

P24-134



PORT TALBOT EAF

Draft Written Scheme of Investigation for Historic Building Recording and Palaeoenvironmental Sampling

for Tata Steel UK

23/05/2025

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May 2025

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PROJECT INFORMATION:

HA JOB NO.	P24-134
NGR	277899, 185772
PARISH	Margam Moors
COUNCIL	Neath Port Talbot

PROJECT TEAM:

PROJECT MANAGER, AUTHOR & GRAPHICS	Kit Byrom, Christine Milton & Kate Turner
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WRITTEN SCHEME OF INVESTIGATION

1. Introduction

- 1.1.1. Turley has commissioned Headland Archaeology (UK) Ltd (on behalf of the client Tata Steel UK) to agree a programme of archaeological work in support of a proposed planning application. The works specified here are designed to ensure that appropriate mitigation of development impacts on archaeological remains are undertaken.
- 1.1.2. Planning permission has been given for the development:
- "Hybrid planning application: full planning permission for the demolition of existing buildings and structures, partial infill of the BOS lagoon, and construction of a new electric arc furnace-based steel production facility (1 no. arc furnace, 2 no. ladle furnaces). The development includes an upgraded slag processing facility, chemical/material storage and transfer infrastructure and pipework and cabling (above and below ground), buildings, fume and dust treatment plant, water treatment facility and material handling systems. Electrical control rooms and power infrastructure. Offices and ancillary facilities together with new and amended transport infrastructure, landscaping and green infrastructure, drainage and associated engineering operations.*
- Outline planning permission (with all matters reserved except for access and landscaping) for demolition and the construction of a scrap metal handling facility and associated scrap yards, scrap processing facility, underground and overground electrical infrastructure, and new and amended transport infrastructure, landscape and green infrastructure, drainage and associated engineering operations."*
- 1.1.3. The specified works comprise:
- level 1 building recording of those buildings that will be significantly changed or lost, involving a basic visual record, supplemented by the minimum of information needed to identify the building's location, age and type;
 - placement of temporary fencing around a colliery monument and medieval remains to prevent accidental damage during construction works;
 - Palaeoenvironmental sampling, assessment and radiocarbon dating of peat deposits, if encountered during excavations of the foundations for two hoppers; and
 - contingency archaeological monitoring and recording associated with a potential peat storage pit.
- 1.1.4. This written scheme of investigation (WSI) builds on previous desk-based assessment¹, preparation of an Environmental Statement² and consultation with Neath Port Talbot Council's archaeological advisors at Glamorgan-Gwent Archaeological Trust (GGAT- now renamed Heneb). This WSI should be read in conjunction with the ES chapter and supporting baseline data.
- 1.1.5. The methods described in this WSI follow relevant Chartered Institute for Archaeologists (CIfA) Standards and Guidance comprising the *Code of Conduct* (2022), *Standard for archaeological monitoring and recording* (2023), *Standard and guidance for the archaeological investigation and recording of standing buildings and structures* (2020), *Standards and Guidance for archaeological watching brief* (2014), *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (2020), and *Standard and guidance for the collection, documentation, conservation and research of archaeological materials* (2020).

¹ Headland Archaeology, 2024a

² Headland Archaeology, 2024b

2. Site description

2.1. Location and Topography

- 2.1.1. The Proposed Development Area (PDA) is situated at NGR 277899, 185772 located at Port Talbot Steelworks, Port Talbot, SA13 2NG (see Illus 1). The site is currently in use as an active steelworks. The site is located mid-slope between Mynydd Margam and the coastline. It is a largely flat site with the eastern extent sitting between 4 and 5 m Above Ordnance Datum (AOD). The site rises to the west with the coal yards sitting at 13m AOD and the north western part of the main body of the site being 19m AOD, although on the northern extent of the haul road the height drops back down to 7m AOD.

2.2. Geological background

- 2.2.1. The underlying solid geology is recorded by BGS³ as South Wales Lower and Middle Coal Measures Formation – mudstone, siltstone and sandstone. This sedimentary bedrock formed between 319 and 314.5 million years ago during the Carboniferous period.
- 2.2.2. Two areas of superficial deposits are recorded:
- 2.2.3. Tidal Flat Deposits – clay, silt and sand are recorded in the eastern half of the site. These sedimentary deposits were formed between 11.8 thousand years ago and the present during the Holocene; and
- 2.2.4. Blown sand – sand is recorded in the western half of the site. This is a sedimentary superficial deposit formed between 2.588 million years ago and the present during the Quaternary period.
- 2.2.5. Also in the area to the east are glacial deposits, including till and glaciofluvial deposits, and to the west on the coastline are marine beach deposits and raised storm beach deposits. Historical borehole logs show a sequence generally comprising bedrock overlain by glacial deposits over which alluvial or tidal flat deposits are present with peat. The blown sand is the upper deposit of the sequence.
- 2.2.6. Blown sand deposits are generally thought to have accumulated during the Devensian period associated with a tundra environment. However, here they seem to overly the alluvium/ tidal flats suggesting they are more recent in date and likely represent sand dunes which have moved inland during the onset of the present interglacial. Such deposits often have a high calcium carbonate content and as such are good at preserving bone and shell. As they can accumulate relatively rapidly they can also preserve old land surfaces and other archaeological features.
- 2.2.7. The tidal flat deposits have been largely recorded in legacy records as alluvium. The two have similar lithologies with the former being deposited in salt water or brackish conditions while the later is deposited in freshwater conditions. The study of any micro fauna such as diatoms and foraminifera is required to distinguish between the two. Such studies can also inform on local sea level change.
- 2.2.8. Peat has also been logged in many of the historic boreholes in and around the site (see below). This is an important deposit as it is made up of organic material suitable for scientific dating and palaeoenvironmental assessment/ analysis. The peat sits between two layers of clay so understanding the date and nature of this deposit could help with reconstructing local sea level change, along with helping to establish a broader understanding of how the surrounding landscape has changed in the Holocene.

