

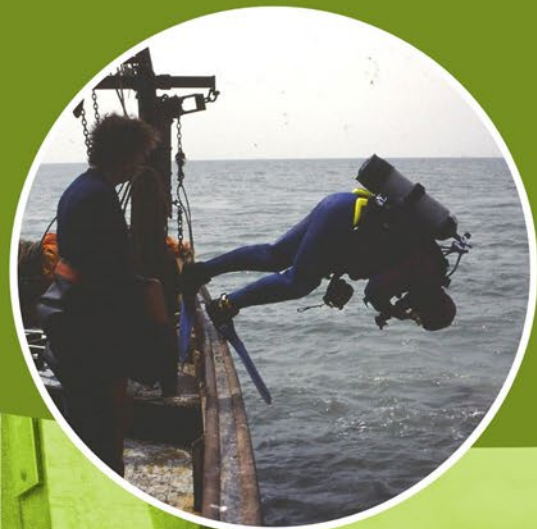
# Visual Impact Provision (VIP), Snowdonia

*Method statement for a  
programme of geoarchaeological  
and palaeo-environmental  
assessment*

*for*  
Intertek

CA ref: 191201

August 2022



## Visual Impact Provision (VIP), Snowdonia

Method statement for a programme of geoarchaeological and palaeo-  
environmental assessment

Coracle project number: 191201

Coracle report number: 191201.2

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date	August 2022
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date	August 2022
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## LIST OF ACRONYMS USED IN THE TEXT

<b>AONB</b>	Area of outstanding natural beauty
<b>CA</b>	Coracle Archaeology
<b>CifA</b>	Chartered Institute for Archaeologists
<b>COARS</b>	Coastal and Offshore Archaeological Research Services
<b>Ofgem</b>	Office of Gas and Electricity Markets
<b>OHL</b>	Overhead lines
<b>VIP</b>	Visual impact provision

