

Chapter 19 Maritime Archaeology and Cultural Heritage

19.1 Introduction

- 1 This chapter considers the known archaeology and the potential for unknown archaeology in the Neart na Gaoithe Offshore Wind Farm site (the area covered by The Crown Estate lease agreement) and export cable route, its importance and any likely physical and setting impacts related to the construction, operation and decommissioning of the wind farm.
- 2 The three main areas of archaeological enquiry addressed in this report are:
- Prehistoric archaeology;
 - Maritime archaeology; and
 - Aviation archaeology.
- 3 This chapter is based on the results of a desk based archaeological study of the offshore site; a review of geophysical data collected in 2009; a review of geotechnical data collected in 2010; and a site visit to the proposed cable route landfall in 2010 in order to establish baseline conditions to inform the assessment of setting impacts (refer to Appendix 19.1: Maritime Archaeology and Cultural Heritage Technical Report).

19.2 Guidance and Legislation

- 4 The following legislation and guidance is applicable to the marine historic environment in Scotland. The list below is not exhaustive but serves to highlight the key legal and policy considerations with respect to offshore development and the marine historic environment in Scottish territorial waters (STW):
- Marine (Scotland) Act 2010;
 - Merchant Shipping Act 1995;
 - Protection of Military Remains Act 1986;
 - Ancient Monuments and Archaeological Areas Act 1979;
 - Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997;
 - Planning Advice Note 2/2011: Planning and Archaeology;
 - Protection of Wrecks Act 1973;
 - European Convention on the Protection of the Archaeological Heritage 1992 (Revised) (the 'Valletta Convention');
 - United Nations, Convention on the Law of the Sea 1982;
 - International Council on Monuments and Sites, Charter on the Protection and Management of Underwater Cultural Heritage 1996; and
 - United Nations Educational, Scientific and Cultural Organisation, Convention on the Protection of the Underwater Cultural Heritage 2001.

- 5 This assessment is conducted in line with industry best practice. Particular reference is made to the following:
- Scottish Planning Policy (SPP) (Scottish Government, 2010);
 - SPP 23: Planning and the Historic Environment; Scottish Historic Environment Policy (Historic Scotland, 2011);
 - Conserving the Underwater Heritage. Historic Scotland Operational Policy Paper (Historic Scotland, 1999);
 - Historic Environment Guidance for the Offshore Renewable Energy Sector (Wessex Archaeology Ltd, 2007);
 - Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy (COWRIE, 2008);
 - Offshore Geotechnical Investigations and Historic Environment Analysis: Guidance for the Renewable Energy Sector (COWRIE and EMU Limited (EMU), 2011);
 - Protocol for Archaeological Discoveries: Offshore Renewables Projects (The Crown Estate and Wessex Archaeology Ltd, 2010); and
 - The Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Development (JNAPC, 2008).

19.3 Data Sources

19.3.1 Desk Study

- 6 The maritime and aviation archaeological record for the study area was assessed using a range of secondary sources, records of charted wreck sites and seabed obstructions provided by SeaZone and shipping losses recorded in the National Monuments Record of Scotland (NMRS). Although there is often an overlap in the various datasets consulted it is standard practice to consult all the available datasets. This extensive search not only identifies all known and purported loss events throughout the study area, it also aids in assessing the archaeological potential.
- 7 Cultural heritage assets considered in this assessment are listed in Appendix 19.2: Gazetteer and Concordance. In the interests of clarity and with reference to the technical report, recorded wreck sites are given a unique EMU Archaeology number, the suffix 'EA', while anomalies identified in the geophysical survey are given the suffix 'EMU'. Onshore assets considered in relation to setting are referred to according to their listing and referenced to their designation index number.

8 The desk based study has been based on readily available and relevant documentary sources. The following archives were referred to:

- Databases of designated cultural heritage assets maintained by Historic Scotland including designated wrecks;
- National Monuments Record of Scotland (NMRS) held by the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS) including maritime losses.;
- UK Hydrographic Office (UKHO) Wrecks and Obstructions Database (SeaZone data, issued 05/06/2010);
- Ministry of Defence (MOD) (military remains only);
- Receiver of Wreck (ROW);
- The Inventory of Gardens and Designed Landscapes in Scotland;
- The Inventory of Historic Battlefields in Scotland;
- Fife Council Fife Sites and Monuments Record ; and
- National Library (for historic charts and maps only).

19.3.1.1 Site Visit

9 A site visit was undertaken at the cable landing point at Thorntonloch beach on the 12 November 2010 to; verify the findings of the desk based element of the study, gather information regarding current land use and identify any factors that might affect the archaeological potential of the proposed export cable landfall site.

10 A further onshore site visit was completed on 2 November 2011 with regard to the ‘setting’ impacts on onshore cultural heritage assets. During consultation, 11 sites were identified by Historic Scotland, all of which were visited during the site visit. The condition of each monument was noted, as were key views from each location.

19.3.2 Survey Methodology

11 A number of surveys were undertaken within the offshore study area and export cable route corridor to inform the understanding of the wider physical environment. Although these surveys were not undertaken specifically to investigate the archaeological conditions, the data collected have been used to support the archaeological assessment and are described in the following sections.

19.3.2.1 Geophysical Survey

12 A geophysical survey of the offshore study area was undertaken and subsequently made available for archaeological analysis and assessment (EMU, 2010). The archaeological assessment of the geophysical findings aimed to identify any cultural heritage assets recorded within the surveyed area and to inform the description of the baseline study and Environmental Impact Assessment (EIA) for the proposed development. Marine geophysical survey data were collected using sidescan sonar, magnetometer, sub-bottom profiler and multibeam bathymetry. Geophysical targets were identified and given a high, medium or low archaeological potential rating as defined in Table 19.1 below.

Archaeological potential rating	Definition
High Archaeological Potential	An anomaly of anthropogenic origin and of archaeological interest.
Medium Archaeological Potential	An anomaly of likely anthropogenic origin that requires further investigation in order to clarify its nature.
Low Archaeological Potential	An anomaly of possible anthropogenic origin that does not require further investigation.

Table 19.1: Definition of archaeological potential ratings

19.3.2.2 Geotechnical Survey

13 A geotechnical survey of the offshore study area was undertaken in 2010 (Gardline Geosciences Ltd, 2010) and made available for archaeological assessment and analysis. The objectives of the geotechnical review were to:

- Review available data to identify seabed and sub-seabed deposits likely to be of palaeoenvironmental and archaeological interest;
- Identify any deposits of palaeoenvironmental potential, particularly within the Wee Bankie and Forth Formations and their interface; and
- Suggest mitigation measures, where appropriate to the findings of the review.

14 In order to establish whether the deposits contained any sediments of palaeoenvironmental potential, in particular peats or sediments with high organic content such as organic silts, the samples from the survey were reviewed. The survey collected samples using Cone Penetration Tests (CPT), vibrocore and boreholes across the study area.

15 A laboratory visit was also undertaken to visually inspect and record the sediments from one core (BH_GT024/A/B/C/D).

19.3.3 Engagement and Commitments

19.3.3.1 Strategic and Site Level Requirements

16 The strategic and site level requirements as advised by Marine Scotland, Historic Scotland and Fife Council, and how these guidelines are addressed in this chapter, are presented in Table 19.2.

19.3.3.2 Consultation

17 A meeting was held with Historic Scotland in May 2010 where the approach to the archaeological assessment of the site was discussed and agreed.