2.3. Previous Ground Investigations

- 2.3.1. ADS records show a peat shelf on the coast to the south west of the Site⁴. BGS historic borehole data also shows a layer of peat of varying thickness (between 0.25m and 1.21m) between depths of 2.87m and 22.35m below ground level (NERC 2025). These peat deposits are logged in most BGS boreholes located within and immediately adjacent to the Site except for the foreshore area (between SS78SE54 and SS78NE288). Generally, the peat layer is greater in thickness and depth to the east of the Site, to a depth of 5.88m BGL at SS78NE3 for example. Coastal peat shelves are present at many locations around the British Isles. The peat beds in the Severn Estuary, Bristol Channel and Pembrokeshire generally date from the Mesolithic to late Bronze Age/ early

³British Geological Survey, 2025a

⁴ <https://archaeologydataservice.ac.uk/archsearch/record?titleId=1973762>

Iron Age and are important in the preservation of archaeological sites and as local sea level indicators (Bell, 2000).

- 2.3.2. To the south of Works Reservoir a group of BGS boreholes (SS78NE177, SS78NE180 and SS78NE178) show the peat layer to be present between -2.36 and +0.12m OD., and within and immediately around Works Reservoir the base of the peat unit is between -4.18 and -0.61m OD.
- 2.3.3. Generally, the peat sits within a natural sequence of glaciofluvial deposits including till, believed to date to the Devensian, overlain by tidal flat/ alluvial deposits with sand associated with windblown or beach deposits on which soil has formed. In some areas this sequence has been truncated, and Made Ground is present to depths of up to 1.8m (at SS78NE296 for example).
- 2.3.4. Historic Boreholes⁵ within the site confirm a layer of clinker and ashes recorded as made ground around 1m deep overlying made ground comprising sand with some black organic inclusions and cement fragments in the south of the site. This overlays various layers of superficial gravels and clay present across the site.

Table 1: Summary of the previously recorded superficial deposits with estimated date range and associated geoarchaeological/ palaeoenvironmental potential.

Deposit Type	Date	Description	Mapped on BGS ¹	Potential
PEAT	Holocene	Organic partially decomposed mass of semi-carbonized vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps.	no	high
ALLUVIUM	<i>Holocene</i>	Unconsolidated detrital material deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain	no	high
MARINE BEACH DEPOSIT	<i>Holocene</i>	Shingle, sand, silt and clay; may be bedded or chaotic; beach deposits may be in the form of dunes, sheets or banks; in association with the marine environment.	yes	low
RAISED STORM BEACH DEPOSIT	<i>Quaternary</i>	Gravel and rarely sand; commonly with bank-like form; now above the level of the present shoreline as a result of earth movement or a general fall in sea level.	yes	Moderate to high
BLOWN SAND	<i>Quaternary</i>	Blown sand is sand that has been transported by wind, or sand consisting predominantly of wind-borne particles.	yes	Moderate to high
TIDAL FLAT DEPOSITS	<i>Holocene</i>	Tidal flat deposits, including mud flat and sand flat deposits, form extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand.	yes	Moderate to high
ALLUVIAL FAN DEPOSITS	<i>Quaternary</i>	Alluvial fan deposits are low, outspread, relatively flat to gently sloping masses of loose rock material, shaped like a fan or segment of a cone. They are deposited by streams at the mouths of tributary valleys onto a plain or broad valley.	yes	Low

⁵ British Geological Survey, 2025b

Deposit Type	Date	Description	Mapped on BGS ¹	Potential
GLACIOFLUVIAL DEPOSITS	DEVENSIAN	Glaciofluvial deposits. Sand and gravel deposited as glacial outwash	yes	Low
TILL	DEVENSIAN	DIAMICTON mix of all lithologies deposited from glacier	yes	Low

¹ British Geological Survey (BGS) 1:50,000 or 1:625,000 superficial geology mapping (NERC, 2024).



Illus 1 Site location

3. Archaeological and historical background

- 3.1.1. There are no designated assets located within the red line boundary.
- 3.1.2. There are 130 designated assets located within the 5km study area. These comprise 19 scheduled monuments, seven grade I listed buildings, 14 grade II* listed buildings, 87 grade II listed buildings, one conservation area and two registered parks and gardens.
- 3.1.3. There are three non-designated historic assets located within the site:
- Morfa Colliery (421174) is a 19th century colliery in the north western area of the site;
 - Morfa Colliery Gas Works (710277) was a private gasworks used to light the colliery buildings; and
 - Theodorics Grange (20041) is a ruined Medieval building which formed part of a monastic grange, possibly of a domestic function.
- 3.1.4. Adjacent to the Site's southern boundary is Margam Warren (24479), a rabbit warren of probable Medieval origin. Although this is recorded as a single point it is likely that it covered land in the immediate vicinity, which may include land within the Red Line Boundary.
- 3.1.5. There are a further 32 non-designated assets located within the 1km study area. Of these, two are historic landscapes of multiple periods, one dates to the Roman period, two date to the Medieval period, 13 date to the Post-Medieval period, 13 date to the modern period, and one is of unknown date.
- 3.1.6. The desk-based assessment identifies that there is:
- A low potential for below ground archaeological remains to be present from the Mesolithic to Early Medieval periods;
 - A medium potential for archaeological remains dating to the Palaeolithic, Post-Medieval and Modern periods likely to be associated with Morfa Colliery and the steelworks respectively;
 - A high potential for archaeological remains dating to the Medieval remains within the Site, likely to be associated with the grange located within the Site or associated agricultural activity; and
 - Large areas of the Site have been disturbed or truncated by Post-Medieval mining and modern development of the steelworks and associated railway tracks. However, borehole records indicate a layer of peat below much of the Site which may contain archaeological potential for remains of low (Local) importance.
- 3.1.7. Historic Landscape Characterisation data for the study area defines the south eastern part of the site as: HLCA002 Margam Moors. This is reclaimed and enclosed salt marsh wetland pasture. There are Medieval and Post-Medieval fields and former Medieval monastic grange land with varied field patterns with typical ridge and furrow, earth bank and drainage features⁶. The rest of the site is not covered by HLC.

