



<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p> <p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	1 of 38

	<p>Culzean Floating Wind</p> <p><i>A semi-submersible pilot project</i></p>	
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<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p> <p>GB-CZT-00-TOTA-000012</p>

Rev.	Date	Issued by	Checked by	Approved by
02	16/04/2025	Claire MacDonald	Charles Howorth	Charles Howorth

Written Scheme of Investigation: Marine Archaeology	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	2 of 38
CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT		

TABLE OF REVISIONS

Revision	Modification
00A	Draft
01	Revision addressing comments received from MD-LOT 11/02/2025
02	Revision to address consultee comments from Historic Environment Scotland received 19/03/2025.

<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p> <p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>3 of 38</p>

DETAILED CHANGE LOG

Date	Rev. Status	References	Description of changes
17/02/2025	Resubmission to MD-LOT for review		<p>Definitions Section, Page 7 – updated to reflect Marine Directorate Licensing Operations Team (MD-LOT).</p> <p>Section 6.2 – updated to correctly reference Table 6-1.</p> <p>Section 7.5 - The following sentence has been added to Section 7.5 – ‘*Any survey that have the potential to disturb European Protected Species (EPS) (within 0 – 200 nautical miles) will require a license to complete these within the legislative requirements (The Scottish Government, 2024).’ And the reference has been included in Section 8 – References.</p>
16/04/2025	Resubmission to MD-LOT for review	Historic Environment Scotland ref - 300065561	Section 4.2, second paragraph, 70005 is changed to 70008.

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	4 of 38

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<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	5 of 38

Contents

EXECUTIVE SUMMARY	12
PURPOSE OF THIS REPORT	12
1. INTRODUCTION.....	13
1.1 PURPOSE OF THE DOCUMENT	13
1.1.1 <i>Consent Compliance</i>	13
1.2 LINKAGES WITH OTHER CONSENT PLANS	14
1.3 STRUCTURE OF THE PLAN.....	14
1.4 PLAN AUDIENCE.....	14
2. SCOPE.....	16
2.1 OUTLINE	16
2.2 LOCATION AND PROJECT DESCRIPTION.....	16
2.3 AIMS AND OBJECTIVES.....	18
2.4 GUIDANCE	18
3. IMPLEMENTATION OF THE WSI	19
3.1 RESPONSIBILITIES AND COMMUNICATIONS	19
3.2 MONITORING COMPLIANCE WITH THE WSI	20
3.3 HEALTH AND SAFETY.....	21
4. SUMMARY OF KNOWN AND POTENTIAL ARCHAEOLOGY	22
4.1 SUMMARY OF DESIGNATED HERITAGE ASSETS.....	22
4.2 SUMMARY OF NON-DESIGNATED HERITAGE ASSETS	22
4.3 SUBMERGED PREHISTORIC ARCHAEOLOGY	22
4.4 DATA LIMITATIONS	24
5. RESEARCH AGENDAS.....	25
6. IMPACTS AND MITIGATION.....	26
6.1 OVERVIEW	26
6.2 MITIGATION	26
6.3 ARCHAEOLOGICAL EXCLUSIONS ZONES	28
6.3.1 <i>Establishing new Archaeological Exclusion Zones</i>	28
6.3.2 <i>Altering Archaeological Exclusion Zones</i>	28
6.3.3 <i>Monitoring Archaeological Exclusion Zones</i>	28
6.4 ARCHAEOLOGICAL MONITORING.....	29
6.5 PROTOCOL FOR ARCHAEOLOGICAL DISCOVERIES	29
7. METHODS FOR ARCHAEOLOGICAL INVOLVEMENT IN FURTHER WORK	30
7.1 INTRODUCTION.....	30
7.2 FURTHER SURVEYS REQUIRING ARCHAEOLOGICAL INVOLVEMENT.....	30

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	6 of 38

7.3	PLANNING SURVEYS	30
7.4	FIELDWORK	31
7.5	ARCHAEOLOGICAL ASSESSMENT OF MARINE GEOPHYSICAL SURVEY DATA	31
7.6	ARCHAEOLOGICAL ASSESSMENT OF ROV SURVEY DATA	32
7.7	GEOARCHAEOLOGICAL ASSESSMENT OF GEOTECHNICAL DATA	32
7.8	OASIS.....	34
7.9	REPORTS.....	34
7.10	PUBLICATION.....	35
7.11	ARCHIVES.....	35
8.	REFERENCES	37

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	7 of 38

DEFINITIONS

AEZ	Archaeological Exclusion Zone imposed to protect known archaeological sites or geophysical anomalies of high, medium or low archaeological potential
Bathymetric Survey	A non-intrusive, remote-sensing investigative survey, using a multibeam echosounder, that measures the depth and topography of the seabed
Culzean Floating Offshore Wind Turbine Pilot Project ("the Project")	The entire Development including all offshore components and all project phases from pre-construction to decommissioning.
Floating Wind Turbine Generator (WTG)	Device that converts the kinetic energy of wind into electrical energy. Can be functionally divided into four parts: wind turbine, tower and transition piece, floating foundation, and mooring system.
Geophysical Survey	A non-intrusive, remote-sensing investigative survey including side scan sonar, magnetometer and sub-bottom profiler, to detect or measure features on and below the seabed
Geotechnical Investigations	An intrusive survey method that penetrates the seabed recovering material samples for analysis
Historic Environment Scotland (HES)	The government's Statutory Heritage advisor, created by the Historic Environment Scotland Act (2014). It is a non-departmental public body with charitable status, governed by a Board of Trustees, who are appointed by Scottish Ministers. For Scottish waters, they provide pre- and post-consent guidance and advice to the marine licensing authority (Marine Directorate – Licensing Operations Team (MD-LOT))
Historic Assets	Elements of the historic environment that have local, regional or national significance, such as protected wrecks or submerged palaeo-landscapes
Historic Marine Protected Areas	A restricted area placed around a wreck or marine historic asset of national or international importance to prevent uncontrolled interference in accordance with the Marine (Scotland) Act 2010.

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	8 of 38

Marine historic assets	Elements of the historic environment found within a marine context. The term is defined in law by the Marine (Scotland) Act 2010 and encompasses a wide variety of man-made structures and artefacts, including vessels and / or their contents, aircraft and submerged prehistoric landscapes
Marine Licence Application (“the Application”)	A Marine Licence is granted under the Marine and Coastal Access Act 2009 for projects between 12-200 Nautical Miles (nm) from shore, or the Marine (Scotland) Act 2010 for projects between Mean High-Water Springs (MHWS) out to 12 nm from shore. The Application includes Habitats Regulations Appraisal (HRA)-supporting documentation (where required), an application letter, Marine Licence application form and this Environmental Impact Assessment Report (EIAR).
MD-LOT	The Marine Directorate – Licensing Operations Team is the regulator with overall responsibility for the protection of the historic environment in the seas around Scotland
Nominated Contact	The shore-based representative from the Developer who will be responsible for liaison between the Archaeological Consultant and the vessel-based Site Champion
PAD	The Protocol for Archaeological Discoveries sets out the procedures that must be followed in the event of unexpected archaeological discoveries either on the seabed or on the deck of working vessels and identifies the personnel with responsibility for ensuring that the PAD is followed
Project Design Envelope (PDE)	The maximum range of design parameters of all infrastructure assessed as part of the EIA.
Project	Refers to the Culzean Floating Offshore Wind Turbine Pilot Project
Project Area	The extent of the immediate area surrounding the floating Wind Turbine Generator (WTG) and cable route as characterised by the extent of the seabed environmental and habitat surveys. Also referred to as the Survey Area where specifically relating to survey activities.

