

3.2.4 In order to compile the marine heritage baseline as presented in this report, where possible, the sources were incorporated into a project Geographic Information System (GIS) using ArcGIS Pro 3.2.2., enabling the data to be spatially analysed.

3.2.5 There are no known shipwreck or aircraft sites in the study area or 'recorded losses', (vessels and aircraft that are known to have been lost, but do not, except by chance, have material on the seabed at their recorded loss location), so no discrimination between record types was required.

3.2.6 For the purposes of this report, the gazetteers (Annex 3) are compiled and illustrated in British National Grid (BNG) information relating to the marine heritage resource that did not include location or positional information were used to inform the marine heritage baseline assessment where relevant.

Chronology

3.2.7 Archaeological material is generally studied within a framework of 'periods' or 'ages' that reflect the activities and cultural changes taking place over time. All dates are referred to as BCE (Before Common Era), BP (Before Present) or AD (Anno Domini) within the text. BCE refers to calibrated radiocarbon chronology that can be considered equivalent to calendar years. BP dates are used for periods of time older than circa 10,000 years ago.

3.2.8 A list of the main archaeological periods in Britain referred to in the text, along with their broadly defined dates are presented in Annex 2.

Submerged prehistory

3.2.9 The baseline assessment for palaeogeography was based on a range of secondary sources, including academic papers, monographs, geological information (e.g. BGS mapping), and previous work undertaken by Wessex Archaeology within the Irish Sea area and the wider region. This baseline for the palaeogeographic assessment aids in producing a stratigraphy for the study area, assigning archaeological potential to identified units, and informing future sampling strategies.

Submerged features: maritime and aviation sites

3.2.10 The baseline summary for maritime and aviation heritage was assessed by means of accessing any records of sites, findspots, wrecks, casualties and seabed features held by the UKHO, RCAHMW and CPAT HER within the study area. The baseline assessment of maritime and aviation heritage was further supplemented by a review of relevant primary and secondary source material in order to provide an indication on the nature of maritime and aviation activity across the region. As well as summarising the known heritage resource, the baseline assessment underlines the potential for encountering unknown shipwreck and aircraft crash sites within the study area.

3.2.11 Responses were received from all data repositories, confirming that there are no known submerged features in the search area.

Intertidal archaeology

3.2.12 The baseline summary for intertidal archaeology was assessed by means of accessing any records of sites and findspots obtained from the UKHO, RCAHMW and CPAT within the Study Area. The data obtained were reviewed and those located within the study area were extracted and compiled to form a gazetteer of the known intertidal features. These records were each given a unique identifier beginning with 1001 and continuing sequentially (Annex 4) and were added to **Figure 18-2: Marine Heritage Assets** (**EN010166/APP/6.3**).

Historic Seascape characterisation

3.2.13 The baseline summary for character of the Historic Seascape within the study area was assessed using the results of National Seascape Assessment for Wales 2015. In particular, the assessment focussed on the Marine Character Areas (MCAs) for Dee Estuary (MCA 01) using the report and data sheets assessing Welsh seascapes and their sensitivity to offshore developments (Ref 34).

3.3 Geoarchaeological methodology

Data sources

3.3.1 A total of 105 Ground Investigation (GI) logs were reviewed as part of a Stage 1 geoarchaeological assessment, with the aim of identifying deposits of potential archaeological and geoarchaeological significance, and to set the sequence of deposits in their wider geoarchaeological context. The logs were reviewed from the following sources (Annex 5):

- Terresearch Ltd – Report on Ground Investigation of Site Conditions at Connah’s Quay (May 1962);

- Foundation Engineering Ltd – Central Electricity Generating Board, North West Region, Connah's Quay 400 kV Substation – Report on Site Investigations (Ref 35);
- Ground Explorations Ltd – Report on Exploration of Ground Conditions, Bangor – Connah's Quay, 400 kV Line (Ref 36);
- Soil Mechanics Limited – Site Investigation for Proposed 400 kV Transmission Line Towers Between Connah's Quay, Flintshire and Kirkby, Lancs. (Ref 37);
- Allott & Son – Report on a Site Investigation at Connah's Quay Power Station (Ref 38); and
- Soil Mechanics Limited - Site Investigation for North West Sites Alternative 'A', Connah's Quay, Deeside (Ref 39).

3.3.2 Of these sources, only those from Soil Mechanics included spatial data (including accurate eastings, northings and elevations) suitable for deposit modelling purposes. The deposit modelling was therefore focused on the GI logs from this ground investigation, with the deposits in the remainder of sources included in the discussion of the geoarchaeological potential of the deposits as a whole.

Geoarchaeological deposit modelling

3.3.1 All GI logs that included suitable spatial data were entered into industry standard geological utilities software (RockWorks™ 23). Each stratigraphic unit was given a colour allowing cross correlation and grouping of the different sedimentary units. The grouping of these deposits is based on lithological descriptions, which define distinct depositional environments referred to as 'stratigraphic units'.

3.3.2 The sedimentary units from boreholes were classified into five stratigraphic units, listed below from the youngest to the oldest:

- Unit 1 - Made Ground/Modern Riverbed Sediments;
- Unit 2 - Alluvium;
- Unit 3 - Fluvial Gravels;
- Unit 4 - Till; and
- Unit 5 - Bedrock.

3.3.3 The deposit modelling software was used to plot two stratigraphic profiles ('transects') to illustrate the stratigraphic units and their lateral and vertical variability. The location of the transects is shown in Figure 1 (Annex 5), with the transects illustrated in Figures 2 and 3 (Annex 5).

3.3.4 Figures 2 and 3 show broadly southwest-northeast aligned transects across the western and eastern areas of the Site respectively, broadly perpendicular to the River Dee.

3.3.5 All location data and figures are presented as projected co-ordinates in British National Grid (OSGB36) Eastings and Northings. The vertical reference level is given as metres relative to Ordnance Datum (m OD).

3.4 Archaeological watching brief / Unmanned Aerial Vehicle (UAV) survey

3.4.1 An archaeological watching brief was undertaken in tandem with a UAV survey planned for ecological purposes. This comprised an archaeologist attending during the UAV and walkover survey, that took place 1-2 July 2024.

3.4.2 The aim of the survey was to ensure that if any features of archaeological interest were encountered, they could be recorded in an appropriate level of detail. For example, for any features encountered during the UAV survey, the archaeologist could direct the drone pilot to capture features in sufficient detail.

3.4.3 The main goal for AECOM's environmental team and the drone team was to conduct an environmental walkover and a drone survey to capture an orthophoto of the study area. Therefore, on the first day, the drone for the orthophoto was launched. The archaeologist accompanied the team at both landing and deploying areas and conducted a visual inspection of the terrain. Open spaces in the area were visually inspected and the whole area was inspected with binoculars as well.

3.4.4 During the UAV survey orthophotos were taken. These were thoroughly reviewed by an archaeologist using ArcPro, as part of the archaeological assessment, as these photos provide a clear image of the study.

3.5 Assessment of setting

3.5.1 PPW states that *'It is important that the planning system looks to protect, conserve and enhance the significance of historic assets. This will include consideration of the setting of an historic asset which might extend beyond its curtilage. Any change that impacts on an historic asset or its setting should be managed in a sensitive and sustainable way. It is the responsibility of all those with an interest in the planning system, including planning authorities, applicants, developers and communities, to appropriately care for the historic environment in their area. The protection, conservation and enhancement of historic assets is most effective when it is considered at the earliest stage of plan preparation or when designing proposals new proposals*.'[1] (Ref 40)

3.5.2 Cadw's *Managing Setting of Historic Assets in Wales* provides general guidance, largely applicable to terrestrial sites, and notes that the importance of setting 'lies in what it contributes to the significance of a historic asset'. With regards to significance for heritage policy, the National Planning Policy Framework notes that the interest

[1] Welsh Government, 2024, Planning Policy Wales, Paragraphs 6.1.7 and 6.1.8

of a heritage asset *'may be archaeological, architectural, artistic or historic'*.[2] (Ref 41)

3.5.3 Cadw states that '*The setting of a historic asset includes the surroundings in which it is understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive, negative or neutral contribution to the significance of an asset*.'[3] (Ref 41)

3.5.4 The setting of a historic asset can include physical elements of its surroundings as well as less tangible elements. Although views to and from a historic asset are often the most obvious factors, other sensory elements can also affect setting. Reference in the guidance is also made to the setting associated with buried heritage assets which may not be readily appreciated by a casual observer, but retains a presence in the landscape such as, for example, wreck sites that are periodically, partly or wholly submerged.

3.5.5 Cadw's *Managing the Marine Historic Environment of Wales* states that *'Development and use of the marine environment can, however, affect historic assets both directly and indirectly, including: loss of, or damage to, historic material; alteration to the setting of historic assets which can positively or negatively affect the ability to understand and appreciate them or through burial or exposure*.'[4] (Ref 41)

3.5.6 Policy SOC_05 in the Welsh National Marine Plan (Ref 42) states that *'Proposals should demonstrate how potential impacts on historic assets and their settings have been taken into consideration and should, in order of preference:*

a. avoid adverse impacts on historic assets and their settings; and/or

b. minimise impacts where they cannot be avoided; and/or

c. *mitigate impacts where they cannot be minimised*.'

If significant adverse impacts cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding. Opportunities to enhance historic assets are encouraged.[5]

3.5.7 In order to assess whether, how and to what degree setting makes a contribution to the significance of heritage assets, the following must be considered: the physical surroundings of the asset including its relationship with other heritage assets; the way the asset is appreciated, and the asset's associations and patterns of use.