## 1. INTRODUCTION

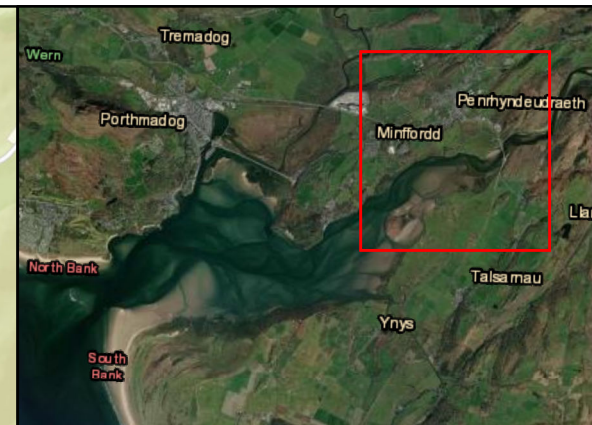
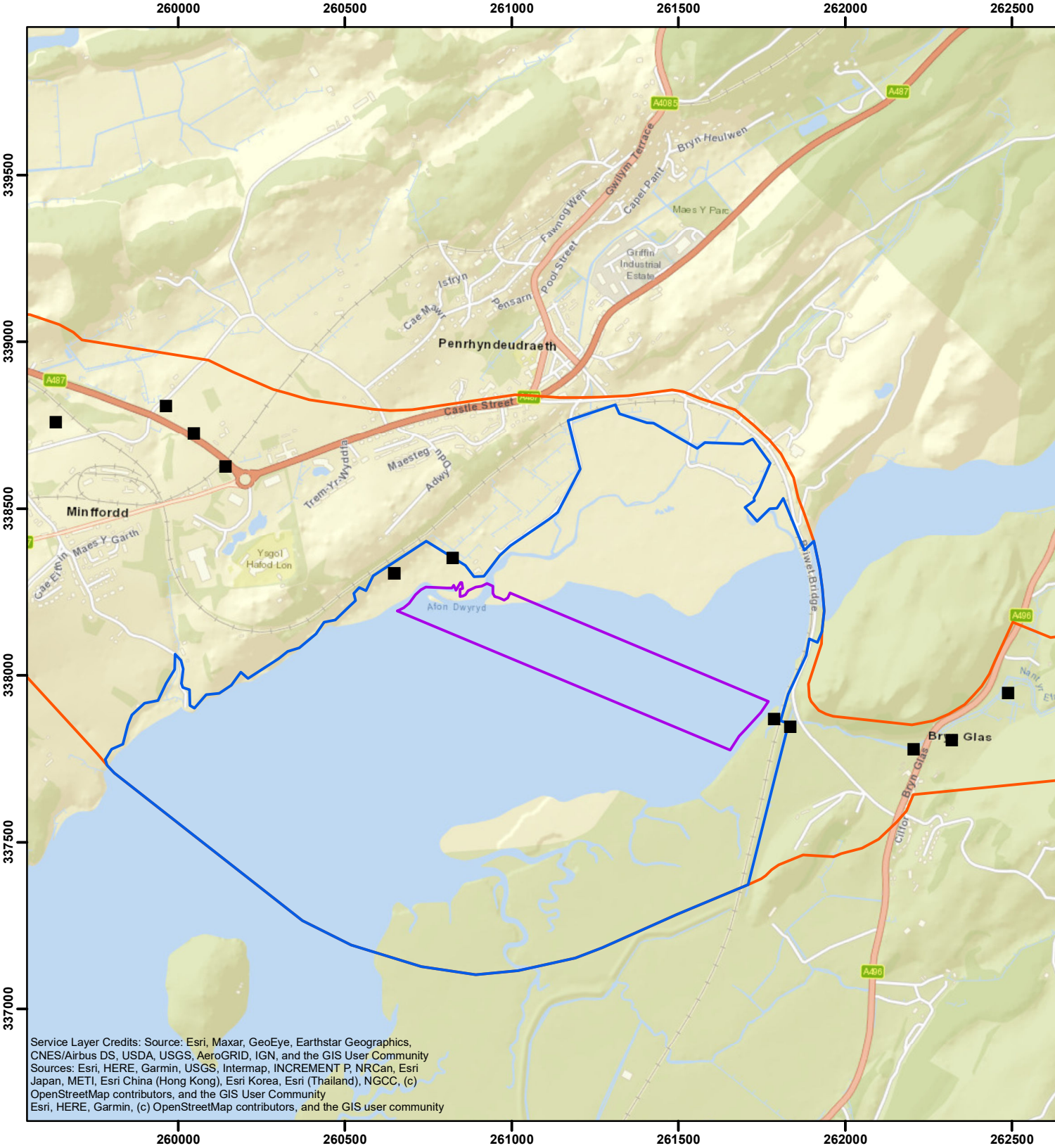
### ***Project background***

- 1.1. Coracle Archaeology (CA) was commissioned by Intertek, on behalf of National Grid, to produce a method statement for a programme of geoarchaeological and palaeo-environmental assessment on recovered cores in support of the Visual Impact Provision (VIP) Snowdonia Scheme (henceforth ‘the proposed development’). The proposed development involves the diversion of National Grid’s 4ZC overhead power line beneath the Dwyryd Estuary in Snowdonia National Park, thus conserving and enhancing the natural beauty, wildlife and environmental heritage within the protected landscape. The development will utilise part of the £500 million Office of Gas and Electricity Markets (Ofgem) allocation to reduce the impact of existing transmission lines in Areas of Outstanding Natural Beauty (AONB) and National Parks.
- 1.2. A number of ground investigations are planned to inform the engineering design of the project, including boreholes within the estuary and marine project area. These are in addition to geotechnical investigations previously undertaken for the project, some of which have already undergone geoarchaeological and palaeo-environmental assessment by Coracle Archaeology (see Coracle Archaeology 2020). This method statement applies only to the assessment of selected cores within the Snowdonia VIP marine project area; geoarchaeological and palaeo-environmental assessment of terrestrial cores is not considered necessary as the terrestrial sedimentary sequence is already well understood (bedrock overlain by top soil).

### ***Landscape context***

- 1.3. The proposed development aims to reduce the visual impact of National Grid’s 4ZC overhead line (OHL) within Snowdonia National Park, through the relocation of an overhead section beneath the Dwyryd Estuary, Penrhyndeudraeth, Gwynedd (figure 1). The solid geology of the area is dominated by the Ffestiniog Flags formation, which consists of mudstones, siltstones and sandstones. The Dolgellau formation is present at the very northern edge of the marine project area, comprising both mudstones and siltstones. These are overlain by estuarine tidal flat sediments.