<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p> <p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>9 of 38</p>

Receiver of Wreck (RoW)	The wreck administration within the Maritime and Coastguard Agency (MCA), which deals with all reports of wreckage from around the UK. It is based in the MCA headquarters in Southampton, with assistance from coastguard personnel around the coast
Receptor	Any environmental or other defined feature that is sensitive to, or has the potential to be affected by, an impact
Retained Archaeologist	The nominated Retained Archaeologist is Dr Michael Grant, Lead Marine Consultant at COARS, who produced this document for the Project
Study Area	Receptor specific area used to characterise the baseline.
The Crown Estate (TCE and Crown Estate Scotland)	The body responsible for managing the seabed and foreshore in England, Wales, Northern Ireland, and Scotland including offshore energy, aggregates, cables and pipelines
WSI	The Written Scheme of Investigation sets out the roles and respective responsibilities of the project team, contractors, and the retained archaeologist and archaeological contractors and formal lines of communication between the parties and with the archaeological curator(s). It outlines the known and potential receptors that could be impacted by the scheme, outlines the agreed mitigation and archaeological actions that are to take place in various circumstances, and provides detailed methodologies for these archaeological actions

<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p> <p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>10 of 38</p>

ACRONYMS and ABBREVIATIONS

AEZ	Archaeological Exclusion Zone
DBA	Desk Based Assessment
CNS	Central North Sea
CPF	Central Processing Facility
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
HES	Historic Environment Scotland
HPHT	High Pressure, High Temperature
HRA	Habitats Regulations Appraisal
INTOG	Innovation and Targeted Oil and Gas
km	kilometre
MBES	Multibeam Echo Sounder
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate – Licensing Operations Team
MW	Megawatt
nm	nautical miles
O&M	Operation & Maintenance
PAD	Protocol for Archaeological Discoveries
ROV	Remotely Operated Vehicle
RoW	Receiver of Wreck
SSS	Side Scan Sonar
SBP	Sub-Bottom Profiler

<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p> <p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>11 of 38</p>

TAEZ	Temporary Archaeological Exclusion Zone
TEPNSUK	TotalEnergies Exploration and Production North Sea United Kingdom (UK) Limited
UK	United Kingdom
UKCS	UK Continental Shelf
UKHO	United Kingdom Hydrographic Office
ULQ	Utility and Living Quarters
VIP	Vessel Information Pack
WHP	Wellhead Platform
WSI	Written Scheme of Investigation
WTG	Wind Turbine Generator

<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
<p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>12 of 38</p>

EXECUTIVE SUMMARY

Purpose of this report

This document forms a Written Scheme of Investigation in support of the proposed Culzean Floating Offshore Wind Turbine Pilot Project. This WSI has been prepared at the pre-construction stage and may be updated as necessary.

The purpose of the document is to set out details demonstrating the archaeological mitigation for the offshore elements of the Project and how this mitigation will be enacted. The document also sets out further work which has been recommended within EIAR Chapter 15.

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	13 of 38

1. INTRODUCTION

1.1 Purpose of the Document

This Written Scheme of Investigation (WSI) document has been prepared to address the specific requirements of the relevant conditions attached to the Marine Licences (the 'offshore consent') issued to TEPNSUK for the Culzean Floating Wind project.

1.1.1 Consent Compliance

The WSI fulfils the consent conditions for the preparation of a Written Scheme of Investigation. The WSI has been produced alongside the Protocol for Archaeological Discoveries (GB-CZT-00-TOTA-000013).

Table 1.1 includes reference to how and where the condition clauses have been addressed within the WSI.

Table 1.1 Consent conditions to be discharged by this CMS

Condition reference	Condition	Relevant section
3.2.16 Written Scheme of Investigation and Protocol for Archaeological Discoveries	The Licensee must, no later than six months prior to the Commencement of the Licensed Activity submit a Protocol for Archaeological Discoveries ("PAD") and Written Scheme of Investigation ("WSI") which sets out what the Licensee must do on discovering any marine archaeology during the construction, operation, maintenance and monitoring of the Works, in writing, to the Licensing Authority for its written approval. Commencement of the Licensed Activity cannot take place until such approval is granted.	This document sets out the WSI for approval by the Scottish Ministers.
	Such approval may be given only following consultation by the Licensing Authority with HES and any such advisors as may be required at the discretion of the Licensing Authority. The Reporting Protocol must be implemented in full, at all times, by the Licensee.	The WSI includes a commitment by TEPNSUK to ensuring that the PAD is implemented in full at all times by their contractors.

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	14 of 38

1.2 Linkages with other Consent Plans

Table 1.2 lists the Consent Plans with linkages to this WSI.

Table 1.2 Consent Plans with linkages to this WSI

Other Consent Plans and Documents	Linkage with WSI
Development Specification and Layout Plan (DSLP)	The DSLP provides information about the Culzean Floating Wind site including WTG layout, seabed information, details on WTG dimensions, generating output of the WTG, as well as details on the cable.
Cable Plan (CaP)	The Culzean Floating Wind CaP details on the specification, location and installation techniques of the export cable. This will include the avoidance of Archaeological Exclusion Zones (AEZs) in undertaking all activities during construction and operation, and any requirements for continued avoidance of features of possible archaeological interest where possible.
Environmental Management Plan (EMP)	The EMP sets out the environmental framework for the construction and operation of the Culzean Floating Wind infrastructure. It also contains the Marine Pollution Contingency Plan (MPCP) which sets out the procedure should an oil spill occur during construction. The installation and construction described within this CoP and CMS will be undertaken in line with the environmental management measures as described in the EMP.
Vessel Management and Navigational Safety Plan (VMNSP)	Provides the management and coordination of vessels to mitigate the impact of vessels.

1.3 Structure of the Plan

Sections 1 Background to consent requirements.

Section 2 Scope of the WSI.

Section 3 Implementation of the WSI.

Section 4 Summary of potential archaeology.

Section 5 Research agendas.

Section 6 Impacts and mitigation.

Section 7 Methods for archaeological involvement in further work.

1.4 Plan Audience

All TEPNSUK personnel, contractors and subcontractors involved in the construction of the Culzean Floating Wind project must comply, as a minimum, with this WSI.

<p>Written Scheme of Investigation:</p> <p>Marine Archaeology</p>	<p>Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
<p>CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>15 of 38</p>

The latest version of this WSI can be obtained from TEPNSUK document management system (Prodom) and from the Marine Directorate website¹. Copies are also to be held in the following locations:

- TotalEnergies Aberdeen office;
- TEPNSUK Floating Package Lead; and
- Retained Archaeologist.

¹ <https://marine.gov.scot/ml/culzean-floating-offshore-wind-turbine-pilot-project>

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	16 of 38

2. SCOPE

2.1 Outline

Coastal and Offshore Archaeological Research Services (COARS) was commissioned by TotalEnergies Exploration and Production North Sea United Kingdom (UK) Limited (TEPNSUK) to produce a Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) for the Culzean Floating Offshore Wind Turbine Pilot Project (henceforth referred to as the 'Culzean Floating Wind'). The PAD is a separate document that should be read in conjunction with this WSI.

The purpose of the document is to set out details demonstrating the archaeological mitigation for the offshore elements of the Project and how this mitigation will be enacted. The document also sets out further work which has been recommended within EIAR Chapter 15: *Marine Archaeology*. This WSI has been prepared at the pre-construction stage and may be updated as necessary.

This WSI outlines how potential impacts on cultural heritage assets will be avoided, minimised, or mitigated. It should be read in conjunction with the project-specific PAD, which clearly sets out the protocols and procedures that must be followed in the event of any unexpected archaeological discoveries whilst undertaking any activities that disturb the seabed. The WSI and PAD have been produced in line with best practice guidance.

2.2 Location and Project Description

The Culzean development is an ultra-High Pressure, High Temperature (HPHT) gas condensate oil and gas development located 222 kilometres (km) east of Aberdeen in the UK Continental Shelf (UKCS) Block 22/25a in the Central North Sea (CNS). The aims of the Project are to deploy one floating WTG with a capacity of 3 Megawatt (MW), test floater and mooring system technologies for offshore floating wind and to demonstrate the feasibility of platform electrification in an offshore environment. The facility is a stand-alone development involving three, bridge linked platforms, including:

- Wellhead Platform (WHP);
- Central Processing Facility (CPF) with flare tower; and
- Utility and Living Quarters (ULQ) Platform.