3.5.8 The assessment of setting in this document follows the guidance discussed in the paragraphs above and draws on the results from the archaeological assessment of

[2] Cadw. 2017, Managing Setting of Historic Assets in Wales p. 2
[3] Cadw, 2017, Managing Setting of Historic Assets in Wales p. 2
[4] Cadw, 2020, Managing the Marine Historic Environment of Wales p. 18
[5] Welsh Government, 2019, Welsh National Marine Plan, Policyt SOC_05. Page 33

the marine heritage assets located within the study area. This is described using the following two factors:

- physical surroundings and views – which includes the physical presence of the asset on the seabed, its surroundings, and relationship with other assets and navigational hazards in the immediate area. Views to and from the asset, and how the asset is experienced in its immediate physical surroundings are also considered; and

- non-visual factors – including the way the asset is appreciated in a broader historical, artistic and intellectual capacity, and the asset's associations.

3.5.9 It should be noted that for heritage assets offshore, sites are generally only experienced by divers, remotely operated vehicle (ROV), or by geophysical survey, and the views to the asset are often very limited due to reduced visibility in the water column. In addition, unlike many terrestrial sites, the position of the asset on the seabed has not been deliberately chosen, and although some sites may have reached their position through military action (e.g. wartime losses and losses from mine-laying activity) or have been lost due to a particular navigational hazard (e.g. hitting a harbour wall or being stranded on a particular sandbank for instance Flint Sands), many positions are entirely arbitrary, and even with military sinking events, an attack on the surface could lead to a wreck being deposited on the seabed miles from where the event took place. Non-visual factors may include associations with particular battles, wars, minefields, and other historic events, as well as how the wreck can be appreciated in its wider context, for example through well-known trade routes, collisions or local industry. Association between the asset and the local social history is another important aspect of an asset's non-visual importance, including rescue attempts or losses occurring within modern memory.

3.5.10 It is not possible to ascertain the setting of currently unidentified marine heritage assets, where limited information is known, for example unknown wrecks or wrecks that have not been characterised to determine their period of build, use or loss. Similarly, setting cannot be assessed for potential sites that have not yet been discovered.

3.6 Determining value and sensitivity

3.6.1 This report informs **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**). In order to assess the potential impacts of a development upon the marine heritage resource, EIAs typically adopt the conceptual approach known as the 'source-pathway-receptor' model. This approach is based on the identification of the source (i.e. the origin of a potential impact), the pathway (i.e. the means by which the activity could impact a receptor) and the receptor that may be impacted (e.g. known/ potential heritage assets). In order for the significance of any given impact to be fully understood, the sensitivity of any receptors that may be impacted needs to be considered. This section outlines the means by which the sensitivity of marine heritage assets is ascertained.

3.6.2 The capability of a receptor to accommodate change and its ability to recover if affected is a function of its sensitivity. Receptor sensitivity is typically assessed via the following factors:

- adaptability – the degree to which a receptor can avoid or adapt to an effect;
- tolerance – the ability of a receptor to accommodate temporary or permanent change without significant adverse effects;
- recoverability – the temporal scale over and extent to which a receptor will recover following an effect; and
- value – a measure of the receptor's importance, rarity and worth.

3.6.3 Maritime heritage assets cannot typically adapt, tolerate or recover from physical impacts resulting in material damage or loss caused by project activities. Consequently, the sensitivity of each asset is predominantly quantified only by its value.

3.7 Impact assessment criteria

Asset sensitivity

3.7.1 The sensitivity of known marine heritage assets have been assessed in this desk-based assessment on a four-point scale using professional judgement informed by criteria provided in **Table 1**.

Value of an asset

3.7.2 Within this assessment, significance is weighed by consideration of the potential for the marine heritage asset to demonstrate the following value criteria (from Cadw's Managing the Marine Historic Environment of Wales (Ref 41)):

- *evidential value: the extent to which the physical evidence tells how and when the historic asset was made, how it was used and how it has changed over time. There may be buried or obscured elements associated with the historic asset which may also be an important source of evidence; -*
- *historical value - the historic asset may illustrate a particular aspect of past life or it might be associated with a specific person, event or movement; there may be physical evidence for these connections which it could be important to retain;*
- *aesthetic value - the design, construction and craftsmanship of the historic asset. This can include setting and views to and from the historic asset, which may have changed through time;* and

- *communal value - the historic asset may have particular significance for its commemorative, symbolic or spiritual value, or for the part it has played in cultural or public life.* [6]

3.7.3 The value of known marine heritage assets was assessed on a four-point scale using professional judgement informed by criteria provided in **Table 1**. Furthermore, *On the Importance of Shipwrecks* (Ref 43) suggests importance can be assessed through the 'BULSI' system, incorporating the following criteria: build, use, loss, survival and investigation. This represents all phases of a ships 'career' and tries to examine the shipwreck through its build and use, the manner in which it was lost and how it has survived and been investigated over time.

3.7.4 To further supplement this approach, the Aggregate Levy Sustainability Fund (ALSF) funded *Marine Class Description and principles of selection for aggregate producing areas project* (ALSF 5383), undertaken by Wessex Archaeology (Ref 44), proposed a composite timeline that considers wrecks in five distinct date ranges. The timeline considers the broad chronology of shipbuilding, thus drawing out generalisations regarding the age and special value of sites. The timeline is summarised as follows:

- pre- 1500 AD: this covers the period from the earliest Prehistoric evidence for human maritime activity to the end of the medieval period, c. 1508. Little is known of watercraft or vessels from this period and archaeological evidence of them is so rare that all examples of craft are likely to be of special interest (which may contribute to them being assessed as of high value);

- 1501 to 1815: this encompasses the Tudor period in England and the Stuart periods in Scotland and Britain, the Wars of the Three Kingdoms, the Anglo-Dutch Wars and later the American Independence and French Revolutionary Wars. Wreck and vessel remains from this date are also quite rare, and can be expected to be of special interest;

- 1816 to 1913: this period witnessed great changes in the way in which vessels were built and used, corresponding with the introduction of metal to shipbuilding, and steam to propulsion technology. Examples of watercraft from this period are more numerous and as such, it is those that specifically contribute to an understanding of these changes that should be regarded as having special interest;

- 1914 to 1945: this period encompasses the First World War, the Interwar years and the Second World War. This date range contains Britain's highest volume of recorded boat and ships losses. Those which might be regarded as having special interest are likely to relate to technological changes and to local and global activities during this period; and

[6] Cadw 2020, Managing the Marine Historic Environment of Wales. P. 33

- post 1945: the final period extends from 1946 through the post-war years to the present day. Vessels from this date range would have to present a strong case if they are to be considered of special interest.

3.7.5 According to this composite timeline, vessels that pre-date 1816 are likely to be considered of special value on the basis of their rarity and subsequent national and international value in our understanding of maritime activity and shipping movements during these periods.

3.7.6 Wrecks dating from 1816 to the present day are more plentiful amongst known wrecks. The Marine Class Description and Principles of Selection project (Ref 45) further revealed that a total of 96% of known and dated wrecks were lost in the period between 1860 and 1950. Due to their predominance in the known marine archaeological record, the special value of wrecks of this period thus depends upon their ability to exhibit both integral and relative factors based on attributes relating to the Wessex Archaeology 'BULSI' system of wreck assessment. The ALSF-funded project *Assessing Boats and Ships 1860-1950* (Ref 46; Ref 47) explored this further by providing a national stock-take of known wrecks in territorial waters off England and review it in the light of the framework for assessing special interest prepared in the *Marine Class Description and Principles of Selection project* and historical thematic studies.

3.7.7 The *Early Ships and Boats Prehistory to 1840* provided further information about earlier vessels (Ref 48). Through undertaking a national stock-take of wrecks dating to this period within English territorial waters, this project provides supplementary guidance on the key themes and interests represented by such wrecks, in order to inform decisions regarding importance and mitigation. These are summarised thus:

- does it illustrate a key narrative of the period;
- does it represent a distinct and tangible link to significant persons or events;
- is it representative of significant loss of life or related responses in seafaring safety;
- does it make a distinct cultural contribution; and
- does it have current relevance or parallels.

3.7.8 *Aircraft Crash Sites at Sea* (Ref 49) identified gaps in knowledge and formulated draft interim guidance for how sites should be planned for and treated.

3.7.9 The UK Marine Policy Statement (MPS) (Ref 50) describes a heritage asset as holding a degree of significance. In this statement significance relates to the heritage interest of an asset that may be archaeological, architectural, artistic or historic.

3.7.10 Furthermore, the nature of the heritage resource is such that there is a high level of uncertainty concerning the distribution of potential, unknown archaeological remains on the seabed. It is often the case that data concerning the nature and extent of sites is out of date, extremely limited or entirely lacking. As a precautionary

measure, unknown potential cultural heritage receptors are, therefore, considered to be of high sensitivity and high value.

3.7.11 The value of known marine heritage assets has been assessed on a four-point scale using professional judgement informed by criteria provided in **Table 1**.

Table 1: Sensitivity / Value Criteria for Marine Heritage assets

Sensitivity / Value	Sensitivity / Value Criteria
High	• Best known, only example or above average example and / or significant or high potential to contribute to knowledge and understanding and / or engagement. Assets with a demonstrable international or national dimension to their importance are likely to fall within this category; • wrecked ships and aircraft that are protected under the Protection of Wrecks Act 1973, Historic Environment (Wales) Act 2023 or Protection of Military Remains Act 1986 with an international dimension to their importance, plus as-yet undesignated sites that are demonstrably of equivalent archaeological value; and • known submerged prehistoric sites and landscapes with the confirmed presence of largely in situ artefactual material or paleogeographic features with demonstrable potential to include artefactual and/or paleoenvironmental material, possibly as part of a prehistoric site or landscape.
Medium	• Average example and / or moderate potential to contribute to knowledge and understanding and / or engagement; • includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have moderate potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation; and • prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.