### Legend

- Borehole locations
- ▭ Survey corridor
- ▭ Marine project area
- ▭ VIP Snowdonia project area

### GEODETTIC INFORMATION:

0 250 500 Metres

Coordinate System: British National Grid  
Projection: Transverse Mercator  
Datum: OSGB 1936  
False Easting: 400,000.0000  
False Northing: -100,000.0000  
Central Meridian: -2.0000  
Scale Factor: 0.9996  
Latitude Of Origin: 49.0000  
Units: Meter



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PROJECT TITLE:  
VIP Snowdonia

FIGURE TITLE:  
Marine project area

DRAWN BY: RK  
CHECKED BY: DG  
APPROVED BY: MW

PROJECT NO.  
191201

FIGURE NO.  
1

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- 1.4. Unlike the terrestrial context, the superficial sedimentary sequence within the estuary is currently poorly understood. While there have been no investigations of the stratigraphy or sedimentary sequence prior to works conducted for the proposed development, its geomorphology has, however, been subject to in-depth study. Mahamod (1989), for example, demonstrated that sedimentation within the estuary is controlled predominantly by fast tidal currents, with weaker currents in the bay. The spatial distribution of textural parameters of the estuarine sediments related to the strength of tidal currents, as well as the morphology and bathymetry of the inlet itself. Estuarine sediments are dominated by sand and are similar in texture and mineralogy to the adjacent beach sediments, though markedly different to the river sediments. It has been suggested therefore that large volumes of sand have been transported into the estuary from coastal areas.
- 1.5. A geoarchaeological assessment of cores from the marine project area, collected in 2018, was previously undertaken by Coracle Archaeology (2020). The presence of a probable palaeosol in core **BH203** indicates the preservation of a [semi-] terrestrial land-surface, preserved at depth below the modern estuary. An assessment of palaeo-environmental potential indicated these cores may provide insights into the evolution of the Dwyrdd Estuary, notably the potential to obtain Sea Level Index Points to better constrain the timing and rate of Late Glacial and Early Holocene sea level change along the mid-Welsh coastline. Assessment of the palaeosol in **BH203**, using pollen, suggested an Early Holocene date, but attempts to radiocarbon date this deposit were unsuccessful. Radiocarbon dating of an oyster shell in **BH205** confirmed the existence of estuarine conditions at the site by c. 7.2 ka and provided a marine limiting datapoint for the regional sea level curve. No recommendations were made for further investigations of these cores.

#### **Standards and guidance**

- 1.6. Geoarchaeological assessment will be conducted following guidelines outlined in Cadw (2020) *Managing the marine historic environment of Wales*, Historic England's *Environmental Archaeology* (2011) and *Geoarchaeology* (2015), COWRIE's *Guidance for offshore geotechnical investigations and historic environment analysis* (2011), and in

compliance with the Chartered Institute for Archaeologists (CIfA) *Standard and guidance for archaeological field evaluation* (2014).

### **Aims**

- 1.7. The principal aim of this investigation is to determine whether any deposits of palaeo-environmental or geoarchaeological interest are present in the vicinity of the proposed development. Any such deposits have the potential to further our understanding of environmental development and land-use in the region.
- 1.8. Broadly, the aims of the archaeological assessment of geotechnical data, as set out in COWRIE (2011), are:
  - to investigate the deposition sequence of sediments within the area represented by the cores to identify, as far as possible, the environments within which deposition took place;
  - to evaluate the potential for past human exploitation and occupation of these past environments;
  - to produce an overview of the geological stratigraphy to provide an indication of the prehistoric archaeological potential for the area; and
  - to comment on the archaeological importance of the identified deposits, in the context of the wider palaeo-environmental history of the region and the UK.
- 1.9. Collection and retention methods should not preclude and, where possible, should facilitate these aims.
- 1.10. The purpose of this method statement is:
  - to provide guidance on the collection and retention of geotechnical cores to ensure that they are suitable for archaeological purposes. It is vital that initial collection and retention of cores is undertaken in a way which will facilitate archaeological assessment, following the steps outlined in this document; and



- to provide methods for undertaking Stage 1 geoarchaeological assessments.