Source	Comment	Relevance/reference
Blue Seas - Green Energy: A Sectoral Marine Plan for Offshore Wind Energy in Scottish Territorial Waters. Part A: The Plan (Marine Scotland, 2011)	Developments should be fully assessed to identify and mitigate their effects on listed buildings and scheduled sites (and their settings) and wrecks (both designated and non-designated) where possible through appropriate positioning within the option boundary, and where impacts cannot be avoided, these should be reduced through appropriate design.	Noted; see Section 19.6: Impact Assessment and Section 19.7: Mitigation and Residual Impacts.
Scoping Opinion (Historic Scotland advice)	Guidance available: SPP 23: Planning and the Historic Environment; Scottish Historic Environment Policy (Historic Scotland, 2011); and Technical Guidance Note (Memorandum of policy).	Noted – refer to Section 19.2: Guidance and Legislation. SPP 23 has been superseded by SPP (Scottish Government, 2010).
	Direct and indirect impacts on Scheduled Monuments and historic listed buildings should be assessed.	Only relevant to the foreshore and intertidal zone to the high water mark at the proposed landfall location.
	Confirm that there are no designations of national importance within site or cable route.	Noted – but mention is given to the K class submarines within the site that are protected under the Military Remains Act 1986.
	Recommended that the impact on undesignated wrecks be assessed in consultation with the Council Archaeological Service.	Noted.
	Assessment should consider Direct impacts and Indirect impacts (including changes in tidal regimes, sediment regimes, water quality).	Noted – see Section 19.6: Impact Assessment.
	Suggest assessment of following assets in terms of seascape and setting: <ul style="list-style-type: none"> ● Tentsmuir Coastal Defences (Index no. 9712); ● St Andrews Castle (Index no. 90259); ● Crail Airfield, pillbox, Foreland Head (Index no. 6461); ● Isle of May Old Lighthouse (Index no. 887); ● St Andrews Harbour (HB no. 40596); ● St Andrews Links; ● Crail Airfield, airfield 1 km E of Kirklands Farm (Index no. 6642); ● St Andrews Cathedral and adjacent ecclesiastical remains (Index no. 90260); ● Crail Airfield, airfield 1 km E of Kirklands Farm (Index no. 6642); ● Isle of May Priory (Index no. 838); ● Bell Rock Lighthouse (HB no. 45197); and ● Cambo. 	Noted – these assets have been considered in the assessment of setting impacts in Section 19.6: Impact Assessment.
	Request additional viewpoints at Tentsmuir Coastal defences and Crail Airfield control tower.	Noted.
	Consider there to be limited potential for impacts to be significant and request view of the full Environmental Statement (ES) for final view on the proposed development.	Noted.
	Archaeological methodology and reference list and approach adequate.	Noted.
	Welcome the production of a Written Scheme of Investigation (WSI), compiled following discussion / consultation with Historic Scotland.	Noted – see Section 19.6: Impact Assessment and Section 19.7: Mitigation and Residual Impacts.
	Welcome the production of protocols for unexpected discoveries before the start of scheme operations.	Noted.
	Guidance available: local archaeological service (Councils)	Noted.
	Keen to view the proposed site layout, photomontages and Zones of Theoretical Visibility (ZTVs), once finalised.	Noted.
Guidance - Historic Scotland setting annex: http://www.historic-scotland.gov.uk/scoping_of_development_proposals_2009.pdf .	Noted.	
Guidance - Historic Scotland technical guidance note on setting (Historic Scotland, 2010): http://www.historic-scotland.gov.uk/setting-2.pdf .	Noted – see Section 19.2: Guidance and Legislation.	
Advice to Forth and Tay Offshore Wind Developer Group (Historic Scotland)	Agree that potential cumulative impacts on marine archaeology should be assessed in individual ESs.	Noted – see Section 19.8: Cumulative and In-Combination Impacts.
Comment to Forth and Tay Offshore Wind Developer Group (Fife Council)	ES should include: <ul style="list-style-type: none"> ● A desk based assessment of the site in archaeological terms; ● A critical analysis of the limitations of a desk based assessment; ● An assessment of the archaeological potential of the seabed; ● A consideration of historic setting impacts within the ZTV; ● An adequate field inspection/survey/assessment of the seabed sufficient to demonstrate that a reasonable attempt has been made to quantify the presence, absence, character, extent, nature and date of any buried archaeological deposits/features that might exist within the development area; ● Written details of a mitigation strategy to safeguard any archaeological sites/deposits threatened by development; ● A strategy to monitor development works in progress; and ● A strategy to deal with unexpected archaeological discoveries made during ground disturbance works beyond that of the initial period of archaeological investigation/monitoring. 	Noted.

Table 19.2: Strategic and site level commitments and requirements

19.4 Impact Assessment Methodology

18 Archaeological remains may be damaged or destroyed during the construction, operation and decommissioning of renewable energy installations as a result of direct, indirect and cumulative and in-combination impacts (see Table 19.3).

Type of impact	Description
Direct Impact	Direct impacts occur where cultural heritage assets are directly affected by any element of the proposed works during construction, operation and decommissioning. These works might include excavation/ dredging or piling.
Indirect Impact	Indirect impacts are defined as those arising as a result of a direct impact. For example, sediment movement and redeposition as a result of scour to damage, cover or bury archaeological features.
Cumulative and In-Combination Impact	The assessment will consider the potential for the impacts of cumulative and in-combination effects associated with the project on sites, features and artefacts of cultural heritage interest. Possible impacts may include effects within the proposed development such as interference through cable laying activities upon a relict landscape surface or deposit. Impacts outside the offshore site and export cable route may include the effects of several developments within the same locality on the cultural heritage resource.
Setting Impacts	Setting impacts may occur where, in this instance, the visibility of wind turbines either causes the loss of cultural significance or affects the degree to which significance may be appreciated. Setting effects are principally associated with the operational phase, as the changes associated with the construction and decommissioning phase are relatively short.

Table 19.3: Description of impacts considered to act upon cultural heritage assets

- 19 The direct impacts associated with construction are caused by:
- Pre-construction seabed dredging;
 - The installation of foundations;
 - Burial of submarine cables; and
 - Impacts from the mooring and jack-up systems of the various vessels that will need to operate in the area during the construction phase.
- 20 During operation direct impacts could come from anchors/mooring systems of the various vessels that will be involved in maintenance works.
- 21 The direct impacts of decommissioning could involve the destruction or damage of archaeological remains during the removal of foundations and impacts from the mooring systems of the various vessels involved. Impacts from decommissioning are considered to be analogous to those during construction.
- 22 Indirect impacts are associated with the effect of the development beyond the primary development footprint, and comprise changes to erosion or sedimentary regimes. The impact upon archaeological remains during the operation phase will largely be due to seabed scouring. Changes to the topography of the seafloor can also have a considerable effect on sediment transportation dynamics and/or currents, and by changing these dynamics, the rate of scouring around a wreck may increase, allowing the wreck to become more exposed and in danger of decay. Similarly, changing dynamics may cause increased sediment deposition in the area of a wreck and thus act to preserve the asset *in situ*.
- 23 During the construction, operation and decommissioning phases of development, the setting of cultural heritage assets may be directly or indirectly affected as a result of the development being visible in key views from onshore cultural heritage assets.
- 24 Cumulative impacts arising as a result of interaction with other wind farms on cultural heritage assets are considered. In addition, in-combination impacts on cultural heritage assets with other plans, programmes and projects are also considered.

19.4.1 The Rochdale Envelope

25 Known archaeology was incorporated in the early constraint mapping and layout development. The following project development scenario and design parameters are considered to reflect the worst (realistic) case scenario for both known and unknown archaeology (refer to Table 19.4). Chapter 5: Project Description provides full details of the layout scenarios and full Rochdale Envelope.

26 It is important to note that the number of wind turbines considered in the Rochdale Envelope is higher than the actual maximum (at the given capacity) permitted on site. Assessing a higher number of turbines theoretically permits flexibility in the array and also considers the addition of one or two substations. This is discussed in more detail in Chapter 4: Site Selection, Project Alternatives and Design Evolution.

Potential impact	Rochdale Envelope scenario assessed
Construction and decommissioning	
Net impact of turbine foundations on the seabed	Maximum impact on the seabed based on: <ul style="list-style-type: none"> ● 80 x 6 MW turbines; ● Gravity base foundations with up to 53 m diameter (including scour protection); 1600 m² foundation footprint; and ● Seabed preparation by dredging with an average of 4,000 m³ dredged per foundation.
Net impact of offshore substation foundations on the seabed	Maximum impact on the seabed based on: <ul style="list-style-type: none"> ● Maximum number of substations (2); and ● Considered within the additional foundation options detailed above.
Net impact of inter-array cabling on the seabed	Maximum impact on the seabed based on: <ul style="list-style-type: none"> ● 220 km maximum cable length; ● Up to 1.5 m cable burial depth; and ● Potential surface laying protection either mattress or rock-dumping.
Export cable installation	<ul style="list-style-type: none"> ● 2 cables with up to maximum 500 m spacing between cables; ● Maximum burial depth – up to 3 m; ● Trenching using a plough; and ● Trenching using backhoe dredger (landfall).
Temporary seabed disturbances	Maximum footprint based on: <ul style="list-style-type: none"> ● Feet of eight legged jack-up barges on seabed for 80 turbines.
Re-distribution of fine sediments	<ul style="list-style-type: none"> ● Fine sediments arising from seabed preparation and installation of 80 gravity base foundations and up to 220 km of inter-array cabling.
Operation	
Turbine height and layout in relation to the setting of onshore receptors	<ul style="list-style-type: none"> ● A single option of 80 x 7 MW turbines was considered to offer the greatest visual impact (refer to Chapter 21: Seascape and Landscape Visual Impacts (SLVIA) for further details).
Change in hydrodynamics	<ul style="list-style-type: none"> ● Net impact in changes in hydrodynamics within the offshore site.
Cumulative	
Cumulative effects – construction and operation phases	<ul style="list-style-type: none"> ● Net impact of turbine foundations and inter-array cabling on the seabed from Inch Cape and Firth of Forth Round 3 Zone 2 wind farms.
Cumulative effects – construction and operation phases	<ul style="list-style-type: none"> ● Change in sediment and hydrological regime and disturbance from Inch Cape and Firth of Forth Round 3 Zone 2 wind farms.
Cumulative effects – operation phase	<ul style="list-style-type: none"> ● Turbine height and layout in relation to the setting of key onshore receptors.

Table 19.4: Cultural heritage ‘worst (realistic) case’ parameters for the offshore site and cable corridor

19.4.2 Study Area

27 For the purposes of this chapter, the offshore study area refers to the wind farm development area (the area bounded in purple on Figure 19.1) and a 1 km buffer zone (the area bounded in red in Figure 19.1). The wind farm development area is referred to as the inner study area, while the 1 km buffer zone is referred to as the outer study area. The export cable route and cable corridor from the offshore site to the mean high water mark have also been assessed as part of the offshore study area.