Sensitivity / Value	Sensitivity / Value Criteria
Low	• Below average example and / or low potential to contribute to knowledge and understanding and / or engagement; • includes wrecks of ships and aircraft that do not have statutory protection or equivalent significance, but have low potential based on a formal assessment of their importance in terms of build, use, loss, survival and investigation; and • prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.
Very Low	• Poor example and / or little or no potential to contribute to knowledge and understanding and / or engagement. Assets with little or no surviving archaeological interest.

3.8 Assumptions and limitations

Heritage data

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

3.8.2 The records held by the UKHO, RCAHMW, CPAT, HER and the other sources used in this assessment are not a record of all surviving cultural heritage assets, rather a record of the discovery of a wide range of archaeological and historical components of the marine historic environment. The information held within these is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown. In particular, this relates to buried archaeological features.

Geotechnical data

3.8.3 The data reviewed as part of the geoarchaeological assessment include geotechnical ground investigations undertaken between 1962 and 1991 (see Section 3.3). The most recent of these has been utilised for deposit modelling purposes on the basis that suitable spatial data for the boreholes (including elevations relative to OD) are included within the logs. For the remainder of the sources, the exact location of the GI interventions is uncertain; the majority appear to be outside of the specific study area examined here.

3.8.4 When reviewing the geoarchaeological and archaeological potential of the deposits, it is assumed that no significant alteration to the sub-surface deposits (for example,

through development impacts since 1991) has negatively impacted on this potential. In reviewing this potential, the sediment descriptions derived from the geotechnical logs are assumed to be a suitably accurate representation of the sedimentary sequence in the study area.

4 MARINE HERITAGE ASSESSMENT OF BASELINE: PALAEOGEOGRAPHY

4.1 Geological baseline and archaeological potential

4.1.1 The following is an overview of the Quaternary geological and archaeological history of the wider region from the Pleistocene to the Holocene marine transgression. This is based on a range of secondary sources, including academic papers, monographs, geological information (e.g. BGS mapping), and previous work undertaken by Wessex Archaeology within the Irish Sea area and the wider region (Ref 51). This serves as a baseline for the palaeogeographic assessment, and aids in producing a stratigraphy for the study area, assigning archaeological potential to identified units, and informing future sampling strategies.

4.1.2 The study area is located within the Dee Estuary, in the Welsh Platform area of the Irish Sea. The basement geology of this area of the Irish Sea comprises sandstones and mudstones dating from the Permian through to the Triassic, with some potential Carboniferous deposits in the nearshore, all of which are extensively folded and faulted (Ref 52; Ref 53).

4.1.3 The upper surface of the bedrock represents a significant unconformity, and the bedrock units are directly overlain by Quaternary sediments within the study area. The Quaternary history of the Irish Sea, as with most of the UK, is complex and has been dominated by recent glacial/interglacial cycles, which have been recorded within the regional geology.

Pre-Anglian to Ipswichian (>478 ka[7] – 115 ka; >Marine Isotope Stage (MIS) 12 – 5e)

4.1.4 As a shallow shelf area at a relatively high latitude, the eastern Irish Sea has experienced at least three glacial advances and retreats since the Anglian period, and the site is located within the maximum extent of each of these glaciations (Ref 54). These advances and retreats are recorded as repeated phases of major incisions, lodgement/ablation tills, and associated interglacial deposits identified at different levels within the Irish Sea stratigraphy.

4.1.5 The phases of formation and ablation of ice sheets affected local (and global) relative sea levels, fluctuations in which likely resulted in the eastern Irish Sea being periodically sub-aerially exposed. Although the region was directly covered by ice during multiple glacial advances, periods of time may have existed between marine regression and glacial advance (and vice versa) where the landscape was free of both water and ice.

[7] Thousand years ago

4.1.6 Quaternary sediments in the River Dee Estuary have been previously mapped by the British Geological Survey (BGS) as sands and gravels associated with the River Dee. The broad sedimentary description however indicates that the lithology and stratigraphy of the area is not fully understood, at least at a local scale that would be mappable and provide information of sufficient detail on the likely geoarchaeological potential of the sedimentary sequence.

4.1.7 From an archaeological perspective, evidence for human occupation in excess of 700,000 years has previously been recorded at sites around the UK, particularly in the East Anglia region (Ref 55; Ref 56). Periods of sub-aerial exposure of the shallow shelf areas around the UK will have permitted the movement of Pleistocene animals, and may have facilitated occupation and exploitation of this landscape by early hominins. Direct evidence of hominin occupation of the shallow shelf areas of the UK has previously been identified off the coast of Suffolk, when numerous lithic artefacts dating from the Early Middle Palaeolithic (c. 350 ka – 180 ka BP) were recovered from the seabed during aggregate dredging (Ref 57; Ref 58).

4.1.8 The presence of Palaeolithic cave sites along the North Wales coast indicates that similar occupation of the region during times of low relative sea level may have been possible, circa MIS 8 and 7. In particular, early Neanderthal remains discovered in Pontnewydd Cave near St Asaph, Denbighshire, dating from c. 225 ka before present (BP), record hominin presence in the area during the Early Middle Palaeolithic, prior to the late glacial maximum (LGM) (Ref 59; Ref 60). However, the area will have been uninhabitable during the heights of the Anglian and Saalian glaciations. As such, any habitation in the area was potentially sporadic and punctuated by extended periods of absence.

Devensian to LGM (c. 115 ka – 18 ka; MIS 5d -2)

4.1.9 The Devensian glaciation was the last, although not the most extensive, glacial advance experienced by the UK, during which the Irish Sea was again likely to have been entirely covered by ice. Relict terrestrial features still visible on the seabed, such as drumlins, moraines, eskers, and periglacial patterned ground, are all evidence of the advance and retreat of the Devensian ice sheet and its effect on the underlying landscape (Ref 52; Ref 53;Ref 61; Ref 62).

4.1.10 According to early studies detailing the origin of the River Dee estuary, during the Last Glacial Maximum (26–19 Kya BP), extensive iceway glaciers forming lateral extensions of the Irish Sea ice-sheet migrated into the lowland valleys constrained by high elevated localities in the mountainous North Wales region. The Dee Iceway forms one of four prominent iceway features in the region, alongside the Ditton, Mersey and Mid Wirral Iceways (Ref 63). Glacially-derived deposits associated with this ice extension comprise Late Devensian brown and grey clayey till, as identified in geotechnical investigations less than 1km to the northwest in association with the Deeside Road Link River Crossing (Ref 64).

4.1.11 Archaeologically, it is known that Wales was occupied at least during the earlier Devensian, with Neanderthal finds dating from 50 ka BP identified from Coygan Cave near Tenby, and modern human remains dating from 26 ka BP discovered in Paviland Cave on the Gower Peninsular, both in South Wales (Ref 59; Ref 60).

Post-LGM and early Holocene (18,000 – 6,000 BP; MIS 2-1)

4.1.12 The history of the Irish Sea basin since the LGM is complex and unclear, and the relative sea level curve for the region is complicated due to complex interactions between global sea level rise and isostatic readjustment (Ref 60; Ref 65).

4.1.13 The correct model of glacial retreat has significant consequences for the post-LGM archaeological potential of the Irish Sea; a fully inundated landscape has low potential for the deposition of artefacts, and vice versa. However, the discovery of Late Upper Palaeolithic material dating from around 10 ka BP in Kendrick's Cave on the Great Orme Peninsular (Ref 59; Ref 60), just south of the study area, indicates that, were the Irish Sea a terrestrial environment post-LGM, then it is likely that human communities had a presence within the landscape.

4.1.14 Assuming a terrestrial followed by marine transgression model, gradual sea level rise would have probably placed much of the Irish Sea either on the coastline or just offshore by the Mesolithic period (c. 10 ka – 6 ka BP) (Ref 66; Ref 67). Past identification of submerged peat deposits and drowned forests around the Welsh coastline and the edges of the Irish Sea suggests coastlines in the area were stable for periods of time during marine transgression (Ref 60; Ref 68; Ref 69).

4.1.15 Geotechnical logs recovered during the construction of the Deeside Road Link River Crossing (Ref 64) largely comprised diamict (glacial till) overlain by more recent transient alluvial sands associated with sands banks of the modern Dee Estuary. Although British Geological Survey (BGS) historic borehole records are limited in the study area, the few that are accessible highlight the absence of organic-rich material, including peats, suitable for palaeoenvironmental reconstruction and scientific dating.

4.1.16 The Mesolithic record of the British Isles suggests a strong relationship between human activity and coasts, wetlands, rivers and streams, and evidence of human occupation of the river Mersey, which drains into the eastern Irish Sea, has previously been discovered (Ref 70). These areas provide rich sources of food and resources for these hunter/gatherer groups, as well as important transport routes inland or between islands. Any surviving sedimentary deposits from this period could potentially contain both in-situ and derived artefacts from a time when these coastal and littoral landscapes, now submerged by the sea, were utilised intensively by human populations.

4.1.17 In addition to these submerged coastal landscapes, the Mesolithic archaeological record potentially contains examples of coastal or sea going craft made from dugout logs or hide covered wooden frames as well as worked flint and chert artefacts.

4.1.18 By the end of the Mesolithic, the Irish Sea would have been completely submerged, with coastlines approximately close to their present day positions, and archaeological evidence from the Neolithic onwards will be of an increasingly maritime nature. However, continued use of the intertidal zone surrounding the Irish Sea has been found in the form of preserved human footprints on the foreshore at Formby Point, Merseyside, dating from the Neolithic/Bronze Age (Ref 70; Ref 71). Further offshore, any artefacts from this period not related to maritime activity are

likely to be derived and re-deposited after introduction to the area by fluvial processes or coastal erosion.

4.1.19 Post the Holocene marine transgression, the archaeological potential of the study area shifts to the maritime history of the UK, which is presented in Section 5.