4. Objectives

- 4.1.1. The aim of the programme of mitigation works is to secure discharge of an archaeological condition placed on consent for the scheme.
- 4.1.2. Heneb (formerly Glamorgan and Gwent Archaeology) has asked for a targeted photographic survey to be undertaken prior to works that will impact upon the historic fabric of the current steelworks in the form of a Level 1 historic building record, in accordance with the levels of survey described in Historic England's guidance document *Understanding Historic Buildings: A Guide to Good Recording Practice*⁷. A Level 1 survey is a basic visual record, supplemented by the minimum of information needed to identify the building's location, age and type.
- 4.1.3. The objectives of the historic building recording are as follows:
- To create an internal and external photographic record of the historic Port Talbot steelworks buildings within the development red line boundary that will be significantly changed or lost;

⁶ Gwent-Glamorgan Archaeological Trust, 2021

⁷ Historic England, 2016

- To prepare a report on the record, including written summary descriptions of the steelworks;
- To photograph anything of interest or merit such as any evidence of graffiti or construction marks;
- To present a location plan as existing, indicating the location and orientation of all photographs;
- To prepare an OASIS summary record; and
- Submit an ordered digital archive to the ADS.

4.1.4. A layer of buried peat has been identified at the site during previous ground investigations as a discontinuous deposit recorded at between 4m and 20m BGL. The construction impact depth of groundworks associated with development is not expected to exceed 4m BGL across the bulk of the development area and is thus deemed to have a low potential to impact these deposits, with peat only anticipated to be encountered during the excavation of foundations for two hoppers (to 9m BGL). A programme of monitoring and paleoenvironmental sampling has been proposed to make a baseline record for this deposit in these locations.

4.1.5. The objectives of the geoarchaeological monitoring and sampling are:

- To complete sampling, radiocarbon dating and paleoenvironmental analysis of peat deposits (if encountered) during excavations for the hopper foundations,
- To produce and deposit a satisfactory archive and disseminate the results via grey-literature reporting and publication as appropriate.

4.1.6. The resulting archive (finds and records) will be organised and deposited with an appropriate museum/archive repository to facilitate access for future research and interpretation for public benefit.

4.1.7. The Morfa Colliery (421174) memorial will be protected from accidental damage by being securely fenced-off during the construction works. This will be undertaken by the client's principal contractor. The operative attending site to recover peat samples will confirm it is in place. Construction works are not planned in close proximity to the monument: the nearby colliery shaft may require attention (capping and/or grouting of cavities) so there may be plant movements in the general area.

4.1.8. Theodorics Grange (20041) is also located away from the planned development activities on the opposite side of a lagoon from the focus of work. It will be located within the red line development area. The grange will be securely fenced along its western side to prevent accidental damage from passing plant traffic.

4.1.9. A contingency measure for archaeological monitoring and recording is included in respect of the potential excavation of a peat storage pit, if required. The objectives of the monitoring and recording are:

- To monitor excavations for the creation of the peat storage pit;
- To identify and record any features of archaeological interest discovered during the works, in order to mitigate the impact of the works on the archaeological resource.
- To establish the integrity and state of preservation of archaeological features or deposits that may be present within the areas proposed to be disturbed during the development;
- To inform the planning authority;
- To assist in developing a mitigation strategy should any remains of significance be present on the site; and
- To produce and deposit a satisfactory archive and disseminate the results of the work via grey-literature reporting and publication as appropriate.

5. Project Team

5.1.1. Headland Archaeology (UK) Ltd is a Registered Organisation and abides by the Codes of Conduct (CIfA 2014a) and Approved Practice and Standards of the Chartered Institute for Archaeologists. The company has all the necessary technical and personnel resources for the satisfactory completion of the work. Alternatively, the client may wish to appoint another archaeological contractor who should also be a CIfA Registered Organisation. The appointed archaeological contractor should confirm with Heneb that the works will be undertaken in accordance with this WSI.

5.1.2. The project will be managed by a MCIfA accredited archaeologist. The field team will comprise a suitably qualified and accredited archaeologist to undertake building recording and one suitably qualified and

experienced geoarchaeologist or archaeologist to undertake palaeoenvironmental sampling during groundworks for the hopper foundations. Personnel will be confirmed to Heneb in advance of the building recording and peat sampling. Curricula vitae of key personnel can be supplied on request. The project team will familiarise themselves with the background to the site and will be aware of the project's aims and methodologies.

- 5.1.3. Environmental analysis will be managed by Headland's Environmental Manager (Kate Turner). Headland has in-house specialists who can undertake analysis of plant macrofossils, charcoal, animal bone and molluscs.

6. Strategy

6.1. Programme

- 6.1.1. Prior to commencement an OASIS record will be initiated and a site code requested from Heneb. The allocated OASIS project reference and site code will be used in all future deliverables.
- 6.1.2. Heneb will be notified of the groundworks programme in advance of the works by the Client or their Principal Contractor, who will arrange for site attendance by suitably qualified personnel.
- 6.1.3. Ground Investigations will be based on the monitoring, recording and sampling of excavations for the foundations of two (2) hoppers as part of the main construction works. Works will be monitored by a suitably qualified geoarchaeologist or archaeologist. Regular communication between the attending operative and/or off-site supervisors/managers and the client contact will be required to discuss intended upcoming works and plan accordingly.
- 6.1.4. Upon completion of the palaeoenvironmental sampling, a report will be produced which will summarise the findings of the peat investigation and associated palaeoenvironmental sampling, assessment and radiocarbon dating. This is anticipated to take up to 18 weeks to complete, contingent on the expected turnaround for return of radiocarbon dating results.