## 2. METHODS

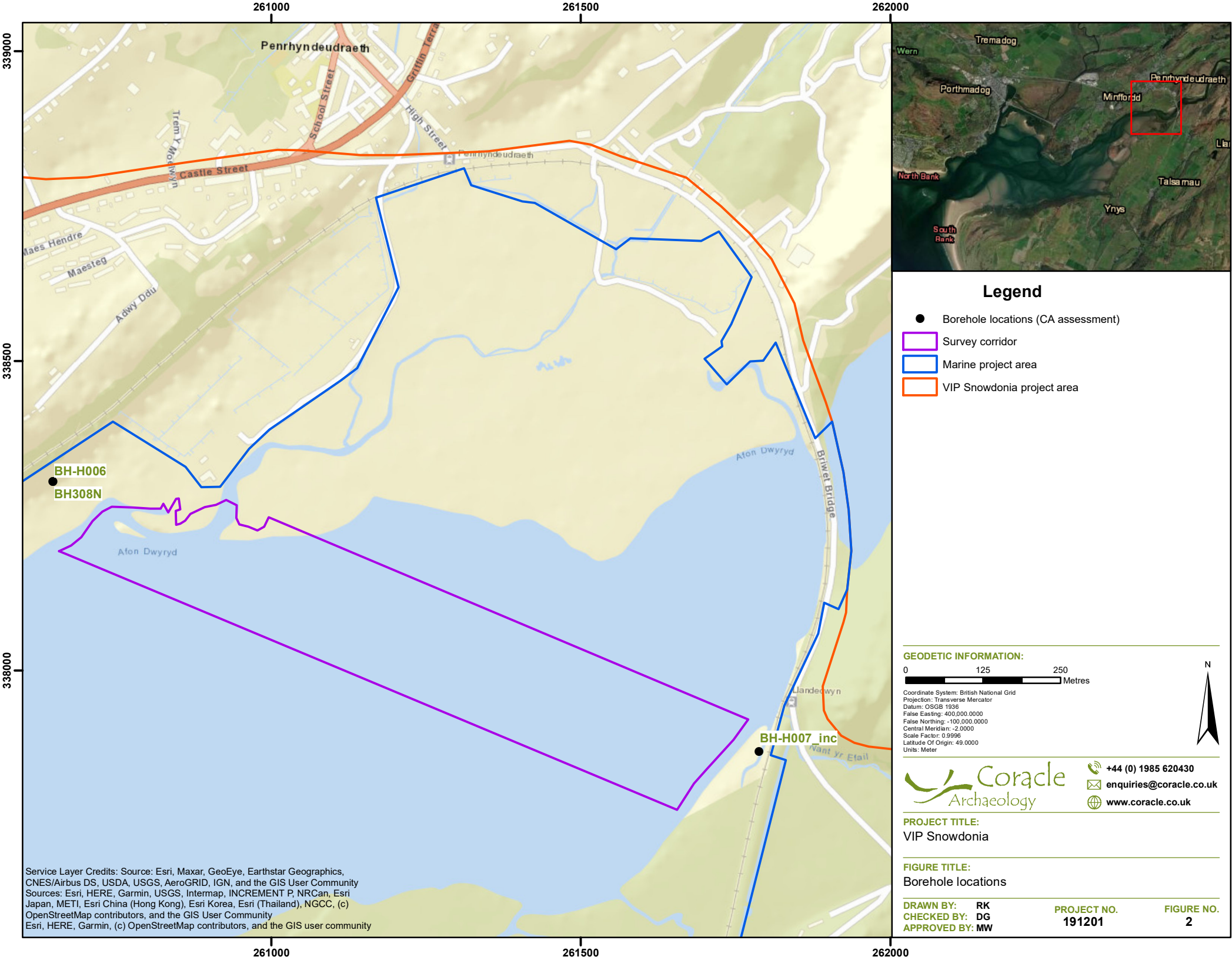
- 2.1. Three proposed boreholes are located within the marine project area boundary (see table 1; figures 2, 3 and 4). Of these, two are co-located (**BH308N** and **BH-H006**). Geoarchaeological assessments will therefore be conducted upon two cores recovered from the sites of **BH308N/ BH-H006** and **BH-H007\_inc** respectively.