4.2 Geotechnical palaeogeographic assessment

4.2.1 A total of 105 borehole and test pit logs resulting from geotechnical Ground Investigation (GI) works at the Site between 1963 and 1991 were reviewed as part of the geoarchaeological assessment, with the aim of identifying deposits of potential archaeological and geoarchaeological significance. This review is supported by a programme of geoarchaeological deposit modelling (Annex 5), the results of which are described in this section.

4.2.2 The basal stratigraphic unit within the majority of the GI logs is recorded as mudstone, siltstone or an interlaminated siltstone and mudstone, collectively interpreted as the carboniferous age Pennine Middle Coal Measures Formation (Westphalian Stage; 313–304 Ma). The bedrock was not reached in all boreholes, but where identified it was generally recorded at depths between 5.0 and 15.0 m below ground level (bgl), with this surface declining towards the main axis of the valley of River Dee. Figure 4 illustrates the decline in this surface from south to north towards the River Dee in the Soil Mechanics Limited (1991) GI logs, in which the bedrock surface falls from c. -3 m OD towards the south to below -18m OD below the modern River Dee.

4.2.3 The bedrock often includes a weathered upper unit, generally recorded as a ‘broken’ or weathered mudstone, siltstone or shale gravel. This deposit is interpreted as weathering through periglacial or glacial processes, and is shown as ‘weathered bedrock’ in Annex 5. Both the bedrock and weathered bedrock have no geoarchaeological or archaeological potential.

4.2.4 Occasionally recorded overlying the bedrock was a generally very stiff silty, sandy and gravelly clay, often recorded in the GI logs as ‘boulder clay’. Given the high density and heterogeneous nature of this deposit, it is interpreted as representing glacial diamict, or ‘till’. Considering deposition occurred during fully glacial conditions during the Late Devensian, these sediments are considered to have low geoarchaeological and archaeological potential. The till was relatively uncommon, recorded in 15 of the 105 GI logs, and was generally more common towards the valley of the River Dee. Here it was overlain by alluvium at elevations below c. -12 m OD (see Figures 2 and 3). It is generally present at depths below c. 10 to 15 m bgl, although in several of the Terrasearch Ltd (1962) GI logs it rises to depths of less than 6 m bgl. The location of the 1962 GI logs is unclear, but these appear to be located to the southeast of the site on the southern bank of the River Dee.

4.2.5 In the Soil Mechanics Limited (1991) GI logs the till is recorded as the basal superficial deposit in logs towards the north of the study area, but is generally absent towards the south (see Figure 2). It is up to a minimum of 6.3 m in thickness in BH10, where it was not bottomed; the distribution of the till is indicative of glacial scour of the bedrock and deposition of till towards the main axis of the valley of the

Dee, underlying the northern area of the study area, with only thin remnants (e.g. BH03) recorded towards the south.

4.2.6 In a total of 16 GI logs unit, relatively thin (generally <1 m thick) units of sandy gravel were identified, overlying either bedrock or till. The depositional origin of this unit is unclear on the basis of the logs; although the stratigraphic position of the gravel may suggest deposition associated with glaciofluvial processes, this deposit is relatively localised; this, combined with the coarse-grained nature of this deposit, suggests deposition may have occurred in geographically restricted fluvial channels, active during either the Late Devensian or Early-Mid Holocene following ice retreat. The gravels are generally present at depths below 7-12 m bgl, although they rise to depths of less than 3m bgl in 1962-BH6 (Ref 39; Ref 72). In the Soil Mechanics Limited logs, gravels are present at the base of the alluvial sequence in boreholes BH02, BH03 and BH07, at depths between 11.3 and 19.3 m bgl (see Figures 2 and 3).

4.2.7 Recorded more widely across the site and the GI logs as a whole is a sequence of variably sandy, silty or clayey alluvium, likely representing alluvium formed on the floodplain of the River Dee under the influence of post-glacial sea level rise. The Soil Mechanics Limited (Ref 39) GI logs indicate that the alluvium within the study area is present at elevations between c. -12 m OD and 4 m OD, in thicknesses of up to 16.7 m in the area of BH09, where it was not bottomed (see Figures 2 and 3). In the Soil Mechanics Limited (1991) logs the alluvium is entirely minerogenic, with only occasional shell fragments and in places a ‘sulphurous’ or ‘organic odour’.

4.2.8 In the remainder of the GI logs, peat or organic-rich alluvium was identified at variable depths within the alluvial sequence in 10 of the 105 GI logs (see **Table 2)**. The organic alluvium is variously described as a ‘peaty silt’, ‘organic silty sand’ or an ‘organic clay’, with the peat generally described as silty or sandy. Given their relatively localised presence, generally in thicknesses of between c. 1.0 and 3.0 m, at depths within the alluvial sequence of between ground surface and 9.14 m bgl, they are likely indicative of the growth of wetland vegetation in abandoned channels or backswamps within the estuarine floodplain. These deposits are assumed to be located outside of the study area, but they demonstrate the potential for the presence of organic deposits of high geoarchaeological potential within the Holocene alluvial sequence.

Table 2: Organic alluvium/peat identified in GI logs

Borehole	Depth from (m bgl)	Depth to (m bgl)	Stratigraphy	Notes
1962-BH2	0.46	1.22	Peat	Black peat
1962-BH3	3.66	6.10	Organic Alluvium	Soft organic clay
1962-BH4	0.23	3.05	Organic Alluvium	Soft organic clay
1962-BH5	0.61	3.05	Organic Alluvium	Soft sandy organic clay
1962-BH10	2.44	3.05	Peat	Peat
1962-BH11	3.66	5.49	Organic Alluvium	Soft black organic clay
1963-BH8	3.05	4.57	Peat	Black sandy peat
1963-BH8	6.10	9.14	Organic Alluvium	Black peaty silt

Borehole	Depth from (m bgl)	Depth to (m bgl)	Stratigraphy	Notes
1968-BH01	1.52	2.74	Organic Alluvium	Black organic silty sand
1968-BH03	1.83	3.66	Organic Alluvium	Grey clayey silt with organic matter
1968-BH04	3.66	4.27	Organic Alluvium	Black organic silty sand
1968-BH15	0.00	0.23	Organic Alluvium	Black organic silt

4.2.9 The uppermost deposit recorded in several of the boreholes is modern made ground. Present in thickness of between c. 2.0 and 4.0 m within the study area (see Figures 2 and 3), this unit likely relates to modern ground raising and land reclamation associated with more recent development of the existing Connah's Quay Power Station site.

4.3 Palaeogeographic potential

4.3.1 The results of the geoarchaeological assessment are broadly consistent with deposits identified during geotechnical investigations elsewhere within the Dee Estuary, including at Mostyn Energy Park (Ref 73) and associated with the Deeside Road Link River Crossing (Ref 64).

4.3.2 The stratigraphic sequence within the study area comprises a series of deposits including glacial till, likely to be of Late Devensian date, overlain by localised fluvial gravels, and a more widespread unit of Holocene alluvium.

Glacial till

4.3.3 Glacial sediments within the lower Dee Estuary are typically characterised by stiff heterogeneous clays. Collectively, these deposits are interpreted as representing subglacial deposition in a fully glaciated environment. The glacial geomorphology of the Cheshire Plain indicates the presence of ice pathways during the Late Devensian, with features including meltwater channels, moraines and streamlined lineations determining the direction of flow into the Dee Estuary (Ref 54). Considering that these deposits were laid down during fully glacial conditions, the likelihood of evidence for occupation is negligible and therefore these sediments are considered to have low geoarchaeological potential.

Fluvial gravels

4.3.4 Localised, and relatively thin (<1.0 m thick) sandy gravels are recorded in places within the study area. The coarse-grained nature of this deposit suggests deposition occurred in a fluvial environment, however its absence in the other borehole records indicates that the channel systems in which they formed were localised.

4.3.5 Based on the interpretation of bathymetric data and sea level modelling, it is suggested that the Dee Estuary was fully inundated by the late Mesolithic (c. 8–6 Kya). The timing of deglaciation across the Cheshire Plain is ambiguous, however more recent geomorphic modelling suggest that ice had retreated from the region by 20.6 ± 2.2 Kya BP (Ref 74). Therefore, the activity of these channel system(s) is temporally constrained to between the Late Devensian and Early- to Mid-Holocene.

4.3.6 The coarse-grained nature of this deposit indicates high-energy depositional conditions unsuitable for occupation. Palaeoenvironmental remains are also unlikely

to be preserved. As such, both the archaeological and geoarchaeological potential of this deposit is considered to be low.

Alluvium

4.3.7 The most abundant deposits recorded in the Dee Estuary stratigraphy are loose alluvial sands typically overlying glacial sediments. The extensive thickness of these sands indicates that the area has been subject to increased siltation, with glacial sands remobilised from the shallow sea floor and trapped in the embayment by longshore drift processes. The lateral accretion of these sands in the Dee Estuary was initiated in the 11th century.

4.3.8 Although these sediments have the potential to mask archaeology, on the basis of their almost entirely minerogenic content, both their geoarchaeological and prehistorical archaeological potential is considered to be low.

4.3.9 However, organic-rich alluvium and peat has been identified in GI logs associated with the wider development area, demonstrating the potential for such sediments, albeit localised, within the alluvial sequence. Where present, such deposits would be of high geoarchaeological and archaeological potential.

4.3.10 Additionally, the alluvium may contain shipwreck material and evidence of activities on the riverside, from the 11th century onwards. This material could be of high archaeological value.

4.4 Summary of palaeographical potential

4.4.1 The landscape consisting of water, coastal marshland, sand and sandbanks create an environment where ancient land surfaces from the later prehistoric period can be preserved, and evidence of past landscapes and human interactions can be preserved. However, the geoarchaeological assessment has indicated that the sediments assessed within the study area were of low archaeological potential. There remains medium potential for the discovery of peat (which would be of high archaeological potential), as peat deposits have been encountered in the wider area. Additionally, the alluvium could preserve shipwreck material.