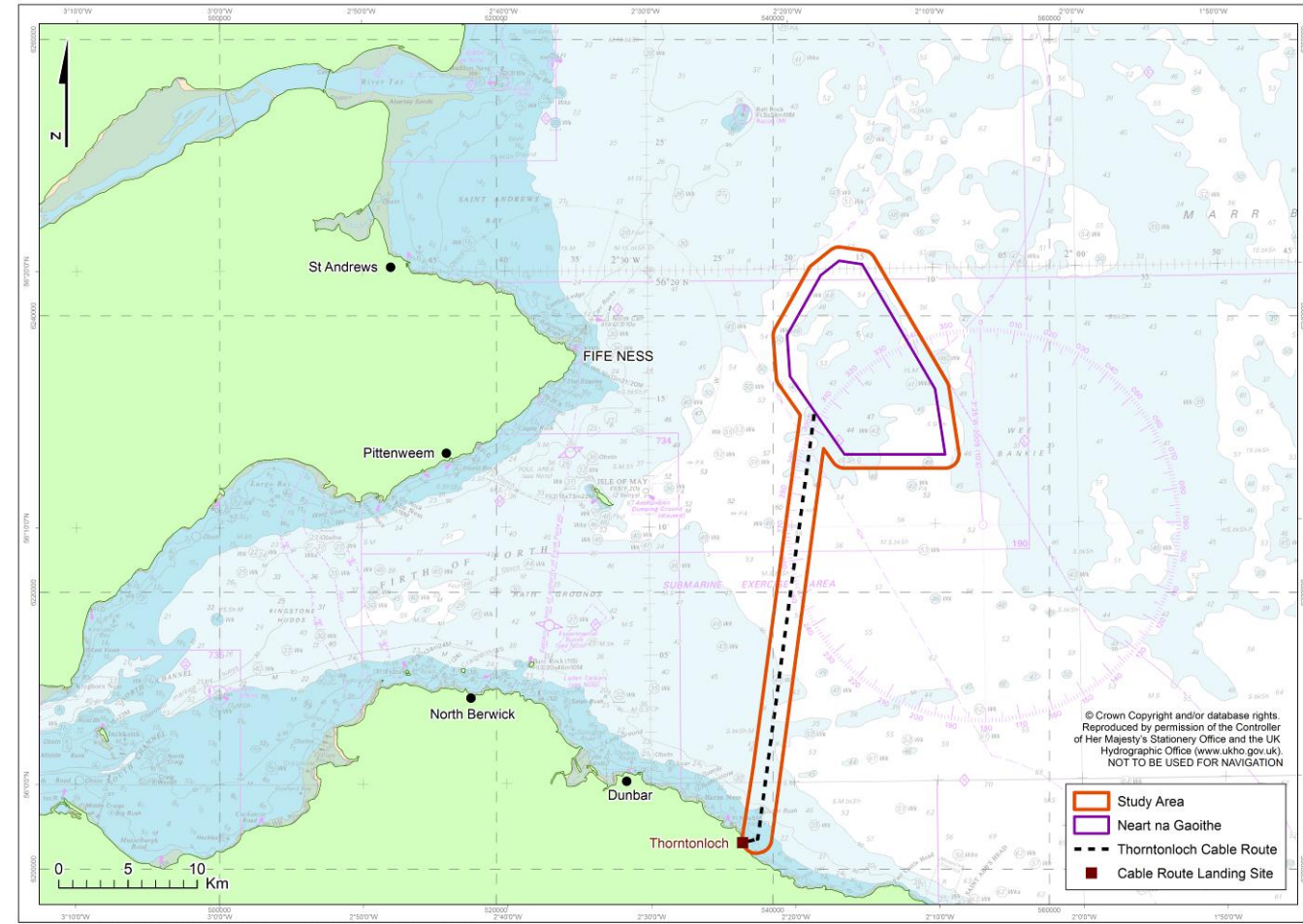


Figure 19.1: Location of the offshore site and export cable route with study area buffers

19.4.3 The Approach to Impact Assessment

19.4.3.1 Magnitude of Effect

- 28 The methodology to determine the magnitude of effect within this ES is considered in terms of spatial extent, duration, frequency and severity. The generic criteria for assessment of magnitude of effect are not readily applicable in this context – spatial extent is nearly always localised (with the exception of a submerged landscape surface or deposit over a project area, which does not apply here); the duration is irrelevant as any effect, whether over a short or long timeframe, will alter a cultural heritage asset; and the frequency is irrelevant as the effect will always be permanent (a cultural heritage asset is a finite resource which cannot ‘recover’). Hence, only severity is considered to be applicable.
- 29 Tables 19.5 and 19.6 provide guideline criteria for determining severity and from this, the magnitude of the effect.
- 30 For the purpose of this assessment and for consistency with other assessments within this ES, severity is considered to be synonymous with magnitude.

Magnitude	Guideline criteria
High positive	The asset is preserved <i>in situ</i> , where it would be lost if the ‘do nothing’ scenario was assumed, preserving or enhancing the asset’s value.
Medium positive	The asset is preserved by record, where it would be lost if the ‘do nothing’ scenario was assumed.
Low positive	The asset is preserved by record, where it would otherwise continue to naturally degrade.
Negligible	Very slight or negligible alteration of the cultural heritage asset.
Low negative	Slight physical alteration of the cultural heritage asset not affecting key elements, slightly reducing the asset’s value.
Medium negative	Loss of one or more key elements of the cultural heritage asset substantially reducing the asset’s value.
High negative	Total loss or major alteration of the cultural heritage asset removing the asset’s value.

Table 19.5: Magnitude of effect criteria for cultural heritage assets

19.4.3.2 Vulnerability of Receptor

- 31 Vulnerability is considered to be the sensitivity of a receptor to a specific change in the baseline conditions. In terms of archaeological or heritage receptors, vulnerability is considered primarily to refer to the rarity or value of the asset. Any measure of recoverability or adaptability (both criteria of vulnerability more applicable for ecological receptors) would in every case be nil and therefore would not add any clarity or weight to the measure of vulnerability.
- 32 Official designations applied to cultural heritage assets have been taken as indicators of importance. Vulnerability is assigned to undesignated cultural heritage assets according to the professional judgement of the assessor.
- 33 The criteria used for defining a cultural heritage asset’s value (and hence vulnerability) to direct and indirect physical effects is summarised in Table 19.6.

Vulnerability of the receptor	Definition
High	<ul style="list-style-type: none"> Designated wrecks; Protected Place; Controlled Sites; Scheduled Monuments; Category A-listed buildings; Inventory gardens and designed landscapes; Inventory battlefields; Undesignated assets of national importance; Maritime losses where the position is known and positively identified; and Targets of high archaeological potential identified in the geophysical survey.
Medium	<ul style="list-style-type: none"> Category B listed buildings; Conservation areas; Targets of medium archaeological potential identified in the geophysical survey; Obstructions that could be indicative of wreckage or submerged features; Cultural heritage assets that contribute; and Undesignated assets of regional importance.
Low	<ul style="list-style-type: none"> Category C(S)-listed buildings; Undesignated assets of local importance; and Targets of low potential identified in the geophysical survey.

Table 19.6: Vulnerability of cultural heritage assets

19.4.4 Approach to Impact Assessment for Impacts on Setting

19.4.4.1 Introduction

34 During the construction, operation and decommissioning phases of developments, the setting of cultural heritage assets may be affected, but as the impact of construction and operational effects are relatively short only operational setting impacts have been considered here. There is considerable debate over definitions of setting and approaches to the assessment of setting impacts (COWRIE, 2008), with no standardised industry wide approach. Historic Scotland has produced a guidance note on setting as part of its ‘Managing Change in the Historic Environment’ series of documents. This states that:

“Setting should be thought of as the way in which the surroundings of a historic asset or place contribute to how it is experienced, understood and appreciated.” (Historic Scotland, 2010)

35 Therefore, setting is not simply the visual aspect of the asset in question. Rather, it is those parts of the surroundings of an asset that are relevant to the cultural significance of the asset. In general, there will be an appreciable historical relationship between the asset and its setting, either in terms of a physical relationship, such as between a castle and the natural rise that it occupies, or a more distant visual relationship, such as a designed vista or the view from, for example, an onshore signal station to an offshore lighthouse. Some assets’ cultural significance will relate to an aesthetic relationship with their surroundings which may result from design or be fortuitous.

36 In such instances the relevant landscape and seascape elements will be considered to form part of the asset’s setting. The cultural significance of assets has been considered in terms of the values described in Scottish Historic Environment Policy (Historic Scotland, 2011) as being:

- Intrinsic - those relating to the fabric of the asset;
- Contextual – those relating to the monument’s place in the landscape or in the body of existing knowledge; and
- Associative – more subjective assessments of the associations of the monument, including current or past aesthetic preferences.

37 Most setting impacts will relate to contextual and associative values.

19.4.4.2 Magnitude of Effect

38 The magnitude of the effect reflects the extent to which relevant elements of the cultural heritage asset's setting are changed by the development and the effect that this has upon the character and value of the asset and the appreciation thereof. Guideline criteria for magnitude of effect are defined as high, medium, low or negligible (refer to Table 19.7: Magnitude of an effect on the setting of a cultural heritage asset

39 As with other criteria presented, this guidance is intended as a general guide and it is not anticipated that all the criteria listed will be present in every case.