6.2. Project Team

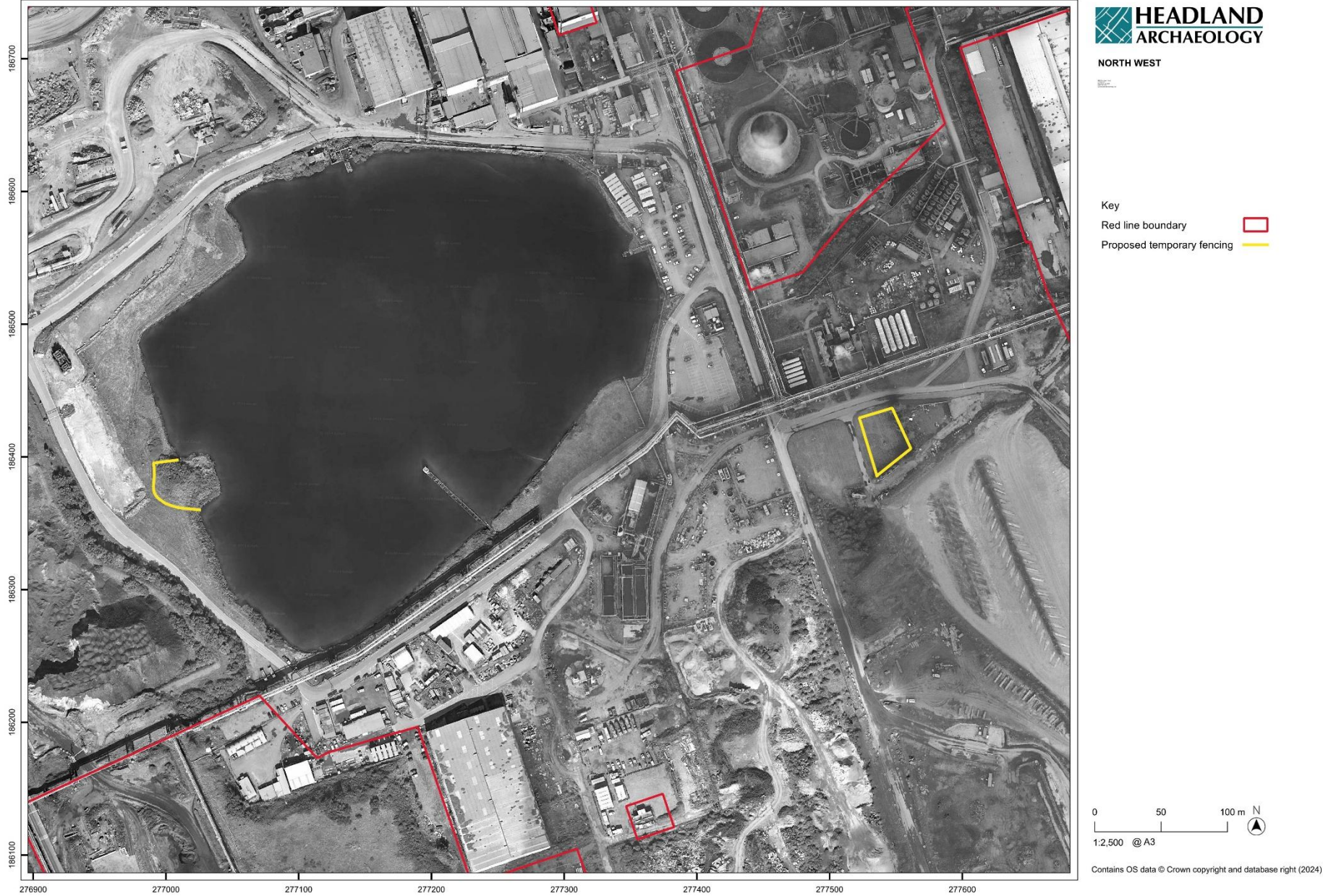
- 6.2.1. Headland Archaeology (UK) Ltd is a Registered Organisation and abides by the Codes of Conduct (CIfA 2014) and Approved Practice and Standards of the Chartered Institute for Archaeologists (CIfA). The company has all the necessary technical and personnel resources for the satisfactory completion of the work. Alternatively, the client may wish to appoint another archaeological contractor who should also be a CIfA Registered Organisation. The appointed archaeological contractor should confirm with Heneb that the works will be undertaken in accordance with this WSI.
- 6.2.2. The project will be managed by a MCIfA accredited archaeologist. The attendant field archaeologist(s) will be CIfA-accredited and confirmed to Heneb in advance of the building recording and peat sampling. Curricula vitae of key personnel can be supplied on request. The project team will familiarise themselves with the background to the site and will be aware of the project's aims and methodologies.
- 6.2.3. Environmental analysis will be managed by a MCIfA accredited a specialist. Headland has in-house specialists who can undertake analysis of plant macrofossils, charcoal, animal bone and molluscs.