The Project does not require a grid connection to shore, and the Development Area will be entirely within the offshore region between 12 nautical miles (nm) and the Exclusive Economic Zone (EEZ) boundary. A floating Wind Turbine Generator (WTG) will be located approximately 2 km west of the Culzean facilities with an approximately 2.5 km long export cable connected to the CPF via an existing J-tube on the platform. The key components include:

- One WTG;
- One floating substructure;
- Up to six mooring lines;
- Up to six drag anchors (or an alternative scenario of three drag and three plate anchors);
- One 2.5 km export cable; and
- Associated scour and cable protection (if required).

The 'Project Area', as defined within the EIAR (Section 4.3 of Chapter 4: *Project Description*), relates to the immediate area surrounding the floating WTG and cable route

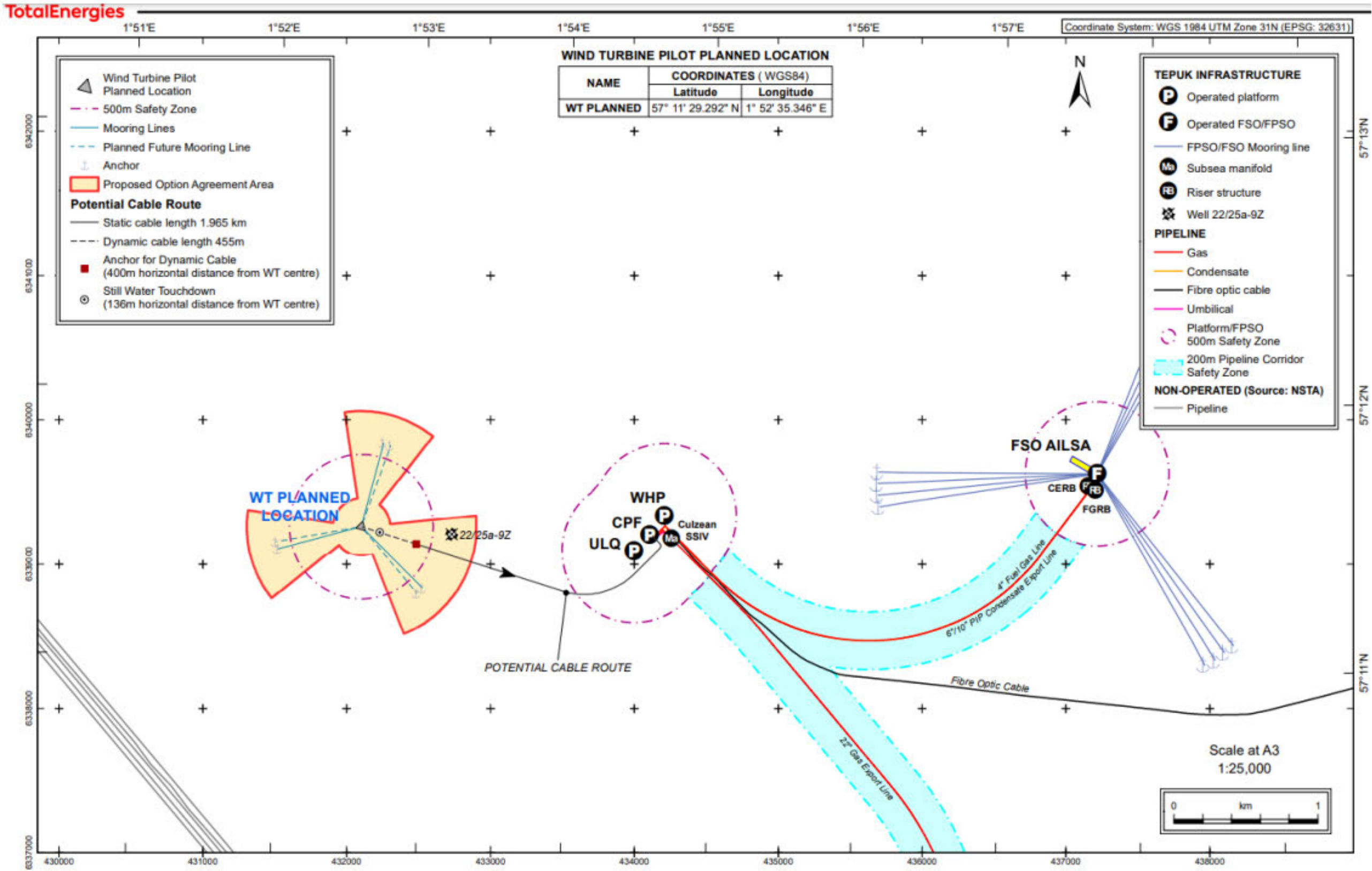


Figure 2-1 Culzean Floating Wind planned layout

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	18 of 38

2.3 Aims and Objectives

The primary aim of this WSI is to reduce the potential risks of impact (direct and indirect) by optimising survey programmes to best support archaeological analysis and interpretation in a timely way to inform project planning, design and delivery.

With reference to the Model Clauses for Written Schemes of Investigation (The Crown Estate 2021) the objectives of this WSI are:

- set out the roles and respective responsibilities of the Applicant, Contractors and Retained Archaeologist and Archaeological Contractor(s) and formal lines of communication between the parties and with Archaeological Curator(s) (see Section 3.1);
- outline the known and potential archaeological receptors that could be impacted by the project (see Section 4.0);
- outline the agreed mitigation and archaeological actions that are to take place in various circumstances (see Section 6.0);
- set out the importance of research frameworks in setting objectives that are delivered through realisation of the work (see Section 5.0); and
- provide methodologies for these archaeological actions, to be employed on archaeological work conducted in the post-consent period (see Sections 6.0 and 7.0).

2.4 Guidance

As described above, this document has been produced in line with best practice guidance, including:

- Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects by (The Crown Estate 2021);
- Historic Environment Scotland's Managing Change in the Historic Environment: Asset Management (2020);
- Historic Environment Scotland's Designation Policy and Selection Guidance (2019);
- Historic England's Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage (now Historic England) 2008);
- The Scottish Government's Planning Advice Notes, in particular 2/2011: Planning and Archaeology; Planning Advice Note 1/2013: Environmental Impact Assessment (amended 2017); Planning Circular 1/2017: Environmental Impact Assessment Regulations (The Scottish Government 2017);
- Code of Conduct (Chartered Institute for Archaeologists (CifA 2022);
- Standard and Guidance for Historic Environment Desk Based Assessment (CifA 2020a);
- COWRIE Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology 2007);
- Offshore Renewables Protocol for Archaeological Discoveries (The Crown Estate 2014);
- Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble and Leather 2011);
- Marine Geophysics Data Acquisition, Processing and Interpretation, Guidance Notes (Plets et al. 2013);
- Military Aircraft Crash Sites (English Heritage 2002);
- Aircraft Crash Sites at Sea (Wessex Archaeology 2008); and
- Code of Practice for Seabed Development (Joint Nautical Archaeology Policy Committee 2006).

Written Scheme of Investigation: Marine Archaeology	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	19 of 38
CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT		

3. IMPLEMENTATION OF THE WSI

The Section sets out the responsibilities of TEPNSUK and lines of communication during the pre-construction, construction, operation & maintenance (O&M) and decommissioning process of the proposed Culzean Floating Wind project site with the aim of ensuring that the archaeological mitigation measures described are fully implemented in a timely manner that does not interfere with the smooth running of the proposed development programme.

3.1 Responsibilities and communications

Primary responsibility for the delivery of this WSI lies with TEPNSUK. Through project documentation and procedures, the implementation of this WSI will involve a range of archaeological contractors and curators.

TEPNSUK shall employ the services of a suitably qualified and experienced Archaeological Consultant (the Retained Archaeologist), to ensure the effective implementation of the WSI and other relevant commitments in relation to archaeology.

Additional Archaeological Contractors may be employed as required, by either TEPNSUK or the Retained Archaeologist, if this task is delegated to them by TEPNSUK. Suitably qualified Archaeological Contractors may be called to provide a range of services relating to specialist archaeological provision (e.g. fieldwork, geotechnical analysis, etc.).