40 The following are guides used in the assessment of magnitude of effect:

- *Obstruction of, or distraction from, key views.* Some assets have been sited or designed with specific views in mind, such as the view from an offshore lighthouse or a country house with open vistas across the sea with a distant landform providing a focal point. The obstruction or cluttering of such views would reduce the extent to which the asset could be understood and appreciated by the visitor. Offshore wind farms within a key view may also distract from them and make them difficult to appreciate where they are prominent. In such instances the magnitude is likely to be greatest where views have a particular focus or a strong aesthetic character.
- *Changes in prominence.* Some assets are deliberately placed in conspicuous locations in order to be highly visible in the surrounding landscape; for example prehistoric cairns are often placed to be silhouetted against the sky and churches in some areas are deliberately placed on ridges in order to be easily seen. Developments have the potential to reduce such prominence and therefore reduce the extent to which such assets can be appreciated.
- *Changes in landscape/seascape character.* A particular land use regime may be essential to the appreciation of an asset’s function, for instance the fields surrounding a farmstead¹ are inextricably linked to its appreciation. In some instances, assets will have aesthetic value or a sense of place that is tied to the surrounding landscape/seascape character.
- *Duration of effect.* Effects which are short term are generally of lesser magnitude than those which are long term or permanent.
- *Reversibility of the effect.* Readily reversible effects are generally of lesser magnitude than those considered irreversible.

41 Effects acting upon a defined setting will be of greater magnitude than those that have an effect on unrelated elements of the asset’s surroundings or incidental views to or from an asset that are unrelated to the appreciation of its value. It should be noted that the assessment of the magnitude of effect has been based on the interplay of these factors.

¹ Note, an onshore example is used as no offshore assets are subject to visual impacts or impacts on setting.

42 No single factor is taken to override other factors, for instance a negative effect that would be of high magnitude will not generally be reduced to low magnitude, simply on the grounds that it is reversible. It should also be noted that whilst a proposed development may be present within the visual envelope of an asset this does not automatically mean there is an impact on the setting of the asset. Where this is the case, the reasoning behind this has been given. As above, the criteria provided have been developed in the absence of official guidance or an accepted methodology.

Magnitude	Guideline criteria
High positive	The offshore wind farm has a significantly beneficial effect on the setting of the cultural heritage asset. This enhancement may be through the restoration of a lost relationship between the asset and its setting, or the legibility of the relationship is greatly enhanced. Elements of the surroundings that detract from the asset's cultural heritage significance or the appreciation of that significance are removed.
Medium positive	The contribution of setting to the cultural heritage asset's significance is enhanced to a clearly appreciable extent as a result of the development; as a result the relationship between the asset and its setting is rendered more readily apparent. The negative impact of elements of the surroundings that detract from the asset's cultural heritage significance or the appreciation of that significance are appreciably reduced.
Low positive	The setting of the cultural heritage asset is slightly improved as a result of the development, slightly improving the degree to which the setting's relationship with the asset can be appreciated.
Negligible	Very slight or negligible alteration of the setting of the cultural heritage asset.
Low negative	The contribution of the setting of the cultural heritage asset to its significance is slightly degraded as a result of the development, but without adversely affecting the interpretability of the asset and its setting; characteristics of historic value can still be appreciated, the changes do not strongly conflict with the character of the asset, and could be easily reversed to approximate the pre-development conditions.
Medium negative	The contribution of the setting of the cultural heritage asset to its significance is reduced appreciably as a result of the development and cannot easily be reversed to approximate pre-development conditions. Relevant setting characteristics can still be appreciated but less readily.
High negative	The contribution of the setting of the cultural heritage asset to its significance is effectively lost or substantially reduced as a result of the development, the relationship between the asset and its setting is no longer readily appreciable.

Table 19.7: Magnitude of an effect on the setting of a cultural heritage asset

19.4.4.3 Vulnerability of Receptor

43 Not all of the guideline vulnerability criteria for the assessment of vulnerability are readily applicable in the context of the setting impact assessment. Adaptability is not relevant as cultural heritage assets can neither adapt nor recover. Setting impacts will cease upon decommissioning and hence all assets have a high degree of recoverability.

44 The vulnerability of a cultural heritage asset to changes in its setting can be evaluated in the first instance by reference to any relevant designation, whereby assets designated as nationally important (scheduled monuments, Category A listed buildings, inventory gardens and designed landscapes and inventory battlefields) will generally be considered the most vulnerable and the assessment has concentrated on these. All nationally designated assets are considered to be of high value.

45 Following reference to the designation of the asset, vulnerability can be more finely assessed by reference to the importance of the asset's surroundings, to its character and value as a cultural heritage asset and the appreciation of its value. Table 19.8 is a general guide to the attributes of cultural heritage assets of high, medium, low or negligible vulnerability to setting impacts. It should be noted that not all the qualities listed need be present in every case and professional judgement is used in balancing the different criteria. As noted above, the guideline criteria have been developed and applied to previous cultural heritage EIA in the absence of official guidance or a standard methodology and have been used in numerous setting assessments previously.

Vulnerability	Guideline criteria
High	The asset has a clearly defined setting that is readily appreciable on the ground and is vital to its significance or the appreciation thereof.
Medium	The asset's significance and the appreciation thereof relate to some extent to its setting.
Low	The asset's surroundings have little relevance to its significance or the appreciation thereof.
Negligible	The asset's significance or the appreciation thereof does not relate to its surroundings.

Table 19.8: Vulnerability of a cultural heritage asset to effects on setting

19.4.5 Significance of Impacts

19.4.5.1 Overall Significance

46 The significance of an impact on a cultural heritage asset, whether a physical impact (direct or indirect) or an impact on its setting, is assessed by combining the magnitude of the effect and the vulnerability of the cultural heritage asset (the receptor).

47 The significance matrix used in this assessment is adapted from that detailed in Chapter 6: The Approach to Environmental Impact Assessment to take account of the additional values attributed to magnitude (refer to Table 19.9).

			Vulnerability			
			Negligible	Low	Medium	High
Magnitude	Positive value	Negligible	Not significant	Minor significance	Minor significance	Moderate significance
	Low negative	Low	Minor significance	Minor significance	Moderate significance	Moderate significance
	Medium negative	Medium	Minor significance	Moderate significance	Moderate significance	Major significance
	High negative	High	Moderate significance	Moderate significance	Major significance	Major significance

Table 19.9: Matrix of overall significance

48 Mitigation is considered to be necessary when an impact (setting or physical) has been assessed to be of moderate significance or above.

19.4.6 Cumulative and In-Combination Impact Assessment Approach

49 Cumulative impacts are those arising as a result of interaction between Neart na Gaoithe and other offshore wind farms.

50 In-combination effects are considered to be those arising between like and unlike schemes, for example between offshore wind farms and the dredging of shipping channels. This combination of activities would include the installation of foundations plus channel dredging, both of which could lead to the degradation of wrecks.

19.5 Baseline Description

- 51 The following section summarises the results of the baseline assessment. All cultural heritage assets are included in Appendix 19.2: Gazetteer and Concordance.
- 52 In the interests of clarity and in reference with the technical report, recorded wreck sites are given a unique EMU Archaeology number, the suffix 'EA', while anomalies identified in the geophysical survey are given the suffix 'EMU'. Onshore assets considered in relation to setting are referred to according to their listing and referenced to their designation index number. All sites are depicted on Figures 19.2- 19.9.
- 53 Locations and descriptions of all identified sites are presented in Appendix 19.1: Maritime Archaeology and Cultural Heritage Technical Report. Those cultural heritage receptors taken forward for impact assessment are presented in Table 19.8.