Illus 2 Red line boundary for level 1 historic building recording



Illus 3 Hopper locations for potential paleoenvironmental sampling



Illus 4 Proposed temporary fencing



Illus 5 Proposed location for potential peat storage pit

7. Methodology

7.1. Health and safety

- 7.1.1. The field work will be undertaken in accordance with the health and safety procedures as set out in:
- The Health and Safety Work Act (1974) and related legislation; and
 - The Federation of Archaeological Managers and Employers' Health and Safety Manual (2010).
- 7.1.2. Site access and health and safety documentation will be prepared by the archaeological contractor. Site personnel will be briefed on the content of the risk assessment, in particular the known and potential hazards, and will ensure that control measures and PPE requirements are adhered to during the implementation of the works.
- 7.1.3. The archaeological contractor will work in compliance with the client and principle contractor's health and safety requirements.
- 7.1.4. The activities of any Headland Archaeology employees on site are covered by Headland's own insurance.

7.2. Access

- 7.2.1. Access to the site/structure for inspection and recording will be secured by the client.

7.3. Level 1 historic building recording

- 7.3.1. A level 1 historic building recording will be carried out on buildings that will be significantly changed or lost as a result of the development that are located within the red line boundary as indicated in Illus 2.

Photography

- 7.3.2. The photographic survey will be made using a high resolution digital SLR camera (Nikon D7000 or equivalent) and tripod/flash as necessary. All photographs will contain a scale.
- 7.3.3. The photographic records will comprise:
- General views of the structures in their wider setting
 - Square/oblique views of each structure's external elevations
 - Oblique views showing the overall appearance of the interior spaces of each structure
 - Selected detail images where appropriate, including fixtures, fittings and any evidence for graffiti, construction marks, manufacturers stamps and removed plant or machinery.
- 7.3.4. The digital file storage format will comply with Archaeological Data Service guidance on long term storage of digital media.
- 7.3.5. Additional high-level contextual images may be captured by remotely operated pole mounted cameras.

Drawings

- 7.3.6. The drawn record prepared on site will comprise roughly dimensioned sketches or annotations made to existing measured plans and elevation surveys.
- 7.3.7. On completion of the site works a location plan (1:10,000 scale) and a site plan showing the location and orientation of all photographs (1:1,250 or 1:2,500 scale as appropriate) will be prepared.

Written records

- 7.3.8. The written records will comprise:
- Notes of the precise location (NGR) of the structures;

- A summary of the building materials and bonding- construction technique and measurements for each structure;
- Any evidence for phasing- extensions or blocked openings.
- Where graffiti, construction marks, manufacturers stamps and evidence of removed plant or machinery are present these will be noted.
- Summary descriptions of the structure will be recorded on pro forma building recording sheets.

Report

- 7.3.9. On completion of the site survey, a building record report will be prepared. This will comprise a standalone document containing the following elements:
- a non-technical summary
 - a table of contents
 - an introduction with acknowledgements, including a list of all those involved in the project and the location and description of the site;
 - a statement of the aims and objectives;
 - a summary description of the structures, with notes on form, function, date and sequence of development;
 - a short desk-based survey of online sources, OS mapping, and both Lancashire and Sefton Archives;
 - drawings at appropriate scales, including a photograph location plan;
 - other maps, plans, drawings and photographs as appropriate;
 - a bibliography of sources consulted; and
 - a list of contents of the project archive and a statement of its location/proposed repository (ADS).
- 7.3.10. Any observations on the content of the report made by Heneb will be taken into account before the final version is issued.
- 7.3.11. Bound and digital copies of the report will be issued to the client, Heneb and the Glamorgan-Gwent Historic Environment Record (HER).
- 7.3.12. The project data will be uploaded to the OASIS online grey literature report library.

7.4. Palaeoenvironmental Monitoring and Sampling

Fieldwork

- 7.4.1. The main contractor will undertake all excavation works for the hopper foundations. Prior to undertaking the sampling of deposits identified as archaeologically significant (i.e. peat deposits identified by geotechnical investigators), the attending geoarchaeologist or suitably qualified person will familiarise themselves with the contractors' method statement and sign onto any relevant RAMS.
- 7.4.2. The attendant operative will maintain a safe distance from excavating plant during all groundworks. This should be at least 1 m beyond the outer most reach of the mechanical excavators arm at full stretch.
- 7.4.3. The attendant operative will investigate upcast from the excavation. Under no circumstances will excavations be entered.
- 7.4.4. Prior to investigating any deposits of interest the attendant operative will signal to the machine driver to stop. They will only investigate the upcast once the excavator has powered down and is switched off and a thumbs up is received from the driver.
- 7.4.5. A full record will be made of the deposits present. The sediments will be described on a summary proforma according to standard methodologies based on Jones (1999) and with the aid of a Munsell soil colour chart if

required (hard copy not digital printouts). This includes a description of colour, compaction, texture, sorting, structure, inclusions (including abundance, shape and material) and contacts.

- 7.4.6. The excavations will be undertaken to the depth required by the contractor.
- 7.4.7. Deposits identified as of palaeoenvironmental significance (i.e. peat deposits identified by geotechnical investigations) will be sampled for environmental evidence and other finds (e.g. bone, pottery etc.).
- 7.4.8. The historic boreholes nearest the proposed hopper locations are SS78NE160, SS78NE152 and SS78NE153. Here the peat is present at between -2.12m OD and -4.11m OD. It overlies what is described as light clay and is overlain by dark grey to brown clay and sand which becomes wet with depth. The maximum thickness of logged peat in the area as 1.22m at SS78NE153.
- 7.4.9. Bulk samples will be taken from selected deposits for wet sieving and floatation off site in order to recover any plant macro remains and other associated palaeoenvironmental material. A bulk sample will typically be 40 litres and will be recovered via machine bucket due to the depth of the proposed excavations. However, where large deposits are encountered more than one bulk sample may be taken. Ideally this would be from the top of the peat deposit and separately from the base in order that the date of the formation might be established by radiocarbon dating and any variation in environmental conditions identified.
- 7.4.10. Samples will be labelled using waterproof marker pens and an internal label. Label will include the site code, context identifier and the depth of sample.
- 7.4.11. Historic England guidance states that samples for scientific dating should only be taken from sample within a continuous sequence:

'Care must be taken to ensure that a continuous sequence of sediment is retrieved and that it is not contaminated during recovery. It is beneficial to take an overlapping series of monolith tins or cores so that samples from undisturbed positions throughout a sequence can be obtained taken. If possible, a closed-chamber corer (such as a 'Russian' or 'Livingstone' corer) should be used to take two adjacent cores (no more than 0.2m apart) overlapping by half the length of the core sections. 'Gouge' augers, typically with an open semi-cylindrical chamber, should not be used. However, in situations where this is unavoidable, extreme care should be taken to minimise the possibility of contamination.' - p27 Radiocarbon Dating and Chronological Modelling: Guidelines and Best Practice, Historic England

- 7.4.12. Collecting bulk samples for radiocarbon dating from peat ex-situ is far from ideal but as continuous sampling is not possible here every care should be taken to avoid contamination and constrain the sample locations three dimensionally in relation to the local datum points e.g. Ordnance Survey grid (OSGB36; UK onshore) or UTM (WGS84) using appropriate surveying equipment (see Historic England 2015b). It should also be accepted that scientific dating is only likely to be possible as a rangefinder for a baseline record of the peat. Two dates will allow either a date from each intervention or base and top from one intervention. To properly date the peat purposive geoarchaeological works including to collection of window sample boreholes would be required. Such samples would also provide a better, more constrained, sequence for palaeoenvironmental work.
- 7.4.13. A site plan including all areas of excavation and other pertinent information using client survey data.

Assessment and Reporting

- 7.4.14. A written report detailing the results of monitoring and palaeoenvironmental sampling will be produced. The report will include the following:
 - A non-technical summary of the report findings;
 - A description of, and a background to, the nature of the works including dates of fieldwork;
 - Archaeological and historical background;
 - Geoarchaeological background;
 - Methodology employed and explanation of any agreed variations to the brief;
 - Aims and objectives;
 - Results, including:
 - Location of interventions;

- Deposit sequences;
 - Specialist assessment of any spot finds recovered;
 - Results of specialist palaeoenvironmental assessment and radiocarbon dating of peat;
 - Discussion of the results, including a discussion of the likely palaeoenvironmental significance of the deposits with consideration to both the site-specific and wider context;
 - Conclusions and recommendations for further purposive mitigation works, if appropriate;
 - References and bibliography of all sources used; and,
 - Appendices including deposit records, suitable illustrations and drawings as appropriate.
 - A list of contents of the project archive and a statement of its location/proposed repository
- 7.4.15. The project archive will consist of all original records, artefacts and documentation that relates to the monitoring and palaeoenvironmental sampling. Copies of the written scheme of investigation, report and any relevant correspondence will be included.
- 7.4.16. An OASIS summary sheet will be completed, and the final report uploaded to the OASIS online Grey Literature Report Library where it will be incorporated into their datasets for public consultation. Deposition of the report with the HER and uploading the project data to OASIS will be considered as placing the results of the project in the public domain.
- 7.4.17. All digital data arising from the monitoring and sampling will be managed in accordance with Headland's procedures for secure storage of data and retrieval from site. All data collection equipment (cameras, GPS) will be removed from site daily and data backed up routinely in accordance with the in-house file structure. Copies of data will be stored locally for routine retrieval on site and backed up on the Headland Archaeology Datto cloud-based server, enabling access for members of the project team. File structures and naming conventions will accord with Headland's internal guidance document 'Digital Archive Preparation Guidance (England) ARC-P07' (updated 2017).
- 7.4.18. If no finds of archaeological significance are discovered as a result of the works, the resulting archive will be deposited with the ADS as a recognised digital archive.

7.5. Sampling strategy

Sampling

- 7.5.1. During excavations for the hopper footings (see Illus 3), deposits identified as archaeologically significant (i.e. peat deposits identified by geotechnical investigations) will be sampled for environmental evidence and other finds (e.g. bone, pottery etc.). Bulk samples will be taken from selected deposits for wet sieving and floatation off site in order to recover any environmental material. A bulk sample will typically be 40 litres and will be recovered via machine bucket due to the depth of the proposed excavations. However, where large deposits are encountered more than one bulk sample may be taken. Ideally this would be from the top of the peat deposit and separately from the base in order that the date of the formation might be established by radiocarbon dating and any variation in environmental conditions identified.

Recording

- 7.5.2. Each sample will be given ID and stored appropriately.
- 7.5.3. A site plan including all areas of excavation and other pertinent information will be recorded 3-dimensionally.
- 7.5.4. Headland maintains a digitally based library of guidance documents that includes information on field evaluation and recording. Relevant parts can be forwarded on request.

7.6. Temporary fencing

- 7.6.1. Temporary Heras fencing will be installed around the colliery monument (421174) and remains of Theodorics Grange (20041) to prevent accidental damage during construction. The suggested layout for this is shown in Illus 4. The location of the fencing will be surveyed on site by dGPS and marked with warning signage indicating the presence of a heritage asset.

7.7. Contingency – Archaeological Monitoring and Recording

Peat storage pit

- 7.7.1. Should the need for a peat disposal pit as part of a Peat Management Plan condition arise, it is likely that archaeological monitoring and recording may be required due to the proximity of the potential pit location to Theodorics Grange. The pit is proposed to be a maximum of 583m² in plan, and a maximum of 4m deep if required. The indicative proposed location of the peat storage pit is shown on Illus 5.