Historic Environment Scotland (HES) is the Archaeological Curator responsible for heritage matters in the marine environment up to mean high water springs (MHWS) in Scottish waters. HES will be consulted regarding activities undertaken as part of this WSI.

Contact with the Archaeological Curator will be administered by TEPNSUK, under advice from the Retained Archaeologist. The Retained Archaeologist will report to the Applicant's appointed project contact in relation to the implementation of the WSI. Interaction with the Applicant's construction team will be administered by the project contact, advised by the Retained Archaeologist.

The responsibilities of the Retained Archaeologist will include:

- maintaining, reviewing and updating the WSI, as required;
- advising TEPNSUK on the necessary archaeological works and input required to the stipulations of this WSI are met;
- advising TEPNSUK which elements warrant archaeological involvement;
- advising TEPNSUK in the course of evaluating scope of work specifications on their capacity to meet archaeological requirements;
- advising TEPNSUK on the necessary interaction with third parties with archaeological interests, including the Archaeological Curator;
- advising TEPNSUK on the implementation of generic archaeological requirements applicable to all construction activities;
- advising TEPNSUK on the micro siting of infrastructure covered by this WSI, based upon archaeological results from Environmental Impact Assessment (EIA) and pre-construction surveys;
- advising TEPNSUK on Method Statements for archaeological investigations;
- preparing Method Statements for archaeological activities;
- ensuring that TEPNSUK provides the Method Statements to the Archaeological Curator for approval;
- implementing and monitoring the protocol for reporting finds of archaeological interest based on the Protocol for Archaeological Discoveries (PAD);

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p style="text-align: center;">Page</p>	<p style="text-align: center;">20 of 38</p>

- monitoring the work of and liaising with Archaeological Contractors, where this is not the Retained Archaeologist;
- monitoring the preparation and submission of archaeological reports, as appropriate, and making them available to the Archaeological Curator;
- preparing provisions for the management of the project archives in consultation with an appropriate museum; and
- advising TEPNSUK on final arrangements for analysis, archive deposition, publication and popular dissemination and the necessary schedule for these deliverables.

Where Method Statements, reports or other deliverables are submitted by TEPNSUK to the Archaeological Curator, their agreement/acceptance will be assumed if no contrary response is received within 30 working days of submission.

All relevant key contractors engaged in the construction of the project shall:

- familiarise themselves with the generic requirements of the WSI and make them available to their staff and/or subcontractors;
- obey legal obligations in respect of 'wrecks' and 'treasure' under the Merchant Shipping Act 1995 and Treasure Trove system, respectively;
- respect constraint maps, archaeological exclusion zones (AEZ) and temporary archaeological exclusion zones (TAEZ);
- assist and afford access to relevant activities by the archaeologists employed by TEPNSUK;
- inform the Retained Archaeologist of any environmental constraint or matter relating to health, safety and welfare of which they are aware that is relevant to the archaeologists' activities; and
- implement the protocol for archaeological discoveries (PAD).

Other roles required for the implementation of the PAD are defined separately in that document.

3.2 Monitoring compliance with the WSI

Compliance with this WSI will be ensured by regular meetings between the Retained Archaeologist and TEPNSUK. The regularity of meetings may alter during different phases of the development. These meetings ensure compliance through agendas which include discussions of the construction programme and any upcoming work which may require archaeological input.

Following this advice, appropriate method statements will be prepared as required for each element of the project which requires archaeological involvement, in line with the requirements of the WSI. These will be submitted to the Regulator and the Archaeological Curator for approval. Approval by the Archaeological Curator will be assumed if no response is received within 30 working days of submission. The Retained Archaeologist will ensure compliance with these method statements during the subsequent works, thereby also ensuring compliance with the WSI.

The performance of the WSI will also be monitored through the provision of archaeological reports, prepared to inform on the results of various activities undertaken under its auspices. These include a review of any new geophysical, geotechnical and environmental data and the implementation of the PAD during all offshore project activities. These reports will be submitted to TEPNSUK, who will ensure their dissemination to the Archaeological Curator.

Responsibility for ensuring the implementation of the PAD rests with TEPNSUK, who will ensure that its agents and contractors are contractually bound to implement the PAD. TEPNSUK and the Retained Archaeologist will agree the system for archaeological reporting through the PAD.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>21 of 38</p>

During any site evaluation/ investigation or construction work that has the potential to affect any archaeological heritage assets, the Retained Archaeologist will advise TEPNSUK who will liaise directly with the Archaeological Curator regarding site monitoring and reporting. TEPNSUK will be kept informed of any contact between the Retained Archaeologist and the Archaeological Curator.

3.3 Health and safety

The Retained Archaeologist will ensure that any method statements prepared to meet the requirements of the WSI are compliant with the requirements of TEPNSUKs health and safety plans for the project.

Health and safety considerations will be of paramount importance in conducting all fieldwork. Safe working practices will override archaeological considerations at all times.

All work will be carried out in accordance with the Health and Safety at Work Act 1974, the Management of Health and Safety at Work Regulations 1999, the SCAUM (Standing Conference of Archaeological Unit Managers) health and safety manual *Health and Safety in Field Archaeology* (SCAUM 2007) and all other relevant health and safety legislation, regulations and codes of practice in force at the time.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	22 of 38

4. SUMMARY OF KNOWN AND POTENTIAL ARCHAEOLOGY

A baseline assessment, including desk-based assessment and archaeological assessment of geophysical survey data, has been undertaken in support of the EIAR (Appendix K: *Archaeological Assessment of Geophysical Data*), using a Study Area measuring up to 2 km from the proposed location of the WTG (and its associated moorings / anchors) and the proposed export cable route. The methodology and results of this assessment are set out in detail within the EIAR Appendix K: *Archaeological Assessment of Geophysical Data*. The following Section contains a summary of the findings.

4.1 Summary of designated heritage assets

No marine designated heritage assets (Historic Marine Protected Areas or remains designated under the Protection of Military Remains Act 1986) or other designated heritage assets lie within the Study Area.

4.2 Summary of non-designated heritage assets

Due to the significant distance offshore, the United Kingdom Hydrographic Office (UKHO) wreck database was the primary source of data. These were examined and cross-checked with any entries in the National Record of the Historic Environment (Canmore) (EIAR Chapter 15: *Marine Archaeology*).

Two features were recorded within the UKHO and Canmore records, both historic records of recorded obstructions on the seabed. One of these records, 70008, was first identified in 1994 as foul ground, but no corresponding geophysical anomaly was present in the geophysical survey dataset from 2023. The second of these records, 70056, is an unidentified seabed obstruction first identified in 2022, laying outside of the 2023 geophysical survey area.

Geophysical anomalies with archaeological potential have also been identified within the study area. 18 were classified as anomalies of likely anthropogenic origin but of unknown date and may be of archaeological interest or a modern feature; and 37 were classified as anomalies of possible anthropogenic origin but interpretation is uncertain and may be anthropogenic or a natural feature. No anomalies of high archaeological potential were identified, with no Archaeological Exclusion Zones (AEZs) recommended with the EIAR (see Appendix K: *Archaeological Assessment of Geophysical Data*). However, in Chapter 15 (*Marine Archaeology*), Section 15.9.1 stated that “*there is insufficient data to assess the value of each individual anomaly at this point. As such, all anomalies must be considered to potentially have archaeological value, to a greater or lesser degree and, in accordance with the precautionary principle are considered as medium or high sensitivity assets*”. The EIAR recommends the use of embedded mitigation (implementation of AEZs and micro-siting of Project infrastructure) so that all direct impacts to known maritime and aviation receptors would be avoided and therefore the magnitude of direct impacts on known receptors would be negligible. On this basis, AEZs may be required for some of the anomalies identified within Chapter 15: *Marine Archaeology*. These anomalies therefore require reassessment to determine if AEZs are required (see Section 6.3).

The EIAR does not state if there are any documented aviation losses within the Development Area, so there exists the potential for aircraft remains to be present within the Development Area, for example represented by one or more of the geophysical and/or magnetic anomalies.