**Table 1 Location of boreholes in marine project area**

Borehole name	Easting (BNG)	Northing (BNG)
<b>BH308N</b>	260647	338305
<b>BH-H006</b>	260647	338305
<b>BH-H007_inc</b>	261787	337868




### **Core recovery, splitting and storage**

- 2.2. Cores will be recovered by the client's geotechnical contractor. All cores will be treated in accordance with guidance set out in *Model Clauses for Archaeological Written Schemes of Investigation* (The Crown Estate 2021) and outlined below. Cores will be labelled clearly with core number, depth and orientation (top and bottom) and stored in an appropriate manner while awaiting assessment and analysis.
- 2.3. It is anticipated that the contractor will undertake core splitting; this can however be undertaken by Coracle Archaeology if required. In the event of the latter, recovered cores should be transported to the laboratories of our colleagues at Coastal and Offshore Archaeological Research Services (COARS), University of Southampton where they will be split by lead geoarchaeologist, Dr Michael Grant.
- 2.4. Cores should be opened lengthways in normal lighting conditions. This is typically achieved using a circular saw, with care being taken not to penetrate the sediment. Alternatively, a router or fein saw can be used to cut through the plastic liner with minimal





### Legend

-  Marine project area
-  Survey corridor
-  Borehole locations (CA assessment)

**GEODETTIC INFORMATION:**  
0 12.5 25  
Metres

Coordinate System: British National Grid  
Projection: Transverse Mercator  
Datum: OSGB 1936  
False Easting: 400,000.0000  
False Northing: -100,000.0000  
Central Meridian: -2.0000  
Scale Factor: 0.9996  
Latitude Of Origin: 49.0000  
Units: Meter



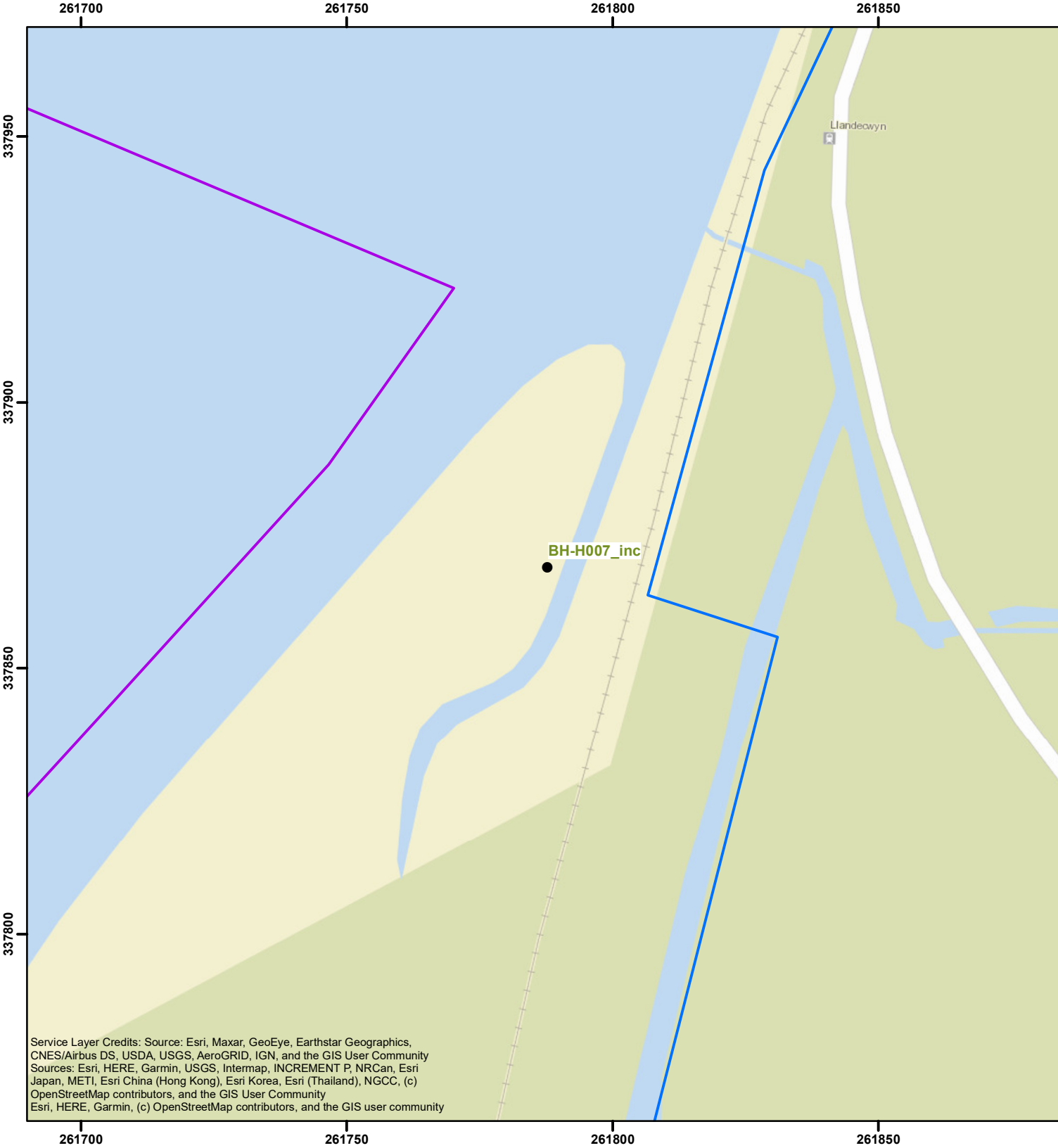
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**PROJECT TITLE:**  
VIP Snowdonia