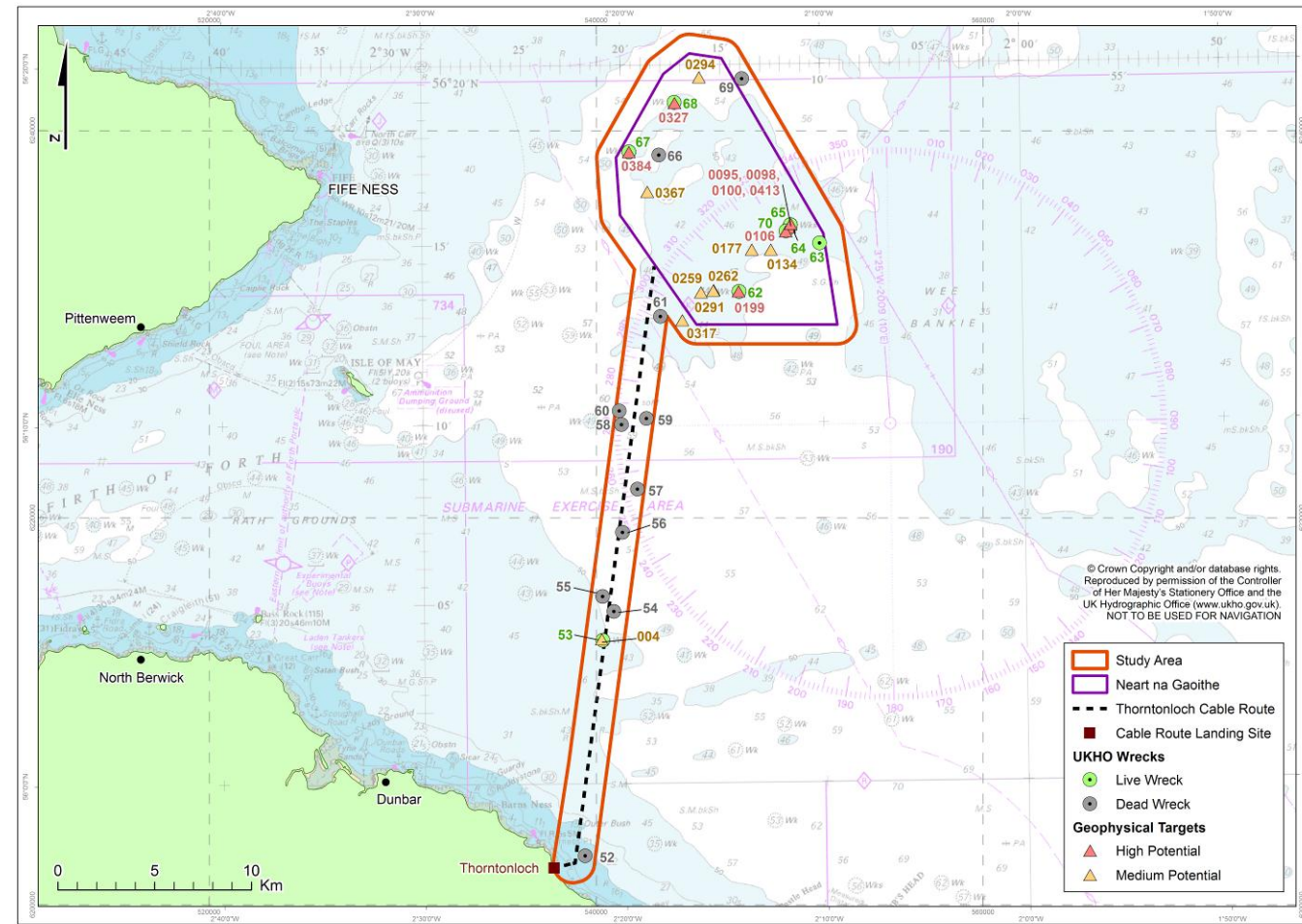


Figure 19.2: Cultural heritage assets within the study area

19.5.1 Offshore Site

19.5.1.1 Known Sites

- 54 There are nine recorded or charted wrecks and obstructions from the Seazone dataset located within the offshore site (Figure 19.3). Eight of these lie within the inner study area and one within the 1 km site buffer zone. Of these, seven are 'Live' (i.e., they have been accurately located by survey) and two are considered 'Dead' (repeat surveys have failed to locate the wreck and its co-ordinates are considered to be unreliable). Three of these sites are designated as Protected Places under the Protection of Military Remains Act 1986 (Sites EA64, EA65 and EA70, see Figure 19.2). All seven of these 'Live' sites (EA62, EA63, EA64, EA65, EA67, EA68 and EA70 – shown as green targets on Figure 19.3) will be taken forward for assessment.

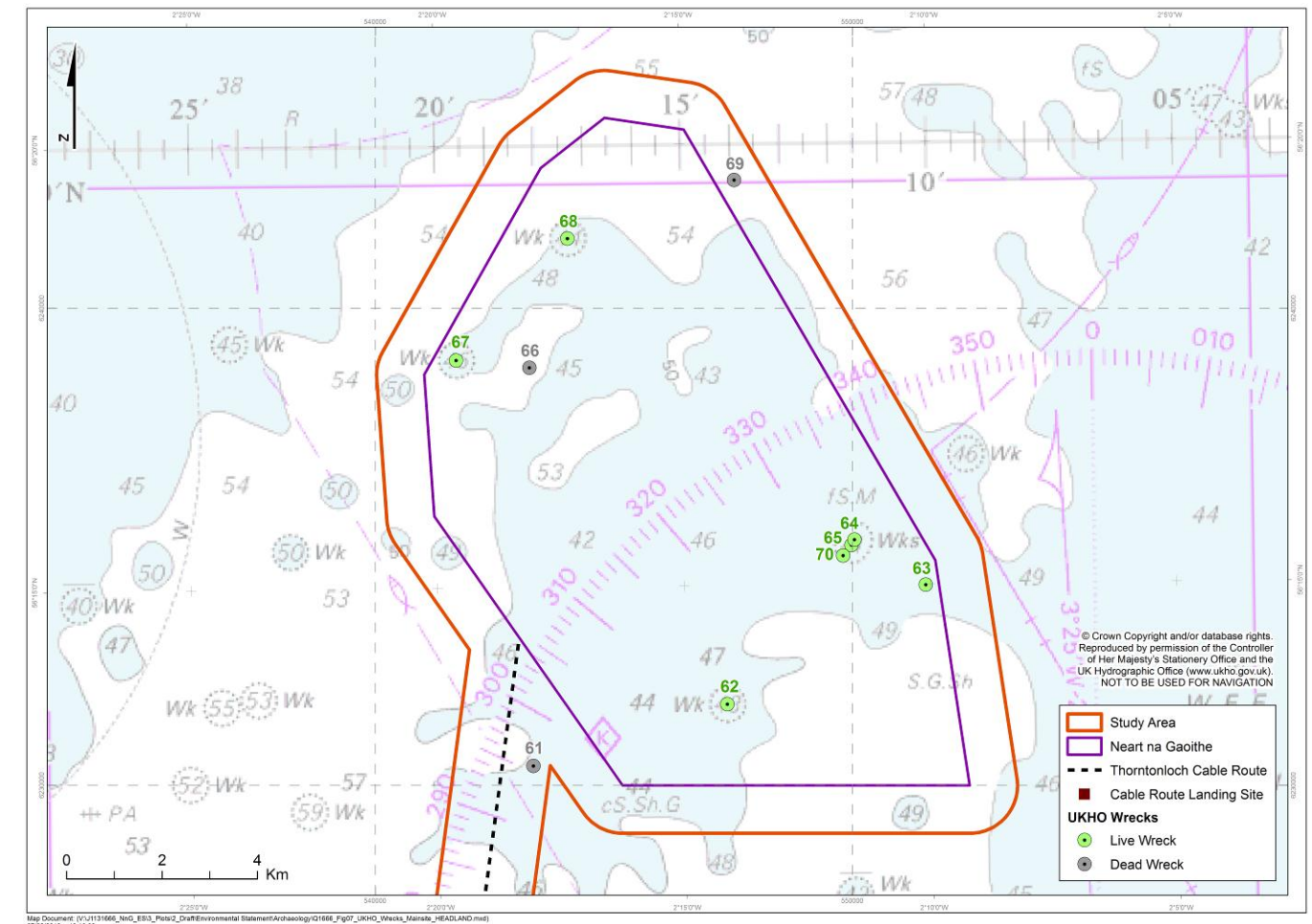


Figure 19.3: Wrecks and obstructions from the Seazone dataset in the wind farm site and 1 km buffer

- 55 The NMRS lists nine historical shipping casualties within the offshore site (see Figure 19.4). Eight of these lie within the inner study area and one within the 1 km site buffer zone. Six of these records correspond to the six 'Live' wrecks identified in the Seazone dataset (EA62, EA64, EA65, EA67, EA68 and EA70 – shown as green targets on Figure 19.3) while the locations assigned to the remaining three are tentative and surveys have failed to locate any remains in their purported locations. These six known wrecks will be taken forward for assessment.

19.5.1.2 Archaeological Assessment of the Geophysical Data

56 Thirty anomalies of potential archaeological interest were identified across the study area by the archaeological review of sidescan sonar data (refer to Figure 19.2).

Sites of High Archaeological Potential

57 Eight anomalies of high archaeological potential were identified across the proposed offshore site through the archaeological review of sidescan sonar data. All eight anomalies of high archaeological potential are located within the wind farm footprint and correspond with six known 'Live' wreck sites recorded in the SeaZone/UKHO records. These sites will be taken forward for assessment (see Figure 19.4).

Sites of Medium Archaeological Potential

58 Seven anomalies of medium archaeological potential were also identified within the wind farm footprint and one anomaly of medium archaeological potential was also identified within the wind farm 1 km buffer (see Figure 19.4). These potential sites are taken forward for assessment.

59 In addition, 34 magnetometer contacts were also noted in the offshore site, seven of which correlate with wrecks or wreck-related debris identified in the sidescan sonar data. These seven sites will be taken forward for assessment in conjunction with the sidescan anomalies (Figure 19.4).