4.4.2 Evidence of prehistoric landscapes, prehistoric sites find spots, palaeoenvironmental evidence, and evidence of early use of the coastal/intertidal area (for example fish traps) from any age are always considered to be of high value.

4.4.3 The potential for direct and indirect impacts of the Proposed Development on marine heritage assets is assessed in the ES (**Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**)).

5 MARINE HERITAGE ASSESSMENT OF BASELINE: MARITIME AND AVIATION SITES

5.1 Introduction

5.1.1 The following assessment of the maritime and aviation marine heritage baseline resource is based on records of known shipwrecks, aircraft crash sites and obstructions.

5.2 Designated Maritime and Aviation Sites

5.2.1 There are currently no designated sites within Water Connection Corridor and the study area that are subject to statutory protection from the Protection of Wrecks Act 1973, the Protection of Military Remains Act 1986 or the Historic Environment (Wales) Act 2023. If there were any aircraft material from crashed military aircraft within the study area, it would automatically be legally protected under the Protection of Military Remains Act 1986.

5.3 Known Maritime Sites

5.3.1 There are no known maritime sites within the Water Connection Corridor or the study area. In addition, no previously unrecorded maritime or aviation sites or material were seen during the archaeological walkover / UAV survey in July 2024.

5.4 Maritime archaeological potential

Introduction and general historical background

5.4.1 It is known that many vessels were lost without a record being made, and sometimes even the records that were created have since been lost (Ref 75). However, examining the recorded losses discussed above provides an indication to the potential for further discoveries, as do the factors discussed below.

5.4.2 Presumably the exploration of the marine environment started in the Mesolithic, at the earliest time of inundation of the coast, when people would have started to use boats to access the available resources and maintain links with other communities. It is thought that during the Mesolithic period major transgressions inundated the low-lying area between Rhyl and Prestatyn, but that areas of elevated boulder clay remained above sea level and were occupied as the most seaward habitable land. This may account for the distribution of shell beds and Mesolithic finds reported around Rhyl (Ref 76). The find of an antler mattock discovered in Rhyl dated to 6560 +/– 80 BP (OxA–1009) indicates early evidence of human presence (Ref 77).

5.4.3 During the Neolithic, with the importation of domesticated animals and other goods from the Continent, maritime traffic was being undertaken. The remains of an ancient submerged forest in Formby, Rhyl and Abergele (Ref 78) is a reminder of a landscape that was once utilised by human and animals that has the potential to yield archaeological remains.

5.4.4 In Wales there has been relatively little direct study of aspects of maritime and coastal activity from the later prehistoric periods. Maritime networks are an underexposed subject, because studies of long-distance trade and exchange of cultures traditionally focus on stone and flint tools and their geological provenance, rather than maritime network. The only evidence for seafaring is usually deduced from the identification of Mesolithic sites on islands, which must have required some form of craft to complete the sea crossing. Skinboats may have been used, but logboats are certainly known from mainland Europe during this period.

5.4.5 Continuing into the Bronze and Iron Ages, there is a long period which is marked only by a few significant maritime/coastal artefact and boat finds, whilst dramatic changes in society, technology and economy are well attested in terrestrial

monuments and material culture. From the Peat shelf at Rhyl an assemblage of over 70 mostly of Neolithic and Bronze Age date were recovered. This assemblage includes polished stone axes among other things (Ref 79) and, therefore, an indication of Bronze Age exploitation of coastal environments. However, finds from peat deposits, such as the two bronze axes and a bronze dagger from the peat shelf off Llandudno, Conwy, and a bronze spearhead and a bronze axe found on the peat shelf at Rhyl, Denbighshire, are more likely to be an indication of Bronze Age exploitation of coastal environments which were later inundated (Manley 1989). The mines within the Great Orme in Llandudno are thought to be the earliest metal workings in the UK and are nationally important Bronze Age copper workings (Ref 80).

5.4.6 The Roman occupation of Britain was by necessity accomplished by ‘maritime’ means, with the classis Britannica operating both for exploration and like a state haulage company in the first centuries of occupation. Apart from the Barland’s Farm boat, no other vessels from the Roman period have been discovered in Wales, even though an inscribed stone found to the west of Chester apparently confirms the age old navigation dangers of the Dee estuary - 'OPTONIS AD SPEM ORDINUS C LVCILI INGENVI QVI NAVFRAGIO PERIT S E' or 'Optio’ in the century of Lucilius Inegneus, awaiting promotion to centurion, who died in a shipwreck, is buried (Ref 81). Some survey work to find Roman sites took place. Geophysical survey work and an excavation at Caerlon show results that have reinforced the importance of the Roman port supporting the Roman legion and its network. The approaches to the Roman port of Chester were provided by The Dee Estuary, with the South Hoyle Channel and Inner Passage. Near Flint a Roman era industrial site was discovered and surveyed by Cadw and the CPAT (Ref 82).

5.4.7 It is possible for the remains of ships dating to the Viking period to be in the vicinity. For instance, the Great Orme, Llandudno was named by the Vikings who passed it on their seafaring voyages as the Scandinavian word “örmr” means snake in reference to the headland protruding out of the water like a monster. In 1165, Henry II hired a Viking squadron from Dublin to raid the coasts of Gwynedd after recognising Wales’ vulnerability to naval blockade (Ref 83).

5.4.8 Into the early medieval period, there is increased evidence of coastal settlement where maritime communities shared cultural contact around the Irish Sea basin, and into the Western Approaches with contact with continental Europe. From the 6th to 7th century onwards, it has been suggested that proto-harbours began to emerge from sheltered beaches along with specialist seafaring traders – often associated with princely strongholds such as Dinas Powys, Hen Gastell, Tenby and Deganwy (Ref 83).

5.4.9 The published volume *Maritime Wales in the Middle Ages: 1039- 1542* (Ref 84) highlights that the maritime medieval archaeological record is sparse – including only the twelfth century logboat of Llyn Padarn, the thirteenth century clinker-built vessel carrying iron ore from Magor Pill, and the fifteenth century Newport Ship (Ref 85). The 13th century Flint Castle is a Grade I Listed Building located to the north of the Proposed Development within the Dee Estuary, approximately 4 km from the centre point of the Water Connection Corridor. The location of the castle was

situated in a prime defensive shoreline position, built by Edward I in 1277. This enabled access to supplies by sea and was instrumental in the final collapse of organised Welsh resistance to the English Crown, as it acted as a launching point for the final invasion of Gwynedd in 1282.

5.4.10 Wrecks from the post-medieval and modern period, as they were generally made of more substantial material, are more likely to have been discovered through surveys undertaken by the UKHO and others, and thus recorded in the archaeological record. However, there is still potential for discovery of previously unrecorded wreck sites, particularly of wooden wrecks, broken up wrecks or partially buried wrecks that are more difficult to detect through geophysical survey.

5.4.11 From the medieval period into the modern day, the range of seafaring and seascape related research topics expands exponentially. In various Welsh commodities much of the presently available research is related to the expansion in trade in various Welsh commodities such as copper, coal, slate and other stone trades, and associated port developments. The Welsh slate industry, while having a mainly 19th and 20th century focus, has a history which stretches back as far as the Roman period at least. Throughout Wales' entire historic period the extraction of slate can be seen as a consistent exploitation of an available resource, with extraction and transport of coal particularly important during the Industrial Revolution (Ref 69; Ref 86). The impacts of these industries highlight their importance to the cultural heritage of Wales. The landscape of North Wales was changed because of them, resulting in their development and a marked change in its demographics in the 19th century. It preserved communities in that area sustaining their populations while many rural areas throughout the rest of the UK were being abandoned in favour of cities.

Navigational hazards

5.4.12 The navigational chart for the River Dee has been consulted.

There are constantly shifting sandbanks recorded as being in the area with changing depths (Ref 79). The hazards are marked by numerous buoys, lights and fog horns, however these could have posed a serious threat in earlier times. The West Hoyle Bank, a sandbank on the mouth of the Dee Estuary, is considered to be a navigational hazard in Welsh waters and has been the cause of numerous shipping losses over the centuries (Ref 80). The shifting sandbanks occur mostly in the wider surroundings and not directly in the study area.

5.4.13 The landscape consisting of water, coastal marshland, sand and sandbanks create an environment where ancient land surfaces from the later prehistoric period can be preserved. These old layers can be covered with estuarine sediments which increase the preservation of old landscapes (FLNTHL326 2017) and past human interactions, for example through fishing weirs. In addition, evidence can be found where peat is present, as it has the potential to provide a high level of preservation for pollen and seeds, because peat originates in a wet environment and therefore creates the ideal environment for the conservation of organic remains. These seeds and pollen are used to reconstruct the prehistoric landscape. Although there is no recorded peat within the Water Connection Corridor, evidence of peat has been discovered in the wider landscape.

5.4.14 Additionally, the alluvium sediments recorded during the archaeological assessment of geotechnical data indicate high potential for the preservation of organic materials, such as wooden shipwreck remains or evidence of activity on the riverside.

Recorded Losses

5.4.15 Recorded Losses are records for ships or aircraft that are known to have wrecked or crashed offshore, but for which the exact locations are not known. Recorded Losses are often grouped together by their general area of loss into Maritime Named Locations (displayed spatially as polygons or centre points of polygons, often associated with NMRW data, for example Dee Estuary Maritime Named Location), however many records are given co-ordinates (displayed spatially as points), although these are similarly unsubstantiated.

5.4.16 Recorded Losses can be considered as an indication of the potential for archaeological maritime remains to exist within the Water Connection Corridor and the study area and the type and number of wrecks that could be present. These records relate to vessels reportedly lost or for which no physical wreck remains have ever been identified.