4.3 Submerged prehistoric archaeology

An assessment of submerged prehistory receptors was scoped out during EIAR, with no geotechnical datasets reviewed as part of the EIA baseline. The 2023 geophysical survey report (EIAR Appendix J: *Geophysical Survey Report*) contains the results of the sub-bottom seismic (SBP) survey, using Innomar SBP and Ultra-high

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>23 of 38</p>

resolution seismic (UHRS) data. This survey identified six seismo-stratigraphic units, which can be correlated with the known Quaternary stratigraphy within the wider area (Gatliff et al. 1994).

The uppermost unit was found intermittently present across the survey area as a thin veneer, up to 0.7m thick in places, consisting mainly of silty sand. A sharp erosional contact was observed where this horizon overlay the underlying deposits. The underlying deposit, attributed to the Upper Forth Formation, was present as a series of north-south aligned channels, up to 16.2m deep, located c. 400m east and west of the proposed WTG location. The base of these channels contained the Lower Forth Formation, which erosively cut into the Coal Pit Formation and occasionally the older Fisher Formation. The Forth Formation is an Upper Pleistocene to Early Holocene marine, glaciomarine or fluviomarine deposit. Those observed within the Development Area were likely deposited in marine to glaciomarine environments, with the deep channels indicating sub-glacial channelling due to Pleistocene glaciation over the Development Area during the Devensian period (likely between c. 29,000 and 11,700 years ago). The presence of Devensian channels within the Forth Formation, likely with a sub-glacial origin, indicates a larger glacial drainage network than currently mapped for the North Sea (Clark et al. 2018). This is a recognised data gap within the North Sea, but the expansion of offshore wind off the east Scottish coast provides significant opportunities to expand our understanding of the extent and timing of the Devensian glaciation in the wider North Sea region. The mapping of these channel features provides the first stage in achieving this.

Beyond the areas of the Forth Formation channels, the Coal Pit Formation is observed at the seabed, in places overlain by the thin veneer of marine silts sands. The base of this formation is between 6.9 and 12.5m below the seabed, overlying and filling the eroded surface of the Fisher Formation. The Coal Pit Formation is an Upper Pleistocene (thought to date between c. 191,000 and 29,000 years ago) sub-glacial, post glacial, interglacial to early glacial deposit, existing as an infill within tunnel valleys that were eroded during/immediately after Middle Pleistocene glaciation. The expected sediments to be encountered within the Coal Pit Formation are firm to stiff clays with dense layers of sand and occasional gravel, cobbles and boulders, the latter observed on the seabed surface as boulder fields. Shell fragments and complete valves are also commonly reported to be abundant in places. Indeed, studies of the upper marine sediments have revealed foraminiferal assemblages' representative of the Ipswichian interglacial (Cameron et al. 1987), underlying a horizon that has been correlated, using palaeomagnetism, with the MIS 5e/d boundary, showing a transition from glaciomarine to marine sediments. The Coal Pit Formation also includes a sequence of shelly glaciomarine clays that have been placed tentatively between c. 57,000 and 29,000 years old on palaeomagnetic evidence (Stoker et al. 1985) indicating that this area was free of glacier ice during this stage. This may indicate that part of the Coal Pit Formation might immediately precede the Late Devensian glaciation of the North Sea. As the Coal Pit Formation is known to contain shallow marine to intertidal deposits, there is the potential that these could provide some information on coastal Middle to Late Pleistocene deposits. While these might have the potential to support hominins, there is no evidence for such activity in Scotland at the time these deposits might have been deposited, with prevailing palaeoclimate conditions also unlikely to make habitation conducive.

Beneath the Coal Pit Formation (and the deepest parts of the Forth Formation channels) is an erosive surface onto the Fisher Formation, siting above the Ling Bank and Aberdeen Ground Formations between 39 and 70m below the seabed. The Fisher Formation is a Middle to Upper Pleistocene glaciomarine deposit, typically consisting of a very stiff over-consolidated silty clay and interlaminated clay and fine-grained silty sand, with some pebbles (of varying clast lithologies).

The archaeological potential of the stratigraphic sequence within the Development Area is considered to be limited, though these still contain significant interest from a Quaternary Science and palaeogeography perspective.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	24 of 38

4.4 Data limitations

The following data limitation was identified within Section 15.5.6 of the EIAR Chapter 15: *Marine Archaeology*:

- The Study Area considered for impact assessment is larger than the geophysical survey data extents leading to areas of the Study Area being without geophysical data coverage. However, the coverage of geophysical data includes the seabed area considered for direct and indirect impacts;
- No other limitations were identified within the EIAR, though Appendix K: *Archaeological Assessment of Geophysical Data* does state that the geophysical line spacing was approximately 100m across the Study Area, with a 25m line spacing within the export cable route. The magnetometer survey spacing at 100m provides an indication of potential ferrous objects (relatively large, depending on distance) but is limited in detection of buried ferrous objects, particularly smaller objects, at this stage; therefore, objects of archaeological interest may not have been identified within this survey; and
- An assessment of submerged prehistory receptors was scoped out during EIAR, with no geotechnical datasets reviewed as part of the EIA baseline. An assessment of the SBP geophysical data (see Section 4.3) provided in Appendix J: *Geophysical Survey Report* indicates a low potential for encountering archaeological material within these deposits, though does indicate that some of these formations will be of interest from a Quaternary Science and palaeogeography perspective, which may warrant some assessment of the geotechnical datasets.

<p style="text-align: center;">Written Scheme of Investigation: Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>25 of 38</p>

5. RESEARCH AGENDAS

The best practice guidance within Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate, 2021: 8) indicates that a WSI should “set out the importance of research frameworks in setting objectives that are delivered through realisation of the work”.

Several research frameworks are of relevance to the archaeological remains and area of the Development Area. These include:

- The Scottish Archaeological Research Framework (ScARF: <https://scarf.scot/>) Marine and Maritime theme (ScARF: <https://scarf.scot/thematic/scarf-marine-maritime-panel-report/>);
- The North Sea Prehistory Research and Management Framework (Peeters *et al.* 2009).

Other frameworks, including those concerning specific themes other than those set out above, may also be relevant, depending on the specific work package undertaken. Any archaeological activities and reporting under this WSI will tie research into the relevant research frameworks, ensuring that the project contributes to archaeological knowledge of areas where research frameworks demonstrate a need for further understanding. The objectives of the research framework will be used to guide work and recommendations made by the Retained Archaeologist to TEPNSUK.

The connection with the specific work package to be undertaken and the relevant research framework, aims and objectives will be identified within the method statements which will precede archaeological work. The method statement(s) will also set out how the work undertaken will be tied into the relevant research framework during OASIS reporting (see Section 7.8).

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	26 of 38

6. IMPACTS AND MITIGATION

6.1 Overview

Impacts relevant to marine archaeology are reviewed in detail within Section 15.9 of Chapter 15: *Marine Archaeology* and a full description of the Offshore Development is given in Chapter 4: *Project Description*. In summary, the proposed development may include the following construction activities:

- Seabed preparation activities (pre-lay grapnel run);
- Placement of catenary moorings, including their movement on the seabed;
- Anchor installation and presence;
- Placement of scour protection at anchors;
- Installation of export cable; and
- Placement of rock protection along the export cable.
- Mooring/anchoring and positioning of vessels and ancillary equipment; and
- Installation of cable and scour protection, such as concrete and frond mattresses.

The maximum design scenarios identified in EIAR Chapter 4: *Project Description* have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the Project Design Envelope (PDE). Effects greater than minor significance are not predicted to arise should any other design scenario, based on details within the PDE (e.g. different infrastructure layout), to that assessed here be taken forward in the final design scheme.

Operation and maintenance activities are anticipated to occur within areas already disturbed during the construction phase, with embedded mitigation measures applied during the construction phase remaining in place, resulting in no direct impacts to known archaeological receptors.

Decommissioning, it is assumed, will include removal of all installations and infrastructure.

6.2 Mitigation

The Project has committed to a series of embedded mitigation measures regarding marine archaeology and cultural heritage, as presented within Table 6-1. These follow standard mitigation measures, engaged to manage the marine archaeological resource in line with current policy and guidance. Further detail is provided within Section 15.8 of Chapter 15.