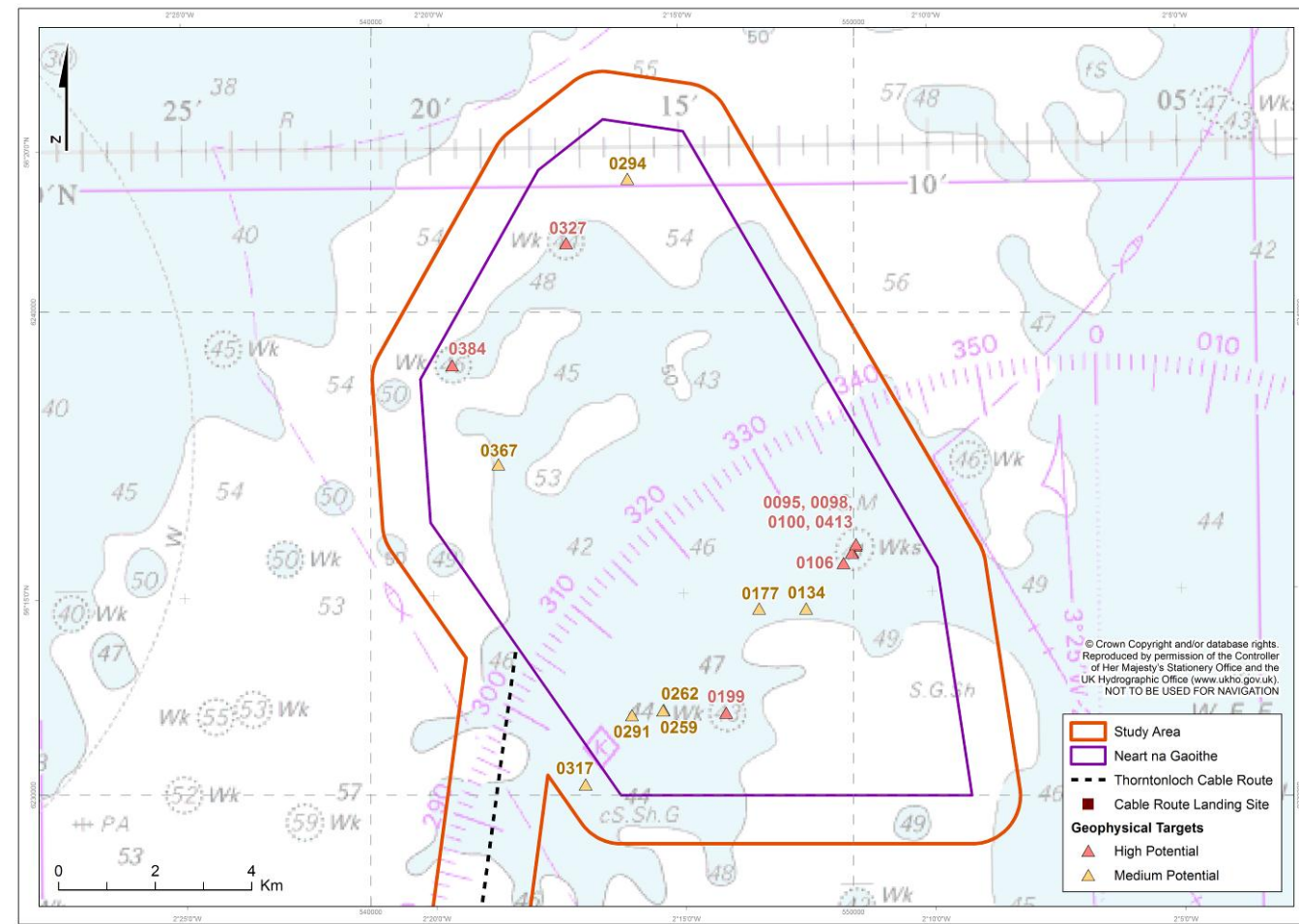


Figure 19.4: Geophysical anomalies identified in the wind farm site, 1 km buffer

19.5.1.3 Archaeological Assessment of the Geotechnical Data

60 No organic sediments such as peats or organic silts were recorded in any of the vibrocore logs and similarly no organic sediments were recorded in any of the penetration test logs (see, Review of Geotechnical Data in Appendix 19.1: Maritime Archaeology and Cultural Heritage Technical Report).

61 Possible organic material was noted in one borehole log identified in the geotechnical data assessment. Due to the lack of palaeoenvironmental evidence identified within the assessment for the proposed development area, this has not been taken forward for assessment.

19.5.1.4 Submerged Prehistoric Archaeology

62 The potential for discovering submerged prehistoric archaeological and palaeoenvironmental material in the proposed development area is regarded as low and so has not been taken forward for assessment (see Prehistoric Archaeological Potential in Appendix 19.1: Maritime Archaeology and Cultural Heritage Technical Report).

19.5.1.5 Maritime Archaeology

63 There is a low potential for unrecorded maritime archaeological material in the proposed development area. Consistent use of the Outer Firth of Forth and North Sea in the post-medieval period is reflected in the number of losses listed by the UKHO and in the maritime records. A total of 15 wreck sites with unknown locations are recorded in the NMRS data for the study area. However, an extensive geophysical survey has been undertaken in the offshore study area which failed to locate these wrecks, and because of the low potential this has not been taken forward for assessment.

19.5.1.6 Aviation Archaeology

64 There is low potential for the remains of aircraft to be discovered within the offshore site and export cable corridor. Recorded aircraft losses in the vicinity of the study area consist of five modern aircraft, the earliest of which both dates from 1970 (a Lightning and a Cessna 320) and the most recent relating to the loss in 2005 of a Panavia Tornado, although the positions of these recorded losses are not accurate. The NMRS also records the remains of a World War II Bristol Beaufighter near Skateraw. However, because of the low potential for the discovery of unrecorded aircraft or associated material this has not been taken forward for assessment.

19.5.2 Cable Route

19.5.2.1 Known Sites

65 There is one known 'Live' wreck site from SeaZone/UKHO within the export cable route corridor (refer to Figures 19.2 and 19.5). This site (EA53) has been taken forward for assessment.

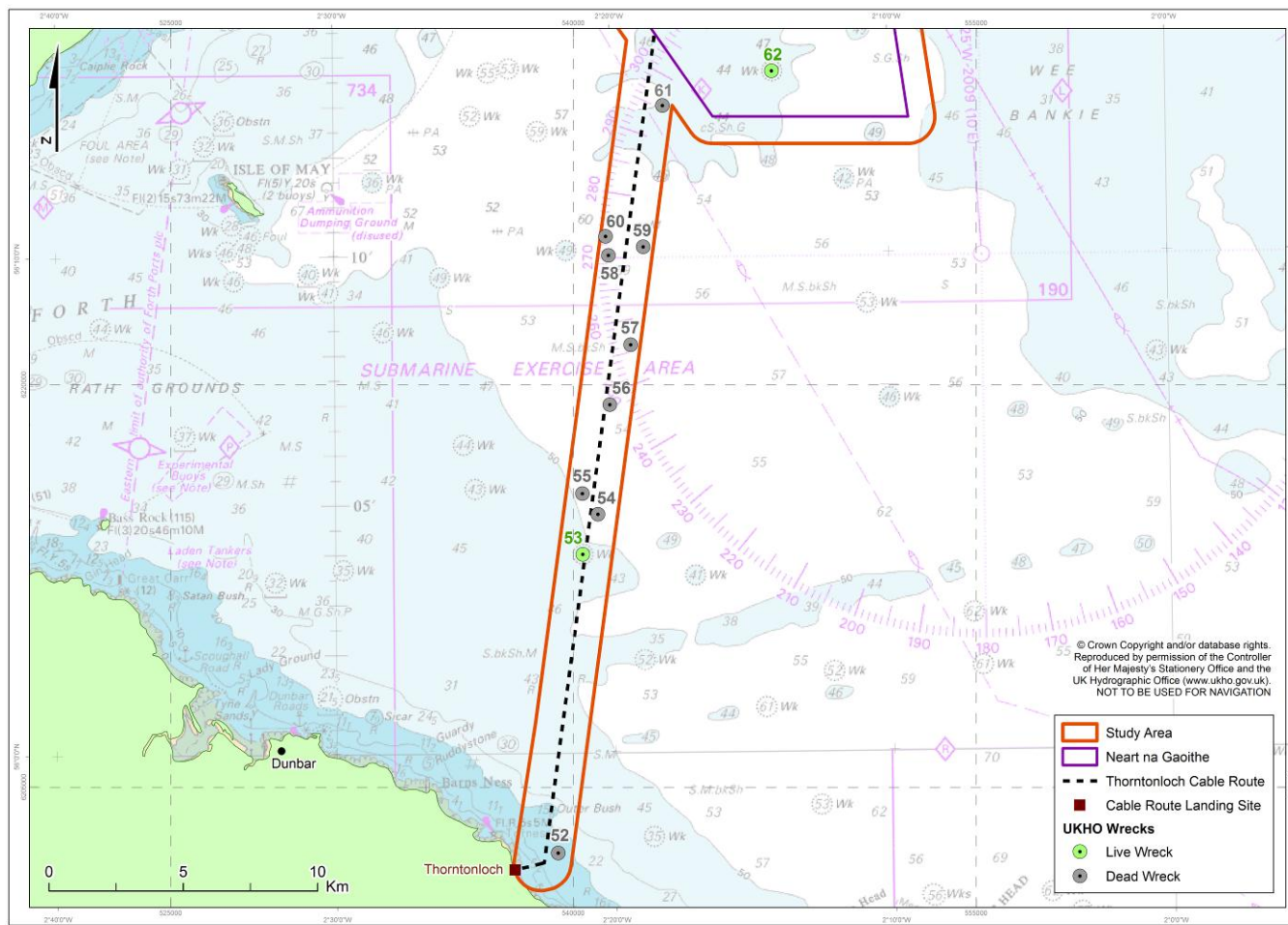


Figure 19.5: Wrecks and obstructions within the cable corridor

66 The NMRS lists 20 historical shipping casualties within and in proximity to the export cable route corridor. None of these sites were identified during the geophysical survey. One site is located 350 m from a 'Live' SeaZone/UKHO wreck (Site EA53) and is taken forward for assessment (refer to Figures 19.2 and 19.5).