5.4.17 The UKHO, RCAHWMW and HER datasets show no recorded losses located within the Water Connection Corridor and the search area, however there is still potential for wrecks that were not recorded and for wrecks where the positional information recorded in the dataset is poor.

5.5 Aviation archaeological potential

5.5.1 There are no known aviation sites in the Water Connection Corridor and the study area.

Recorded Losses

5.5.2 There are no recorded aviation losses in the Water Connection Corridor and the study area

Overview of archaeological potential

5.5.3 Although no aircraft remains are known in the area it is possible that remains could be encountered.

5.5.4 During the Second World War, aircraft activity increased dramatically and the highest potential for aircraft material on the seafloor is from this period. By the Second World War, aircraft were more heavily built and, therefore, material from their crash sites is more likely to survive in the archaeological record.

5.5.5 After the Second World War, there is still potential for aircraft to have been lost in the area, however any military losses during this period are more likely to have been lost due to training accidents rather than combat operations (Ref 45Ref 49), and civilian losses are likely to have been reported and recorded.

5.6 Summary of maritime and aviation archaeological potential

5.6.1 There are no known shipwreck sites in the Water Connection Corridor and the study area. Although the area around Connah's Quay has a rich seafaring past there is a low potential for encountering shipwreck material (dating from the Mesolithic to modern times) and modern aviation material in the Water Connection Corridor and a medium potential for encountering shipwreck and aircraft material in the study area.

5.6.2 Maritime or aviation material encountered in the Water Connection Corridor and the study area would need to be assessed on a case-by-case basis, but could be of high value. This is because Marine Heritage Assets are a finite, non-renewable resource, with no potential for recovery. In addition, Connah's Quay has a rich seafaring past and after the Second World War there is still potential for aircraft material to have been lost in the area. Furthermore, the preservation of the area is considered to be high for any type of archaeological material which increase the value of maritime and aviation assets to high.

5.6.3 The potential for direct and indirect impacts of the Proposed Development on marine heritage assets is assessed in the ES (**Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**)).

6 MARINE HERITAGE ASSESSMENT OF BASELINE: INTERTIDAL HERITAGE ASSETS

6.1 Data assessment

6.1.1 A search of records in the UKHO, RCAHMW and HER dataset revealed seven assets (**Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**)). All of these assets are located on the edges of the study area, which is placed around the Water Connection Corridor. The were no records found in the Water Connection Corridor itself.

6.1.2 The RCAHMW dataset consists of two assets. The first **1001** is a post medieval beacon that marks the western end of a revetment or training wall. The second record **1002** comprises the Connah's Quay road bridge, which was constructed in 1996.

6.1.3 The HER dataset consists of four assets. The first asset **1003** is a post medieval breakwater, constructed in 1839. The second asset **1004** is a post-medieval flood defence embankment or reclamation embankment. The third and fourth assets, **1005** and site **1007,** consist of a modern water management reservoir and the last asset **1006** is a modern port or river embankment.

6.2 Archaeological watching brief / Unmanned Aerial Vehicle (UAV) survey

6.2.1 The archaeological watching brief comprised an archaeological walkover and Unmanned Aerial Vehicle (UAV) survey. The area was visually inspected by an archaeologist. No Marine Heritage Assets were visible during the survey.

6.2.2 During the drone survey in July 2024 orthophotos were made by the drone team from AECOM. The data was supplied to Wessex Archaeology on 11 February 2025

and included 10 data files. The data also included two PDF figures with the orthophotos already displayed in the Proposed Development area. The data was loaded to ArcPro and thoroughly reviewed by an archaeologist.

6.2.3 The orthophotos do not show visible evidence for previously unrecorded Marine Heritage assets, nor do they show signs (crop marks and soil marks) of hidden Marine Heritage Assets. The orthophotos show modern debris, such as a rusty pipeline, on the river bank opposite to the Water Connection Corridor, however no marine heritage assets were detected among the debris.

6.3 Known marine assets

6.3.1 Six assets are located in the intertidal area, outside of the Water Connection Corridor, namely site **1001, 1003, 1004, 1005, 1006** and **1007**. One asset, **1002,** is located on the River Dee.

6.3.2 Assets **1001, 1003, 1004** are assessed as being of medium value, as these features date to the medieval and post-medieval period and therefore can be seen as historic examples of water management and nautical navigation. Asset **1002** is assessed as being of medium value, because the Quay's road bridge is still in use today and can be seen as a landmark. The last assets **1005**, **1006** and **1007** are assessed as being of low value, as these records indicate modern structures.

6.3.3 These assets are located outside of the footprint of impacts anticipated as a result of the Proposed Development; therefore they would not be physically impacted by the Proposed Development. It is not considered likely that the value of these assets would be affected by the Proposed Development, and they are therefore scoped out of further assessment in the ES.

6.4 Potential for heritage assets within the intertidal zone

6.4.1 Around the 18th century, the town Connah's Quay, formerly known as New Quay, developed, and expanded. This is due to Connah's Quay's location on the River Dee, which facilitates the transfer of trade from Chester. Besides the trade route with Chester, Connah's Quay also had direct access to the coal and pottery mines from Buckly. These access routes sped up the towns economic growth and the city developed (NPRN: 268146). From 1500 onwards Connah's Quay developed several shipyards where wooden ships and barges were built. The demise of the port around 1960 marks an end of this shipbuilding and seafaring tradition (Ref 88).

6.4.2 The history of Connah's Quay sets out a medium potential for heritage assets within the intertidal zone or study area or study area. Due to Connah's Quay shipbuilding and seafaring history, heritage assets relating to shipbuilding, port constructions, nautical navigation and wreckages may be found in the intertidal zone. Shipbuilding activities often occurred in the intertidal zone because the water was shallower and therefore easier to launch ships. Furthermore, Connah's Quay has a history with industrial works which involves exploiting of mines. Therefore, some additional infrastructure might be found in the intertidal zone, such as: industry-related constructions and old infrastructure (trainlines). There is a low potential for encountering these potential assets within the Water Connection Corridor.

6.4.3 The soil in the intertidal zone of the study area consists of made ground layers. These layers are known to have a low potential for encountering Marine Heritage assets. However, below these soil layers, there is the potential for encountering previously unknown Marine Heritage assets, therefore there is also a low potential for encountering previously unknown Marine Heritage Assets within the Water Connection Corridor.

6.5 Summary of archaeological potential within the intertidal zone

6.5.1 There are currently no known or designated intertidal assets in the Water Connection Corridor and the study area. There is a low potential for encountering intertidal assets in the Water Connection Corridor and a medium potential for encountering intertidal assets in the study area. However, if an intertidal asset is encountered during works the value would need to be assessed on a case-by-case basis, and could be high.

6.5.2 The potential for direct and indirect impacts of the Proposed Development on marine heritage assets is assessed in the ES (**Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**)).

7 ASSESSMENT OF HISTORIC SEASCAPE CHARACTER

7.1 Introduction

7.1.1 Working on behalf of the Welsh Government, Natural Resources Wales carried out a study to identify the character of Wales's seascapes at a broad scale (Ref 80). Seascapes, like landscapes, reflect the relationship between people and place; MCAs highlight the key natural, cultural and perceptual influences that make the character of each seascape distinct and unique. Seascapes are about linking people and their cultures, and places and their natural resources. This is important as it allows us to understand and appreciate a sense of place and local distinctiveness. There are 29 MCAs in Welsh territorial waters and there is spatial information and a description for each of them. This forms part of the information underpinning the Welsh National Marine Plan. MCAs and the effects of development on them should be considered when drawing up and assessing project proposals (Ref 24).

7.2 Historic Seascape Characterisation

7.2.1 The Water Connection Corridor and the study area are within MCA 01: Dee Estuary (Ref 34; Ref 80). The character area highlighted sandbanks. Sandbanks can provide archaeological potential as there could be buried material in the sandbanks that cannot be detected by geophysical survey. The configuration of the navigation channels happens by great changes at the mouth of the estuaries of the Conway in the Dee inlet. The entrance of the River Dee consists of a former 18th Century lighthouse to guide ships to a safe river entrance. Moreover, on the sand banks the remains of historic ships have previously been found and this increases the chances of encountering shipwreck material in the wider area, however, there is a low potential for the Water Connection Corridor, as it is an area of known navigation hazard, and therefore potential for shipwreck material to be (un)covered by changing and shifting sandbanks.

7.2.2 Historically, the Dee provided the maritime approaches to the Roman port of Chester, and signs of past industry are visible along the length. Today, the waters are commercially and recreationally fished. These indicate potential for the discovery of marine related finds from the Roman period to the present.

7.2.3 The area is characterised by previous industrial activities and has a long-standing importance for trade, defence and occupation. Even in present times, nationally important industries are based near the River Dee area, for example the Port of Mostyn. This indicates an industrial area with capacity to accommodate further development in areas that already have an industrial character.

8 CONCLUSIONS

8.1 Potential Impacts

8.1.1 The assessment has indicated that there are currently no known prehistory, maritime or aviation archaeology receptors located in the Water Connection Corridor. However, within the intertidal area within the study area, six assets of medieval to post-medieval date are located (**1001, 1003, 1004, 1005, 1006, 1007**). These assets are located outside of the footprint of the Water Connection Corridor and are therefore anticipated to be beyond the extent of impacts as a result of the Proposed Development. These assets are therefore not taken forward for assessment in the ES.