Archaeological mitigation specific to the Development Area of the Project has been defined as ‘primary’ or ‘tertiary’, where primary mitigation relates to decisions which affect the EIA and tertiary mitigation relates to best practice. No ‘secondary’ mitigation measures have been implemented (relating to additional measures needed to reduce significance of effects to acceptable levels).

Written Scheme of Investigation: Marine Archaeology CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	27 of 38

Table 6-1 Mitigation for Marine Archaeology and Cultural Heritage

Mitigation Measure	Form (Primary or Tertiary)	How mitigation will be secured
Micro-siting of WTG and associated offshore infrastructure including cable route	Primary	AEZ will be established around identified sites of high and medium archaeological potential. Final cable routing and anchoring will avoid any known archaeological constraints identified in pre-construction site investigation surveys through micro siting. AEZs (or TAEZs) may be reviewed, amended or new areas added, on the basis of further data review.
WSI and Protocol for Archaeological Discoveries (PAD)	Primary	This WSI and the accompanying PAD will be put in place for the Project. This includes guidance for the use of AEZs and TAEZs.
Archaeological Assessment of Marine Geophysical data for baseline enhancement	Tertiary	Any new geophysical data will be subjected to archaeological review and mitigation reviewed as necessary

This WSI provides further mitigation options that may be employed as necessary during the Offshore Development. If implementation is agreed, detail of additional activities would be provided through task-specific method statements, to be prepared and agreed with Archaeological Curators on an 'as-needed' basis. Such activities may include:

- archaeologists to be consulted in the preparation of any pre-construction Remotely Operated Vehicle (ROV) surveys and, if appropriate, in monitoring/checking of data (see Section 7.6);
- operational awareness of the location of those archaeological anomalies identified as having a low potential. Reporting through the agreed protocol will be undertaken should material of potential archaeological interest be encountered (see Section 6.5);
- archaeologists to be consulted in the preparation of pre-construction cable route clearance or other pre-construction operations and, if appropriate, to carry out archaeological monitoring (e.g. a watching brief) of such work (see Section 6.4);
- mitigation of unavoidable direct impacts on known sites of archaeological significance: Options include i) preservation by record; ii) stabilisation; or iii) detailed analysis and safeguarding of otherwise comparable sites elsewhere. Direct impacts upon archaeological sites are not planned, all known sites of potential significance are protected by AEZs and will be avoided by development impacts. Should potential for any unforeseen and unavoidable impacts be identified, a method statement will be produced in agreement with Archaeological Curator, detailing how these will be handled and general archaeological practices will be followed where preservation by record or detailed analysis of sites elsewhere is an agreed approach. Methods for any stabilisation and safeguarding will be site-specific and will be detailed within a method statement, should the need for these interventions arise; and
- commitment to implementation of the Marine Archaeology WSI (the current document) prior to any post-consent works within the Development Area.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	28 of 38

6.3 Archaeological Exclusions Zones

Best practice favours the *in-situ* preservation of archaeological remains. Therefore, the preferred mitigation for archaeological remains is avoidance (COWRIE, 2007). The methodology for this WSI is to adopt the precautionary principle.

AEZs will apply to any activities that may disturb the seabed, within which all development-related activities will be prohibited. All AEZs agreed with the Retained Archaeologist will be incorporated into constraints mapping and provided to all contractors, and sub-contractors, typically within Vessel Information Packs (VIPs).

The size of each AEZ will be designed to encompass all debris/ structure visible on the seabed, with an added dimension to adequately protect both potentially buried remains and the potential for mobile debris associated with the direction (and extent) of the scour (if known/ recorded).

Scope is allowed for their amendment considering further evidence and with the involvement of consultees. The final development layout will consider these AEZs, with no impacts to finalised AEZs during construction, operation, maintenance and decommissioning activities.

6.3.1 Establishing new Archaeological Exclusion Zones

If new finds of archaeological importance are made during construction (or any subsequent stage of the project), they may be subject to the implementation of additional AEZs. Establishment of new AEZs may occur where additional data of the area is collected and archaeologically reviewed or where activities such as ROV or UXO investigations identify additional features, or formalisation of temporary archaeological exclusion zones (TAEZs) established through the PAD into AEZs (see PAD).

All finds of archaeological material will be reported to the Retained Archaeologist/ TEPNSUK by the Construction Contractor(s), in accordance with the PAD (see Section 6.5). The Retained Archaeologist will inform the Archaeological Curator and TEPNSUK of all reports.

All activities that may affect the seabed in the vicinity of any find will cease until archaeological advice has been sought and received and, if necessary, an archaeological inspection of the material and site has taken place.

The Archaeological Curator will be consulted by the Retained Archaeologist on the need for, and the design (position, extent) and implementation of any new AEZs.

6.3.2 Altering Archaeological Exclusion Zones

AEZs may be altered (enlarged, reduced, moved or removed) as a result of the results of future geophysical or visual surveys (e.g. ROVs or drop-down cameras) and/or archaeological field evaluation. Archaeological field evaluation may include suitable high-resolution marine geophysical survey and/or survey by ROV.

The alteration of AEZs will only be undertaken following consultation with the Archaeological Curator. Following alteration, a new plan giving details of the revised AEZs will be drawn up for TEPNSUK by the Retained Archaeologist and issued by TEPNSUK to its Construction Contractor(s) and onboard vessel representatives.

6.3.3 Monitoring Archaeological Exclusion Zones

The effectiveness of the AEZs will be monitored through review by the Retained Archaeologist of vessel track plots and anchor spots supplied by TEPNSUK.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>29 of 38</p>

Should a breach of an AEZ be suspected, this will be resolved by further investigation, which may include carrying out a geophysical or ROV survey of the area thought to be affected.

On completion of the construction phase, the Retained Archaeologist will compile a report on the effectiveness of the AEZs, any alterations to them and the results of monitoring.

6.4 Archaeological Monitoring

Where archaeological watching briefs are necessary, a detailed method statement for the proposed works will be produced and agreed with the Archaeological Curator prior to any watching brief activities taking place. All watching briefs will be conducted in line CifA's Standard for archaeological monitoring and recording (2023a) and Universal guidance for archaeological monitoring and recording (2023b).

6.5 Protocol for Archaeological Discoveries

A protocol for reporting finds of archaeological interest will be implemented during all activities relating to construction, operation, maintenance and decommissioning. It will address the reporting of unexpected finds of archaeological material, recovered from the sea during these activities.

The protocol will largely follow the format laid down in the document PAD: Offshore Renewables Projects (The Crown Estate, 2014). The Retained Archaeologist will operate to administer the Protocol for Archaeological Discoveries (PAD), provide initial advice to TEPNSUK and will liaise with the Archaeological Curator, as necessary. The details of the PAD, including key roles and communication steps, are set out in with the PAD document.

<p style="text-align: center;">Written Scheme of Investigation: Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	30 of 38

7. METHODS FOR ARCHAEOLOGICAL INVOLVEMENT IN FURTHER WORK

7.1 Introduction

Archaeological involvement in further work is a key component in the ongoing process of assessing known and potential archaeological remains within the Development Area, to ensure robust and proportionate mitigation for heritage assets which may be impacted by the development.

A detailed method statement will be produced by the Retained Archaeologist, for agreement with and approval by TEPNSUK and the Archaeological Curator in advance of each archaeological element discussed below. Approval by the Archaeological Curator will be assumed if no response is received within 30 working days of submission of individual method statements. Overviews of methods are given below. These methods are in line with best practice guidance, set out within Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects (The Crown Estate 2021)

7.2 Further surveys requiring archaeological involvement

Further surveys requiring archaeological involvement include:

- geophysical survey –requiring archaeological assessment of the survey dataset;
- ROV obstruction surveys - requiring archaeological assessment of the survey dataset (video and positional data); and
- geotechnical investigations - requiring geoarchaeological assessment and, where necessary, analysis, following the staged approach set out below.