19.5.2.2 Archaeological Assessment of the Geophysical Data

Anomalies of High Archaeological Potential

67 No sites of high archaeological potential have been identified within the export cable route corridor (see Figure 19.6).

Anomalies of Medium Archaeological Potential

68 One anomaly of medium archaeological potential was identified in the cable route study area. This anomaly is approximately 80 m from a known live wreck site recorded in the SeaZone/UKHO records and may be wreckage or debris associated with this site. This potential site is taken forward for assessment (see Figure 19.6).

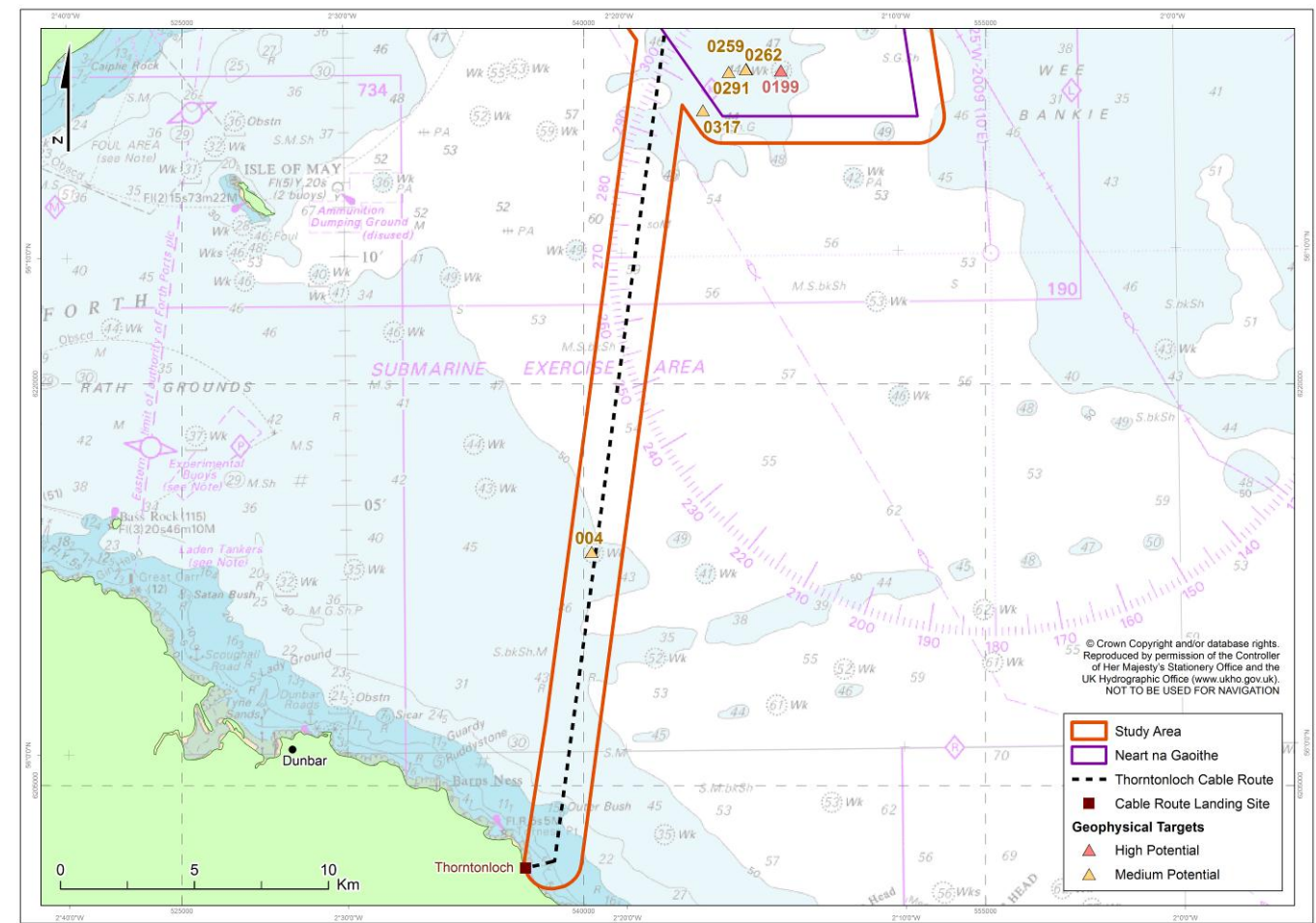


Figure 19.6: Geophysical anomalies identified in the cable corridor

19.5.3 Setting Baseline: Designated Onshore and Island Cultural Heritage Assets

69 Although the wind farm will be visible from a number of designated cultural heritage sites, it is clear that in most instances there is no potential for this to have a significant impact upon setting; for there to be such potential the asset's significance would have to relate closely to its visual relationship with the sea. Historic Scotland's scoping response identifies 11 assets that have a 'seascape setting' and 'may be subject to [a setting] impact as a result of the proposed offshore turbines' (see Figure 19.7). Accordingly these assets (listed below and highlighted in Section 19.5.4) have been considered for assessment:

70 Scheduled Monuments

- Tentsmuir Coastal defences (Index no. 9712);
- Crail Airfield, airfield 1 km E of Kirklands Farm (Index no. 6642);
- Crail Airfield, pillbox, Foreland Head (Index no. 6461);
- St Andrews Castle (Index no. 90259);
- St Andrews Cathedral and adjacent ecclesiastical remains (Index no. 90260);
- Isle of May Old Lighthouse (Index no. 887); and
- Isle of May Priory (Index no. 838).

- 71 Category A Listed Buildings
- St Andrews Harbour (HB no. 40596); and
 - Bell Rock Lighthouse (HB no. 45197).
- 72 Gardens and Designed Landscapes
- St Andrews Links; and
 - Cambo Estate Designed Landscape.
- 73 In addition to the above assets, the Category A-listed Ladyloan Signal Tower (HB no. 21230) has been selected because of its historic link to the Bell Rock Lighthouse.

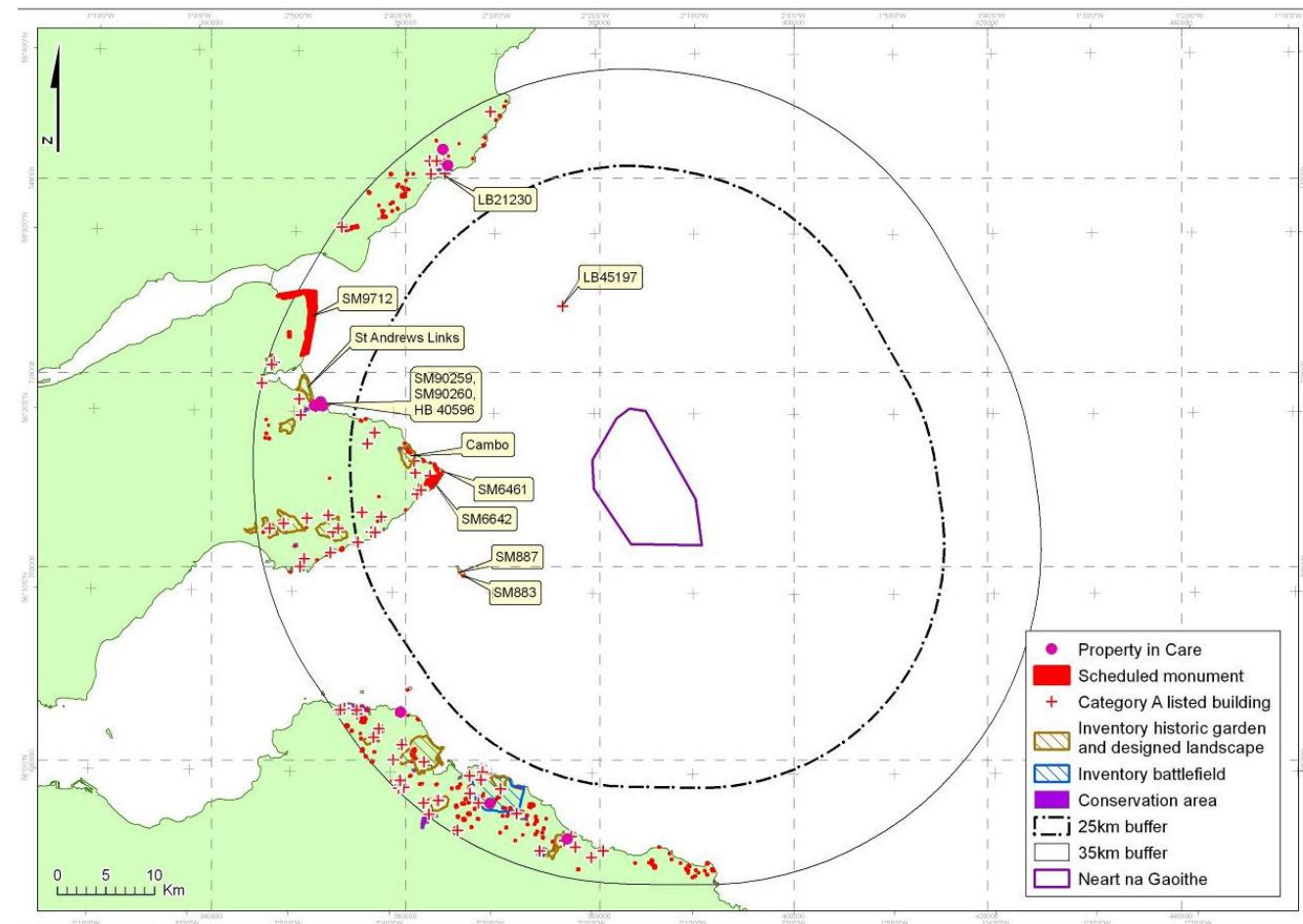


Figure 19.7: Location of key onshore receptors (labelled) considered for setting impacts

19.5.4 Receptors Taken Forward for Impact Assessment

74 Table 19.10 presents the cultural heritage receptors taken forward for impact assessment within the offshore site and cable corridor.