Machine excavation

- 7.7.2. All groundworks are to take place under the direct supervision of an archaeologist.
- 7.7.3. All machine excavation must be undertaken using a toothless ditching bucket so as not to disturb underlying deposits. All excavated material from the designated areas will be removed and placed to the side of the excavated area. Excavation will continue in shallow spits until the preferred depth has been reached.
- 7.7.4. Where features that are archaeologically significant are identified within the excavated area, machine excavation shall cease to allow sufficient time for their excavation and recording. Extensive and/or unusually complex archaeological deposits may require the production of an updated WSI.
- 7.7.5. The Client and Heneb will be notified by Headland Archaeology immediately if any archaeology is uncovered during the peat investigation.

Archaeological excavation and recording methodology

- 7.7.6. Any archaeological remains will be excavated and recorded within the working areas according to accepted professional standards, by qualified professional(s), and in accordance with the standards outlined in the Chartered Institute for Archaeologists' Code of Conduct (CIfA 2020) and Standard and Guidance for Monitoring and Recording (CIfA 2023).
- 7.7.7. Where exposed, archaeological features will be recorded and excavated stratigraphically and all relationships will be investigated.
- 7.7.8. Ideally, sufficient of any archaeological features or deposits will be hand excavated in order to provide the information required, however, the minimum requirements are as follows:
- 50% (by volume) of all identified discrete negative features;
 - 75-100% (by volume) of all structural features, including negative features;
 - 75-100% (by volume) structural remains to be exposed and excavated sufficiently to establish phasing and relationships; and
- 7.7.9. Each context will be recorded on a pro-forma context sheet by written and measured description.
- 7.7.10. The location of the area of the works shall be identified on a site plan that has been related to the OS National Grid. North shall be clearly indicated. Any archaeological features identified will be cleaned and recorded in plan at an appropriate scale.
- 7.7.11. All archaeological deposits will be recorded by drawn plans (scale 1:20 or 1:50 as appropriate) and sections (scale 1:10 or 1:20 as appropriate).
- 7.7.12. The Ordnance Datum height of all principal features and levels will be calculated and plans and sections will be annotated with Ordnance Datum heights.
- 7.7.13. Photographs (digital SLR to a minimum of 24 MP) will be taken as appropriate, to record each feature, the site, and landscape context, including an appropriate scale measure. Images will be saved in RAW and JPEG formats. The use of camera phones to take the primary record is not acceptable.

Sampling strategy

- 7.7.14. Deposits identified as archaeologically significant will be sampled for environmental material and other finds (e.g. bone, pottery etc.). Bulk samples will be taken from selected deposits for wet sieving and floatation in order to recover any environmental material. A bulk sample will typically be 40 litres. However, small deposits such as the fill of postholes may contain less than 10 litres of sediment and will be fully sampled. A representative proportion of samples taken on site will be processed and assessed with the results and recommendations for any further work included in the report.
- 7.7.15. Where waterlogged deposits are encountered (such as peat) appropriate sampling techniques will be employed so as to maximise the environmental information gained from such deposits. This may include the taking of monolith or core samples for pollen and non-pollen palynomorphs (e.g. testates and fungal spores) and large specialist samples for plant macrofossil, wood (including waterlogged wood) and insect analyses.
- 7.7.16. Headland's Environmental Manager, Kate Turner, will liaise with site staff to ensure an appropriate strategy for the recovery and sampling of environmental remains develops in tandem with fieldwork results.

Small finds policy

- 7.7.17. All artefacts identified during the course of the project will be collected, processed, sorted, quantified, recorded, labelled, packed and stored appropriately. The treatment of artefacts and environmental samples will be in accordance with the ClfA's *Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials* (2020).
- 7.7.18. Sufficient artefacts will be retained to determine the date and function of the feature or deposit. If unsure as to the date of the context, all artefacts will be retained for further assessment.
- 7.7.19. Artefacts will be bagged by archaeological context. The location of special (or 'small') finds will be three-dimensionally recorded.
- 7.7.20. Excavated spoil will be examined for artefacts and these will be retained and recorded, except for material of a modern (i.e. obvious post-1900) date which will be noted but not retained.
- 7.7.21. Contingency will be made for external specialist advice and conservation needs on-site should unexpected, unusual or extremely fragile and delicate objects be recovered. X-raying and storing of metalwork and other delicate objects will be undertaken by an appropriate external specialist facility.

Peat investigation report

- 7.7.22. On completion of the fieldwork, the site records will be checked and cross referenced. Any artefacts and samples recovered will be sent along with contextual information to the relevant specialists for analysis.
- 7.7.23. The report will contain (as a minimum):
- a non-technical summary with Welsh translation;
 - a table of contents;
 - an introduction with acknowledgements, including a list of all those involved in the project and the location and description of the fieldwork area;
 - a statement of the project aims and objectives;
 - an account of the investigation methodology undertaken, and an assessment of its effectiveness;
 - a description of the archaeological findings;
 - plans and section drawings at appropriate scales;
 - a description of any finds and paleoenvironmental samples collected including an exposition of the methodologies employed, a statement on the presence or absence of material and an assessment of preservation. An interpretation of the finds including reference to any unusual or important features of the assemblage will also be included. Specialist assessments of all-important groups of finds, materials and samples as necessary, including proposals for any proportionate further analysis;
 - a discussion and assessment of the results with a statement of the heritage significance of any identified archaeological features/sites on a local/regional/national scale;

- interpretive maps, plans, drawings and photographs as appropriate;
- a summary of any implication of the findings for the proposed development;
- a bibliography of sources consulted; and
- a list of contents of the project archive and a statement of its location/proposed repository; and
- a copy of the OASIS reporting form.