Should archaeological material be encountered by these works, sufficient time and resources will be made available to ensure the archaeological assessment of such material. In areas where there are to be further impacts, no impacts will take place until the assessment has been conducted and mitigation actions agreed and implemented. The scope of any further assessment will be agreed with the Archaeological Curator and, where necessary, further suitable mitigation measures will be instigated in agreement with the Archaeological Curator.

7.3 Planning surveys

When planning geophysical and geotechnical surveys, TEPNSUK will advise the Retained Archaeologist well in advance and seek their input into the scope of work. Archaeological input will take the form of advice from the Retained Archaeologist on measures to optimise archaeological results from the planned geotechnical, geophysical and other surveys or work. Areas to be considered will include:

- the available details on previously identified sites and/ or anomalies and areas of heightened archaeological potential;
- the archaeological potential of areas where no existing sites and/ or anomalies are yet known;
- the equipment, equipment settings, survey methodology(s) and data collection points that will optimise the recovery of archaeological information; and
- the requirements for data analysis, interpretation, and archiving.

The required response to elements of archaeological input may include:

- altering vibrocore/borehole positions to maximise the potential for the collection of (geo-) archaeological data; or
- altering grab sample positions to maximise the potential for the collection of archaeological data.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	31 of 38

7.4 Fieldwork

Where further survey work has as one of its objectives the investigation of previously identified sites and/or anomalies to alter or remove an AEZ, the Applicant will make provision for a suitably qualified Archaeological Geophysical Contractor to be available to provide advice and input into the survey and as the survey is ongoing. In some cases, this may include the presence of the Retained Archaeologist on the vessel alongside the vessel crew or, in most cases, this advice may be given remotely. In all cases, the archaeologist will ensure that the best possible data is collected for those anomalies subject to review.

7.5 Archaeological assessment of marine geophysical survey data

New marine geophysical data that covers areas of development impact and AEZs will be subject to analysis by a suitably qualified Archaeological Geophysical Contractor (the Retained Archaeologist, if suitable). Any such assessment will be preceded by a method statement which will set out in detail the methods to be used, along with the aims and objectives of the work. The method statement will be submitted to the Archaeological Curator prior to the work being conducted. Approval by the Archaeological Curator will be assumed if no response is received within 30 working days of submission of individual method statements.

The Applicant will seek archaeological input at the planning stage of any such works, to maximise the potential benefits of any geophysical survey and ensure the datasets meet archaeological requirements (see Plets et al. 2013).

Once the surveys have been processed to meet their primary objectives, the survey data, together with factual reports, will be made available in digital formats to the Retained Archaeologist, or a suitably qualified Archaeological Contractor for archaeological analysis and interpretation.

Archaeological interpretation may include:

- Examination of multibeam echosounder (MBES), side scan sonar (SSS), magnetometer and sub-bottom profiler (SBP), where acquired, to assess AEZs; and
- Examination of multibeam echosounder (MBES), side scan sonar (SSS), magnetometer and sub-bottom profiler (SBP), where acquired, to identify any as yet unknown anomalies with archaeological potential.*

*Any survey that have the potential to disturb European Protected Species (EPS) (within 0 – 200 nautical miles) will require a license to complete these within the legislative requirements (The Scottish Government, 2024).

The geophysical data will be assessed to identified geophysical anomalies with archaeological potential, with selection based on the presence of multiple lines of evidence (confirming datasets such as historical data, geophysical datasets, etc) and identifiable features. Anomalies will be defined by an experienced Marine Archaeologist based on their potential to be of archaeological interest and classified using the following criteria:

- High potential – an anomaly of anthropogenic origin and of archaeological interest;
- Medium potential – an anomaly of likely anthropogenic origin that requires further investigation in order to clarify its nature and to determine its archaeological interest;
- Low potential – an anomaly of possible anthropogenic origin with a low likelihood to be of archaeological interest, and therefore does not require further investigation; and
- No potential - features such as boulders or known (and often mapped) anthropogenic features such as cables, anchorages, spudcan marks etc. These are not recorded separately in this archaeological evaluation of the data.

Written Scheme of Investigation: Marine Archaeology	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	32 of 38
CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT		

This approach follows the protocols and standard practices widely adopted and accepted internationally (see Bengtsson 2008; The Crown Estate 2021; CADW 2020; Historic England 2016; United States Department of the Interior 2020) and is compatible with Rules 14 and 15 of the UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage (see Maarleveld et al. 2013). In summary, these guidance documents and the 2001 convention require that the archaeological potential of the discovery shall be assessed in conjunction with geophysical and/ or desk-based information where available, with categorising anomalies as low, medium or high archaeological potential permitting a means to evaluate the potential significance of any sites and if further archaeological investigation is required.

7.6 Archaeological assessment of ROV survey data

Seabed photography and video footage will be subject to archaeological assessment and analysis by a suitably qualified Archaeological Contractor. Any such assessment will be preceded by a method statement which will set out in detail the methods to be used, along with the aims and objectives of the work. The method statement will be submitted to the Archaeological Curator prior to the work being conducted. Approval by the Archaeological Curator will be assumed if no response is received within 30 working days of submission of individual method statements.

The Applicant will seek archaeological input at the planning stage of any such works, to maximise the potential benefits of any proposed ROV surveys.

Archaeological input will take the form of advice from the Retained Archaeologist on measures to optimise archaeological results from the planned survey. Advice will include:

- the available details of sites and/ or anomalies identified in the desk-based assessment;
- the archaeological potential of areas where no existing sites and/ or anomalies are yet known;
- the type and level of ROV positioning, voice recording and video/ still recording to be utilised;
- the provision of clear guidance on the types of sites and finds that are to be reported and recorded;
- wherever possible, input into the scope of works to include potential archaeological sites/ AEZs where more detailed mitigation planning is required; and
- other specific advice will be given depending on the nature and purpose of the investigations. All such areas would be outlined within the method statement for the work.

Following the completion of the ROV survey, all data, including video footage, will be reviewed by the Archaeological Contractor. This review will identify any anomalies or sites that are potentially of archaeological interest. A report will identify those sites and/ or geophysical anomalies that are of sufficient archaeological interest to warrant further investigation and/ or mitigation. It will also identify those sites that are no longer of archaeological interest and hence may be removed from the list of AEZs.

The archaeological results of any ROV survey will be compiled in a report by the Archaeological Contractor. The report will include a statement of the likely requirements (if any) for further archaeological work and mitigation.

The report will be forwarded to the Retained Archaeologist, who will submit it to TEPNSUK and the Archaeological Curator for a decision on the scope of any further work where required.

7.7 Geoarchaeological assessment of geotechnical data

Broadly, the aim of the archaeological assessment of geotechnical data, as set out within COWRIE's *Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector* (Gribble and Leather 2011), is to:

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>33 of 38</p>

- Investigate the deposition sequence of sediments within the area represented by the cores to identify, as far as possible, the environments within which this deposition took place;
- Evaluate the potential for past human exploitation and occupation of these past environments;
- To compliment, and enhance, other datasets being archaeologically assessed (e.g. marine geophysics) and advance the development of a site-wide deposit/ ground model;
- Produce an overview of the geological stratigraphy to provide an indication of the prehistoric archaeological potential for the area; and
- Comment on the archaeological importance of the identified deposits, within the context of the wider palaeoenvironmental history of the region and the UK.

Early input should seek to determine methods and specifications for geotechnical sampling (e.g. vibrocores or boreholes) and engagement with TEPNSUK and their geotechnical team should aim to find ways to ensure archaeological aims and sampling can be conducted alongside any other requirements. Following these discussions, a method statement for core collection, transport, retention and storage should be produced, ensuring that cores are stored in a way which facilitates later assessment or analysis, if required. This method statement may also include methods for Stages 1 and 2 of the geoarchaeological assessment (see below).

It should be noted that some of the methods of analysis require special consideration and have requirements in terms of core processing and storage. In particular, luminescence dating, which determines the age elapsed since sedimentary minerals were last exposed to sunlight, has a time-dependent signal that is extremely sensitive to light. Treatment of cores should follow the method set out below to ensure that they retain their potential for luminescence dating.