8.1.2 The landscape consisting of water, coastal marshland, sand and sandbanks create an environment where ancient land surfaces from the later prehistoric period can be preserved. These old layers can be covered with estuarine sediments which increase the preservation of old landscapes and past human interactions, for example through fishing weirs. In addition, evidence can be found where peat is present, as it has the potential to provide a high level of preservation for pollen and seeds, because peat originates in a wet environment and therefore creates the ideal environment for the conservation of organic remains. These seeds and pollen are used to reconstruct the prehistoric landscape. Although there is no recorded peat within the Water Connection Corridor, evidence of peat has been discovered in the wider landscape, surrounding the study area. There is a low potential for encountering prehistoric sites, find spots, palaeoenvironmental evidence and evidence of early use of the coastal / intertidal area within the Water Connection Corridor in sediments that have not been previously impacted. The potential for remains to be impacted by the Proposed Development are discussed further in **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**).

8.1.3 The industrial revolution of Connah's Quay indicates a low potential for encountering additional post-medieval and modern industrial and construction infrastructure within the Water Connection Corridor. These assets have been assessed for impact by the Proposed Development and are, therefore, discussed further in **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**).

8.1.4 There is also a low potential for encountering previously unknown marine heritage assets such as shipwrecks and aircraft crash sites in the Water Connection Corridor, which have the potential to be impacted by the Proposed Development, in previously

undisturbed areas, and are, therefore, discussed further in **Chapter 18: Marine Heritage** (**EN010166/APP/6.2.18**).

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ANNEXES

Annex 1: Glossary of Terminology

AD	Anno Domini
ALSF	Aggregate Levy Sustainability Fund
BCE	Before Common Era
BGS	British Geological Survey
BNG	British National Grid
BP	Before Present
CCGT	Combined Cycle Gas Turbine
CCP	Carbon Capture Plant
CO_2	Carbon Dioxide
CIfA	Chartered Institute for Archaeologists
CPAT	Clwyd Powys Archaeological Trust
DEFRA	Department for Environment, Food and Rural Affairs
DCLG	Department for Communities and Local Government
EIA	Environmental Impact Assessment
ES	Environmental Statement
GIS	Geographic Information System
HER	Historic Environment Record
LGM	Last Glacial Maximum
MCA	Marine Character Areas
MCAA	Marine and Coastal Access Act 2009
MHWS	Mean High Water Springs
MPS	Marine Policy Statement
N/A	Not applicable (not included in dataset)
NM	Nautical Miles
NRW	Natural Resources Wales
NMRW	National Monuments Record of Wales
PEIR	Preliminary Environmental Information Report
PPW	Planning Policy Wales
ROV	Remotely Operated Vehicle
UKHO	United Kingdom Hydrographic Office
RCAHMW	Royal Commission on Ancient and Historical Monuments in Wales
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UTM	Universal Transverse Mercator

Annex 2: Chronology

Where referred to in the text, the main archaeological periods are broadly defined by the following date ranges:

Prehistoric	
Palaeolithic Lower Palaeolithic Pre-Anglian to Ipswichian Middle Palaeolithic Devensian to LGM Upper Palaeolithic Post-LGM and early Holocene Late Upper Palaeolithic	970,000 – 9500 BCE 970,000 – 300,000 BCE >478 ka – 115 ka; >Marine Isotope Stage (MIS) 12 – 5e 300,000 – 40,000 BCE c. 115 ka – 18 ka; MIS 5d -2 40,000 – 10,000 BCE 18,000 – 6,000 BP; MIS 2-1 12,000 – 9500 BCE
Early Post-glacial	9500 – 8500 BCE
Mesolithic	8500 – 4000 BCE
Neolithic	4000 – 2400 BCE
Bronze Age	2400 – 700 BCE
Iron Age	700 BCE – AD 43

Historic	
Romano-British	AD 43 – 410
Saxon	AD 410 – 1066
Medieval	AD 1066 – 1500
Post-medieval	AD 1500 – 1800
19th Century	AD 1800 – 1899
Modern	1900 – present day

Annex 3: Intertidal heritage assets

WA ID	RACHMW ID	HER ID	Description	Easting	Northing	Type
1001	95562		A beacon with a round ball on top. This beacon marks the western end of revetment or training wall.	329226	371256	Navigation Aid
1002	17883		Connah's Quay Road Bridge.	328780	370780	Bridge
1003		34226	Breakwater constructed around 1839 and in damaged condition.	328000	371700	Breakwater
1004		34228	Flood defence embankment or reclamation embankment and the construction is damaged.	329500	371000	Flood defences
1005		122656	Water management reservoir. This reservoir is on the Natural Resources Wales List of Larg Raised Reservoirs, because this reservoir can hold more than 10,0000 cubic meters of water.	327623.46	371523.9	Reservoir
1006		34288	River embankment extending to the Northwest. The area is a stone-faced and revetted quay area and contains a timber landing stage. The area is cut by a concrete and timber wharf. The condition of the entire structure is damaged.	329200	370400	Port
1007		122657	Water management reservoir. This reservoir is on the Natural Resources Wales List of Large Raised Reservoirs,	327623.46	371523.9	Reservoir

			because this reservoir can hold more than 10,0000 cubic meters of water.			

Annex 4: GI logs included in the geoarchaeological assessment (see Annex 5)

Name	Source	Easting	Northing	Elevation (m OD)
1962-BH1	Terresearch Ltd (1962)	N/A	N/A	5.54
1962-BH2		N/A	N/A	6.43
1962-BH3		N/A	N/A	6.76
1962-BH4		N/A	N/A	6.17
1962-BH5		N/A	N/A	5.36
1962-BH6		N/A	N/A	6.86
1962-BH7		N/A	N/A	6.43
1962-BH8		N/A	N/A	6.91
1962-BH9		N/A	N/A	8.31
1962-BH10		N/A	N/A	7.24
1962-BH11		N/A	N/A	6.86
1963-BH1	Foundation Engineering Ltd (1963)	N/A	N/A	N/A
1963-BH2		N/A	N/A	N/A
1963-BH3		N/A	N/A	N/A
1963-BH4		N/A	N/A	N/A
1963-BH5		N/A	N/A	N/A
1963-BH6		N/A	N/A	N/A
1963-BH7		N/A	N/A	N/A
1963-BH8		N/A	N/A	N/A
1963-BH9		N/A	N/A	N/A
1963-BH10		N/A	N/A	N/A
1963-BH11		N/A	N/A	N/A
1963-BH12		N/A	N/A	N/A
1963-BH13		N/A	N/A	N/A
1963-BH14		N/A	N/A	N/A
1963-BH15		N/A	N/A	N/A
1963-BH16		N/A	N/A	N/A
1966-249	Ground Explorations Ltd (1966)	N/A	N/A	N/A
1966-251		N/A	N/A	N/A
1966-252		N/A	N/A	N/A
1966-253		N/A	N/A	N/A
1965-BH2K		N/A	N/A	N/A
1965-BH3K		N/A	N/A	N/A
1963-BH04ZD37	Soil Mechanics Ltd (1963)	N/A	N/A	N/A
1963-BH04ZD36		N/A	N/A	N/A
1963-BH04ZD35		N/A	N/A	N/A
1963-BH04ZD34		N/A	N/A	N/A
1963-BH04ZD33A		N/A	N/A	N/A

Name	Source	Easting	Northing	Elevation (m OD)
1963-BH04ZD33B		N/A	N/A	N/A
1963-BH04ZD33C		N/A	N/A	N/A
1963-BH04ZD33D		N/A	N/A	N/A
1963-BH04ZD32A		N/A	N/A	N/A
1963-BH04ZD32B		N/A	N/A	N/A
1963-BH04ZD32C		N/A	N/A	N/A
1963-BH04ZD32D		N/A	N/A	N/A
1963-BH04ZD31		N/A	N/A	N/A
1963-BH04ZD30		N/A	N/A	N/A
1963-BH04ZD29		N/A	N/A	N/A
1963-BH04ZD28		N/A	N/A	N/A
1963-BH04ZD27		N/A	N/A	N/A
1963-BH04ZD26		N/A	N/A	N/A
1963-BH04ZD25		N/A	N/A	N/A
1963-BH04ZD24		N/A	N/A	N/A
1963-BH04ZD23		N/A	N/A	N/A
1963-BH05		N/A	N/A	N/A
1963-BH08		N/A	N/A	N/A
1963-BH18		N/A	N/A	N/A
1968-BH01	Allott & Son (1968)	N/A	N/A	9.14
1968-BH02		N/A	N/A	9.75
1968-BH03		N/A	N/A	17.07
1968-BH04		N/A	N/A	4.27
1968-BH05		N/A	N/A	3.96
1968-BH06		N/A	N/A	7.70
1968-BH07		N/A	N/A	7.09
1968-BH08		N/A	N/A	6.35
1968-BH09		N/A	N/A	7.95
1968-BH10		N/A	N/A	7.44
1968-BH11		N/A	N/A	6.86

Name	Source	Easting	Northing	Elevation (m OD)
1968-BH12		N/A	N/A	7.26
1968-BH13		N/A	N/A	7.39
1968-BH14		N/A	N/A	4.06
1968-BH15		N/A	N/A	4.88
1991-BH01	Soil Mechanics Limited (1991)	327768.00	371093.00	6.67
1991-BH02		327833.00	371170.00	6.40
1991-BH03		327863.00	371075.00	6.12
1991-BH04		328045.00	371150.00	6.99
1991-BH05		327933.00	370993.00	6.30
1991-BH06		328146.00	371128.00	6.31
1991-BH07		328426.00	371047.00	4.65
1991-BH08		328502.00	371123.00	-2.12
1991-BH09		328200.00	371207.00	4.62
1991-BH10		328273.00	371340.00	-0.01
1991-TPA		327696.00	370982.00	6.62
1991-TPB		327798.00	370915.00	6.56
1991-TPC		327905.00	370829.00	6.35
1991-TP01		327705.00	371090.00	6.57
1991-TP02		327750.00	371145.00	6.56
1991-TP03		327793.00	371113.00	6.66
1991-TP04		327831.00	371235.00	6.56
1991-TP05		327735.00	370835.00	6.55
1991-TP06		327791.00	371037.00	6.39
1991-TP07		327841.00	371003.00	6.45
1991-TP08		327935.00	370937.00	6.38
1991-TP09		327921.00	371013.00	6.37
1991-TP10		327859.00	371134.00	6.95
1991-TP11		327906.00	371113.00	7.08
1991-TP12		328007.00	371055.00	6.51
1991-TP13		328068.00	371020.00	6.54
1991-TP14		327943.00	371169.00	6.75
1991-TP15		328051.00	371183.00	6.75
1991-TP16		328110.00	371135.00	6.43
1991-TP17		328204.00	371112.00	6.78
1991-TP18		328275.00	371060.00	6.45
1991-TP19		328346.00	371011.00	6.28
1991-TP20		328394.00	370987.00	6.26