- 7.7.24. The final report on the results of the peat investigation will be prepared within eight weeks of completion of the site works, pending receipt of specialist reports, and any specific requirements of Heneb.
- 7.7.25. Any comments on the content of the final report made by the Client and Heneb will be taken into account before the final version is issued. Digital copies of the report will be issued to the Client and Heneb.
- 7.7.26. An OASIS record will also be completed for the project, which will include report texts. A short (c.300) word summary of the project results will be published in the relevant local or period specific journal as appropriate.

7.8. Monitoring

- 7.8.1. Access to the site will be afforded to the archaeological advisor, Heneb, for monitoring purposes.
- 7.8.2. The archaeological advisor to the LPA shall be given at least ten working days' notice of the commencement of each phase of site works.

7.9. Archive

- 7.9.1. The project archive will consist of all original records, artefacts, ecofacts/samples and all documentation that relates to the archaeological works. Copies of the written scheme of investigation, report and any relevant correspondence will be included.
- 7.9.2. The preferred method of deposition, where possible, will be digital. Archiving procedures will follow best practice guidance published in Brown's Archaeological Archives a Guide to Best Practice in Creation, Compilation, Transfer and Curation (2007), the ClfA's Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives (2014), the RCAHMW Guidelines for Digital Archives (2015) and The National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales 2017 (National Panel for Archaeological Archives in Wales 2017).
- 7.9.3. The final digital archive will be submitted to the National Monuments Record of Wales (NMRW) within 12 months following completion of all site works.
- 7.9.4. If necessary an appropriate museum will be agreed as the physical archive repository for the project. An accession number will be obtained for the project, which will be used as a reference on all material to be archived. The project archive will be compiled in accordance with the guidelines published by the ClfA on behalf of the Archaeological Archives Forum (2011). The physical archive will be submitted within 12 months of completion of all work on this project. Any UPD will be submitted within 3 months of Heneb's agreement to the Assessment Report and any final publication will be complete within a year of Heneb's agreement to the UPD. It is anticipated that any final publication will report the results of the project as a whole. All finds will be reported to Heneb, which will determine the ultimate destination of the material archive. Once this is determined, and within 12 months, arrangements will be made with the specified archive repository for transfer of material and title.
- 7.9.5. Final reports will be deposited with the Heneb Historic Environment Record in accordance with Heneb's *Guidance for the Submission of Data to the Heneb Historic Environment Record* (2024).⁸

⁸ <https://heneb.org.uk/wp-content/uploads/2025/01/Guidance-for-the-Submission-of-Data-to-Welsh-HERs-V4-EN.pdf>

7.10. *Public benefit*

- 7.10.1. The short duration and nature of the recording works is not suited to public participation on site while the project is ongoing.
- 7.10.2. The results of the record will be disseminated to the regional Historic Environment Record and online OASIS library where they will be freely accessible to the public.

8. Human Remains

- 8.1.1. Human remains are not anticipated to be encountered during the work. If encountered human remains will not be excavated until reported to the client, curator and local police and a strategy for excavation agreed with all parties. As standard when encountered, excavation of human remains is anticipated to be undertaken during the course mitigation excavation works, prior to which a license will be gained from the Ministry of Justice in accordance with Section 25 of the 1857 Burial Act. All excavation and treatment of cremated and inhumed human remains will be undertaken in cognisance of ClfA Guidelines to the Standards for Recording Human Remains (Brickley and McKinley 2004); ClfA Updated Guidelines to the Standards for Recording Human Remains (Mitchell & Brickley 2017); and all relevant BABAO Guidance including the BABAO Code of Ethics (2019) and BABAO Code of Practice (2019).

9. Treasure

- 9.1.1. Any recovered artefacts that are designated treasure as defined by the Treasure Act 1996 will be treated in accordance with said act. Headland Archaeology (UK) Ltd will follow the advice provided by the portable antiquities scheme for treasure and follow the Code of Practice attached to the Treasure Act 1996.
- 9.1.2. Should an artefact or artefacts classed as potential treasure be recovered during the course of the works, the law requires that it is to be reported to the local coroner within 14 days of discovery or realisation that the artefact(s) constitute potential treasure – this reporting requirement will be undertaken by Headland Archaeology (UK) Ltd, And the archaeological coordinator will be informed.
- 9.1.3. Where appropriate and agreed with the Client and LPA, the site/spoil should be scanned with a metal-detector and finds recorded and recovered as soon as practicable.
- 9.1.4. Any MD-user engaged or allowed to undertake this work should formally agree to an appropriate methodology for this work, that any finds remain the property of the landowner, and that all significant finds and their locations shall be fully recorded as part of the project.
- 9.1.5. Any treasure will be removed to a secure store. Where removal cannot be achieved on the same working day as the discovery, suitable security measures must be taken to protect the finds from theft.
- 9.1.6. All finds and archaeological records should be removed from the site at the end of each working day as a matter of course.

10. Health and Safety

- 10.1.1. The archaeological contractor's work will be undertaken in accordance with current Health & Safety legislation. A risk assessment will be prepared prior to the commencement of fieldwork. All staff will wear appropriate PPE, which is to include high-visibility clothing, hard hats and safety footwear. Suitable site welfare facilities will be provided by the client.
- 10.1.2. This WSI is submitted on the understanding that there will be unlimited access to all relevant areas of the development area.

11. Insurance and Copyright

- 11.1.1. Headland Archaeology (UK) Ltd carries adequate insurance for the works described in this document. Certificates can be presented on request.
- 11.1.2. Copyright will be retained by the archaeological contractor as far as it applies to any and all items produced by Headland Archaeology (UK) Ltd or its subcontractors in the course of the works. Headland will licence the client, Local Planning Authority and relevant archives as necessary for use in matters relating to the project. This licence will also extend to non-commercial use.

12. References

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- Headland Archaeology 2024b *Project EAF Environmental Statement Volume 2 Chapter 11 Cultural Heritage*
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