**FIGURE TITLE:**  
Boreholes BH308N & BH-H006

<b>DRAWN BY:</b> RK	<b>PROJECT NO.</b> 191201	<b>FIGURE NO.</b> 3
<b>CHECKED BY:</b> DG		
<b>APPROVED BY:</b> MW		

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Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community



### Legend

-  Marine project area
-  Survey corridor
-  Borehole locations (CA assessment)

### GEODETTIC INFORMATION:

0 12.5 25 Metres

Coordinate System: British National Grid  
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PROJECT TITLE:  
VIP Snowdonia

FIGURE TITLE:  
Borehole BH-H007\_inc

DRAWN BY: RK  
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APPROVED BY: MW

PROJECT NO.  
191201

FIGURE NO.  
4

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Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community  
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disturbance to the sample itself. The core should then be photographed alongside a scale. It is important to minimise moisture loss; reviewing and sampling intervals should therefore be limited as much as possible. Conducting core splitting and imaging in normal light conditions assists in the siting of sampling locations for the full range of laboratory analyses, helps to identify areas of fracture to be avoided in sampling, and is fundamentally safer.

- 2.5. Half-cores will be retained and stored for geoarchaeological review and potential sampling, if deemed necessary. Split cores should be wrapped in several layers of clingfilm to maintain sample integrity and to preserve moisture content; the sample number should be marked on the clingfilm. Three layers of aluminium foil should then be applied and secured with tape with the sample number labelled clearly. Cores should be kept in a temperature-controlled environment.
- 2.6. If core splitting is not undertaken by COARS, all cores should be kept at the contractor's premises in a temperature-controlled environment for the duration of the geoarchaeological assessment. All cores will be retained for Stage 1 archaeological assessment and later stages of investigation if the assessment identifies a need for further work.
- 2.7. The core samples should be made available for archaeological inspection if required. These samples should be made available within one month following a request to the contractor and / or the storage facility. Samples should not be discarded before full archaeological assessment and (where required) analysis has taken place.

### **Recording**

- 2.8. Recording of recovered cores will either be undertaken by the client's geotechnical contractor or by COARS. Eurocode 7 will be used to describe sediments; any additions to this will be to British Standard and, where used, will be specified. Characteristics which are of archaeological interest will be logged. In particular, any evidence of the following will be recorded:
  - fine-grained sediments indicative of fluvial/estuarine conditions;

- organic materials such as peat, wood or charcoal which can be used to date sediment layers and provide information on past environments;
- palaeo-environmental and palaeo-climatic indicators such as palynomorphs (pollen grains, spores and other microfossils), foraminifera, ostracods, mollusc shells, insects and plant remains which can be used to reconstruct the prehistoric environment;
- mammal macro-faunal remains which can be used to reconstruct landscape and habitat; and
- archaeological artefacts which provide direct evidence of a prehistoric human presence in the palaeo-landscapes.