Annex 5: Figures

Annex 5: Figures

Connah's Quay

Environmental Statement

ES Volume II, Chapter 18: Marine Heritage

Ref: 288651.01
July 2025

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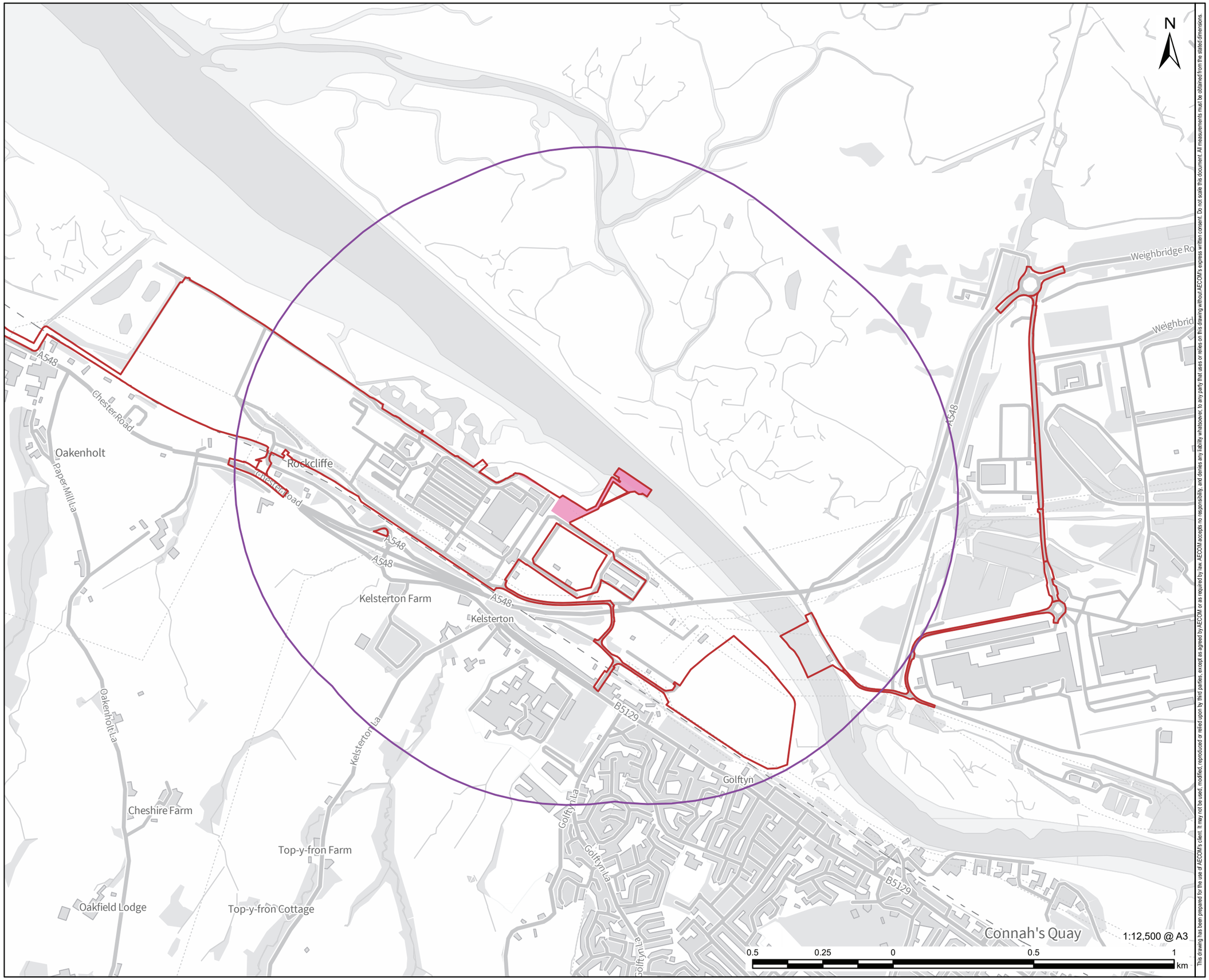

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Connah's Quay Low Carbon Power

CONSULTANT

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www.aecom.com

LEGEND

- Order Limits
- Water Connection Corridor
- Study Area (1km Buffer of the Water Connection Corridor)

NOTES

Coordinate system: OSGB 1936 British National Grid

ISSUE PURPOSE

Environmental Statement

DATE

July 2025

PROJECT NUMBER

60717119

FIGURE TITLE

Marine Cultural Heritage Study Area

FIGURE NUMBER

Figure 18-1

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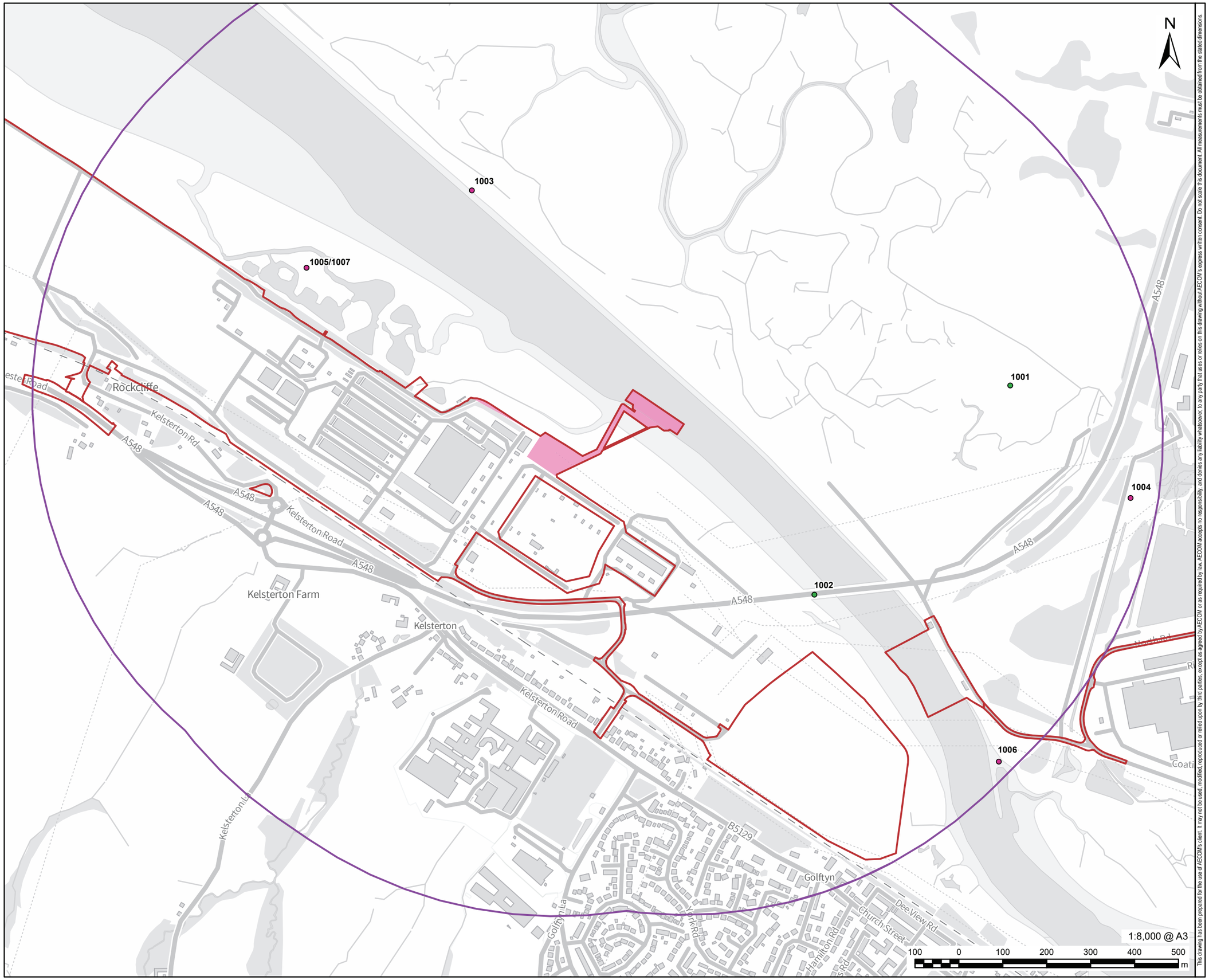
Revision: 0 Drawn: ND Checked: JG Approved: NS Date: 2025-07-25



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PROJECT

Connah's Quay Low Carbon Power

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LEGEND

- Order Limits
- Water Connection Corridor
- Study Area (1km Buffer of the Water Connection Corridor)
- Royal Commission on the Ancient and Historical Monuments of Wales point - Core Hole
- Historic Environment Record Point

NOTES

Coordinate system: OSGB 1936 British National Grid

ISSUE PURPOSE

Environmental Statement

DATE

July 2025

PROJECT NUMBER

60717119

FIGURE TITLE

Marine Heritage Assets

FIGURE NUMBER

Figure 18-2

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