Following COWRIE guidance (Gribble and Leather 2011), the aims of archaeological assessment of geotechnical data are achieved through a programme of staged recording, assessment and analysis:

- Stage 1. Geoarchaeological review of core logs: consists of a desk-based assessment of geotechnical core logs by a trained geoarchaeologist to determine which cores contain sediments of archaeological interest. These core logs will be compared against available SBP datasets to contextualise the records and establish which cores can best inform the evolving deposit/ ground model. Recommendations will be made to TEPNSUK as to which cores the geoarchaeologist would like to look at in Stage 2. For Stage 1 to be undertaken the core logs must be recorded in a manner which will allow identification of sediments of archaeological interest. The luminescence dating potential of the sediments is also assessed.
- Stage 2. Geoarchaeological recording: a detailed inspection and recording of the cores identified in Stage 1 to further assess archaeological potential. This requires physical access by the geoarchaeologist, who will make a record of the sediments encountered and their archaeological potential. The results of the Stage 2 assessment will be used to enhance/ refine the deposit/ ground model, with recommendations for any Stage 3 assessment made, if required.
- Stage 3. Geoarchaeological assessment: samples are taken from the cores recommended (and recorded) in Stage 2 for specialist assessment to determine the age and palaeoenvironmental potential of the sediments. This stage comprises the sampling and laboratory analysis of a selected core, or cores, to a level sufficient to enable an assessment of the value of the palaeoenvironmental material (e.g. pollen, diatoms, ostracods and foraminifera) surviving within the core(s). A provision for the scientific dating of core samples (e.g. radiocarbon or luminescence dating) should be included within this stage. The assessment seeks to establish the preservation, diversity, and quantity of palaeoenvironmental material, in order to further refine the interpretation of the sedimentary environment, and past human activity, identified in the Stage 2 recording. The results of the Stage 3 assessment will be used to enhance/ refine the deposit/ ground model. Recommendations are made

Written Scheme of Investigation: Marine Archaeology	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	34 of 38
CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT		

as to whether a Stage 4 analysis programme, including any additional scientific dating, should take place on any of the core material.

- Stage 4. Geoarchaeological analysis: consists of 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. The results of the Stage 4 analysis will be used to enhance/ refine the deposit/ ground model. Stage 5 will proceed in the event that further publication of the findings is required.
- Stage 5. Publication.

This work should be undertaken by an experienced marine geoarchaeologist. Each stage should inform the scope of the next and work may cease at any point where no recommendations for further work are made. This would be the case if, for example, cores were determined to hold no geoarchaeological potential at the end of Stage 2.

This geoarchaeological assessment and analysis should aim to deliver conclusions on the prehistoric archaeological and palaeoenvironmental remains within the area. Further mitigation may be required based on the results of this assessment. The geoarchaeological work should follow guidance set out within COWRIE's Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (Gribble and Leather 2011).

The PAD also provides mitigation for prehistoric and palaeoenvironmental remains.

7.8 OASIS

An Online Access to the Index of Archaeological Investigations (OASIS) online record (<https://oasis.ac.uk/>) will be created. OASIS is an online form which allows for archaeological investigations to be reported to regional HERs and national heritage bodies. The system also allows for reports to be shared for public release through the ADS library. Reporting through OASIS has been incorporated within this WSI, in line with best practice.

An OASIS record will be set up following consent, to notify the relevant authorities of future work that is taking place. TEPNSUK must then ensure that an archaeological report is submitted to MD-LOT and the Archaeological Curator following completion of any survey and subsequent investigation. The contents of this report must be agreed and accepted by the Archaeological Curator and MD-LOT. TEPNSUK must then ensure that a copy of the agreed archaeological report is submitted through the OASIS form within 2 weeks of acceptance by the Archaeological Curator and MD-LOT. Sign off on the OASIS record will be by HES, who are responsible for administering the OASIS reporting system. TEPNSUK should notify MD-LOT that the OASIS report has been submitted within 2 weeks of the submission.

7.9 Reports

Reports should be prepared in accordance with the guidance provided in the relevant ClfA Standard and Guidance documents (see <http://www.archaeologists.net/codes/cifa>) and with reference to any other activity or analysis specific guidance. Reports will also satisfy all requirements set out within the relevant method statement covering the work package.

The timetable for reporting and depositing archives with the receiving institution after completion of the post-fieldwork programme will be set out in the relevant method statement. In accordance with guidance issued by the Crown Estate (2021), reports will typically include:

- a non-technical summary;

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	35 of 38

- the aims and methods of the work;
- the results of the work including finds and environmental remains;
- a statement of the potential of the results;
- an explanation of how this work is relevant to the objectives and research agendas from applicable local and national archaeological research frameworks;
- proposals for further analysis and publication; and
- illustrations and appendices to support the report.

TEPNSUK will provide a digital (pdf) copy of each report to the Archaeological Curator and MD-LOT (as appropriate), following survey completion. Following the production and acceptance of archaeological reports, these will be deposited with the relevant repositories by submitting an OASIS form with a digital copy of the report.

7.10 Publication

In consultation with TEPNSUK and the Archaeological Curator, the Retained Archaeologist will ensure that the results of important archaeological investigations undertaken in connection with the project will be published in an integrated manner. Publication media and all publication matters will be discussed and agreed in advance with TEPNSUK and the Archaeological Curator.

7.11 Archives

Archive planning will be included within detailed method statements for each activity undertaken. Archiving will follow best practice as laid out within:

- Brown, D. (2011). *Archaeological Archives: A guide to best practice in creation, compilation, transfer and curation*. Archaeological Archives Forum;
- ClfA. (2020b). *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*; and
- The Crown Estate. (2021). *Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects* (Section 13.5: Archiving).

The Archaeological Curator will be notified of any archaeological investigation in advance of fieldwork and any specific requirements relating to the preparation and deposition of project archives will be accommodated as appropriate.

Where there is the likelihood of any archaeological fieldwork, the Retained Archaeologist will contact an appropriate receiving institution to discuss the intended fieldwork and seek its agreement to accept the site archive for long-term storage and curation. The Retained Archaeologist will consult the receiving institution regarding its policy on the selection, retention and disposal of excavated material, and to confirm the requirements in respect of the format, presentation and packaging of archive records and materials. A museum accession number will also be sought on each occasion.

Project archives, including written, drawn, photographic and material elements (together with a summary of the contents of the archive), will be prepared and deposited by the Retained Archaeologist in accordance with the requirements of the receiving museum, repository, or digital archive.

Written, drawn and photographic archives will be compiled to a standard that allows for the publication of a summary report. Written archives will be on clean, stable materials and will be suitable for photocopying. The materials used will be of the standard recommended in *Guidelines for the Preparation of Excavation Archives for Long-term Storage* (Walker 1990).

Written Scheme of Investigation: Marine Archaeology	Document Reference: GB-CZT-00-TOTA-000012	
	Revision: 02	Status:
CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT	Date: 16/04/2025	
	Page	36 of 38

Born-digital records, including digital photographs, will be stored and deposited in accordance with guidelines issued by the receiving repository, ClfA (2023c), Historic England (2015) and the ADS (2023).

The timetable for depositing archives with the receiving repository after completion of the post-fieldwork programme will be agreed with TEPNSUK and Archaeological Curators.

On completion of the scheme, an OASIS form will be produced and copies of all archaeological reports will be attached as data files. Notification of the completion of the OASIS form will be sent to Archaeological Curator and MD-LOT (where appropriate).

The costs of archiving (whether digital, paper or object) will be met by TEPNSUK. Tenders or costings by contractors for work packages should include provision for the preparation and deposition of the expected archive.

<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	Revision: 02	Status:
	Date: 16/04/2025	
	Page	37 of 38

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<p style="text-align: center;">Written Scheme of Investigation:</p> <p style="text-align: center;">Marine Archaeology</p> <p style="text-align: center;">CULZEAN FLOATING OFFSHORE WIND TURBINE PILOT PROJECT</p>	<p style="text-align: center;">Document Reference: GB-CZT-00-TOTA-000012</p>	
	<p>Revision: 02</p>	<p>Status:</p>
	<p>Date: 16/04/2025</p>	
	<p>Page</p>	<p>38 of 38</p>

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