- 2.9. The presence of any of the above features or inclusions, where observed, should be noted in the core log. Any voids or areas of loose sediment within the cores should also be noted, along with their depths.
- 2.10. All cores should be photographed in good light. Photographs should cover the entirety of the core (although this can be done in separate sections), including any areas of loose material or voids.
- 2.11. Core logs and photographs produced by the client's geotechnical contractor will be assessed for deposits of geoarchaeological and palaeo-environmental interest by our colleagues at COARS. Sample core logs should be sent to the retained archaeologist as a priority to ensure recording has been done to a standard enabling geoarchaeological assessment.

### ***Staged geoarchaeological assessment***

- 2.12. Geoarchaeological analysis will follow the staged strategy proposed by COWRIE (2011) and recommended by Historic England (2015). The staged approach is specifically designed to ensure that the level of investigation is commensurate with the results identified in the previous stage:

- **Stage 1 Geoarchaeological review of core logs**

This consists of a desk-based assessment of geotechnical core logs by a trained geoarchaeologist to determine which cores contain sediments of archaeological interest. Recommendations will be made as to which cores warrant Stage 2 recording.

- **Stage 2 Geoarchaeological recording**

A detailed inspection and recording of the cores identified in Stage 1 to further assess archaeological potential. This requires physical assessment of the cores by our geoarchaeologist, who will make a record of the sediments encountered, their archaeological potential, and recommendations, if required, for any Stage 3 assessment.

- **Stage 3 Geoarchaeological assessment**

This stage will comprise the sampling and laboratory analysis of a selected core, or cores, to a level sufficient to enable an assessment of the value of the palaeo-environmental material (pollen, diatoms, ostracods and foraminifera) surviving within the core(s) and approximate age of the sediments. The assessment seeks to establish the preservation, diversity, and quantity of palaeo-environmental material, to further refine the interpretation of the sedimentary environment and past human activity, identified in Stage 2 recording. Recommendations are made as to whether a Stage 4 analysis programme, including dating, should take place on any of the core material.

- **Stage 4. Geoarchaeological analysis**

A more detailed investigation of the core material typically using the same techniques as Stage 3, but with extended counting and / or higher sampling intervals within key stratigraphic units. The work will be undertaken to a high standard which should permit the publication / dissemination of the results.

- 2.13. Stage 1 review will be undertaken on supplied core logs and photographs. This stage will seek to identify cores which contain deposits of palaeo-environmental or

geoarchaeological interest. Core logs will be compared with existing project-specific geophysical survey data (Cotswold Archaeology 2017), and recommendations will be made for further (Stage 2) assessments if deemed necessary. All geoarchaeological assessments will be conducted by Dr Michael Grant, COARS, University of Southampton.

### **Reporting and deliverables**

2.14. A report summarising the results of Stage 1 assessment will be produced in line with the ClfA standard (2014). It will include as a minimum the following elements:

- a non-technical summary;
- a discussion of the archaeological and planning background to the project;
- an outline description of the aims of the evaluation and the methodology used to achieve these aims;
- a descriptive text concerning the results of the evaluation, including any finds;
- supporting figures at appropriate scales;
- summary tables; and
- an interpretation and discussion of the results. This will include a proposal for any subsequent stages of geoarchaeological assessment.

## **3. SUMMARY**

3.1. This method statement for a programme of geoarchaeological and palaeo-environmental recording and assessment has been compiled in support of environmental assessments undertaken as part of the VIP Snowdonia Scheme. It applies solely to the assessment of selected cores within the marine project area; in contrast to the marine context, the terrestrial sedimentary sequence is generally well understood. It is based on the premise that the client's geotechnical contractor will undertake core splitting and the production of core logs. Core preparation and treatment can, however, be undertaken by Coracle Archaeology and COARS if required.



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