EMU ID (EA/EMU)	Name/Type	SeaZone ID/ UKHO ID	NMRS ID	Geophysical Anomaly ID (EMU)	Position WGS 84 UTM 30	Location
62	Wreck of <i>Ballochbuie</i>	2964	RP1	0199	547378 6231700	Offshore Site
63	Obstruction	2969	-	-	551539 6234207	Offshore Site
64	Submarine wreck – <i>K4</i> or <i>K17</i>	2975	RP12	0413	549981 6235037	Offshore Site
65	Submarine wreck – <i>K4</i> or <i>K17</i>	2973	RP2	0100 / 095	550042 6235149	Offshore Site
67	Unknown	2984	RP14	0384	541692 6238908	Offshore Site
68	Wreck of <i>Einar Jarl</i>	2989	RP15	0327	544025 6241465	Offshore Site
70	Wreck	7116	RP13	0106 / 098	549807 6234816	Offshore Site
0294	Geophysical target of medium potential	-	-	0294	545313 6242768	Offshore Site and 1 km Buffer
0367	Geophysical target of medium potential	-	-	0367	542643 6236851	Offshore Site and 1 km Buffer
0291	Geophysical target of medium potential	-	-	0291	545412 6231657	Offshore Site and 1 km Buffer
0259	Geophysical target of medium potential	-	-	0259	546068 6231770	Offshore Site and 1 km Buffer
0177	Geophysical target of medium potential	-	-	0177	548044 6233870	Offshore Site and 1 km Buffer
0134	Geophysical target of medium potential	-	-	0134	549018 6233868	Offshore Site and 1 km Buffer
0317	Geophysical target of medium potential	-	-	0317	544451 6230222	Offshore Site and 1 km Buffer
53	Wreck of <i>Bellax</i>	2900	RP6	004	540349 6213674	Cable Corridor

Table 19.10: Cultural heritage receptors taken forward for assessment

19.6 Impact Assessment

19.6.1 Impact Assessment - Known Sites and Geophysical Anomalies – Construction Phase

75 The following sections present the potential construction impacts from the proposed offshore site and cable corridor. Unless otherwise stated, in each case the assessment has been conducted using indicative Layout B (refer to Chapter 5: Project Description for additional information on the layout).

19.6.1.1 Offshore Site

Known Sites

76 There are potential direct impacts on Sites EA64, EA65, and EA70 arising as a result of vessel anchoring activities and the installation of the inter-array cables (refer to Figure 19.3). The severity has been assessed as being high negative; therefore the magnitude of effect is high. The value of the receptors is assessed as high and so are considered to have high vulnerability. The significance of impact is regarded as being of **major significance**. The associated NMRS sites RP2, RP12 and RP13 are considered to be included with these recorded wrecks.

77 There are also potential direct impacts on Sites EA62, EA63, EA67 and EA68 (refer to Figure 19.3). The severity has been assessed as high negative; therefore the magnitude of effect is high. The receptors are regarded to be of high value and therefore high vulnerability. The significance of impact is regarded as being of **major significance**. The associated NMRS sites RP1, RP14 and RP15 are considered to be included with these recorded wrecks.

78 There is a potential direct impact on Site EA63 (refer to Figure 19.3). The severity is high negative, therefore the magnitude of effect is high. The receptor is of medium value and therefore of medium vulnerability. The significance of impact is regarded as being of **moderate significance**.

Geophysical Anomalies of High Archaeological Potential

79 There are potential direct impacts on Sites EMU_0095, EMU_0098, EMU_0100, EMU_0106, EMU_0199, EMU_0327, EMU_0384 and EMU_0413 (refer to Figure 19.4 and Table 19.11). The severity is regarded to be medium negative, therefore the magnitude of effect is medium. The receptors are of high value and therefore high vulnerability. The significance of impact is regarded as being of **major significance**.

Geophysical Anomalies of Medium Archaeological Potential

80 There are potential direct impacts on EMU_0134, EMU_0177, EMU_0259, EMU_0262, EMU_0291, EMU_0294 and EMU_0367 (refer to Figure 19.5 and Table 19.11). The severity is medium negative; therefore the magnitude of effect is medium. The receptors are of medium value and therefore of medium vulnerability. The significance of impact is regarded as being of **moderate significance**.

81 The potential indirect impacts on the identified cultural heritage assets noted above have been assessed. The possibility of alteration to the sediment regime and scour leading to long term effects on patterns of sediment transport within the offshore site are assessed and reported in Chapter 9: Physical Processes. The predicted changes to sediment transport processes, wave climate, water level, and tidal regime due to the Neart na Gaoithe development are considered to be low to negligible. Given these findings it is considered that there will be no significant impact on cultural heritage assets due to changes to the sedimentary regime or scour as a result of the presence of the proposed development. The significance of impact is assessed as being **not significant**.

82 There is also the potential for indirect impacts on the known sites and geophysical anomalies identified above. These impacts may occur through effects such as the anchoring of construction vessels or the deployment of jack-up legs. As such, the severity is regarded as medium negative; therefore the potential magnitude of effect is medium negative. The value of the receptors noted above is medium to high and therefore of medium and high vulnerability. The significance of impact is regarded as being of **moderate to major significance**.

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Seabed preparation	Dredging/cable ploughing/ anchoring	Wreck EA62, EMU_0199, RP1	High	High	Major significance
Seabed preparation	Dredging/cable ploughing/ anchoring	EA63	Moderate	Moderate	Moderate significance
Seabed preparation	Dredging/cable ploughing/ anchoring	EA64, EMU_0098, EMU_0100, RP13	High	High	Major significance
Seabed preparation	Dredging/cable ploughing/ anchoring	EA65, EMU_0095 EMU_0413, RP12, RP2	High	High	Major significance
Seabed preparation	Dredging/cable ploughing/ anchoring	EA67, EMU_0384, RP14	High	High	Major significance
Seabed preparation	Dredging/cable ploughing/ anchoring	EA68, EMU_0327, RP15	High	High	Major significance
Seabed preparation	Dredging/cable ploughing/ anchoring	EA70, EMU_0106	High	High	Major significance
Seabed preparation	Dredging/cable ploughing/ Anchoring	EMU_0134, EMU_0177, EMU_0259, EMU0262, EMU_0291, EMU_0294, EMU_0367	Moderate	Moderate	Moderate significance

Table 19.11: Receptor specific assessment outputs

19.6.1.2 Cable Route

Known Sites

83 There is a potential direct impact on Site EA53. Given that the cable could be placed anywhere within the 1 km buffer zone the severity is medium negative, and therefore the magnitude of effect is medium. The receptor is of medium value and therefore medium vulnerability. As such, the significance of impact is regarded as **moderate**. The associated NMRS site RP6, and medium potential target EMU_0004 are included with this site (refer to Table 19.12).

Geophysical Anomalies of Medium Archaeological Potential

84 There is a potential direct impact on Site EMU_0004. As above, the cable could be placed anywhere within the 1 km buffer zone and with the likelihood of anchoring activities occurring in the vicinity of this site during cable installation the severity is regarded as medium negative, and therefore the magnitude of effect is medium. The receptor is of medium value. The overall significance of impact is therefore regarded as **moderate** (refer to Table 19.12).

85 The potential indirect impacts on the identified cultural heritage assets noted above have been assessed. The possibility of alterations to the sediment regime and scour leading to long term effects on patterns of sediment transport within the cable corridor are assessed and reported in Chapter 9: Physical Processes. The predicted changes to sediment transport processes, wave climate, water level, and tidal regime due to the Neart na Gaoithe development are considered to be minor to negligible. Given these findings it is considered that there will be no significant impact on cultural heritage assets due to changes to sedimentary regime or scour as a result of the presence of the export cable.

86 There is also the potential for indirect impacts on Sites EA53 and EMU_004. These impacts may occur through effects such as the anchoring of construction/installation vessels. As such, the severity is regarded as medium negative, and therefore the potential magnitude of effect is medium. The value of the receptors noted above is medium to high and therefore of medium and high vulnerability. The significance of impact is regarded as **moderate** to **major** (refer to Table 19.12).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Seabed preparation	Dredging/cable ploughing/anchoring	EA53, EMU_004, RP6	Moderate	Moderate	Moderate significance

Table 19.12: Impact assessment cable route – construction phase

19.6.2 Impact Assessment - Setting – Construction Phase

87 The potential impact of the construction phase upon the setting of onshore assets will be relatively short and identical to those of the operation phase. It has not been considered separately (see Section 19.6.4).

19.6.3 Impact Assessment - Known Sites and Geophysical Anomalies - Operation and Maintenance Phase

88 The following presents the potential operation and maintenance impacts from the proposed offshore site and cable corridor.

19.6.3.1 Offshore Site

89 There is potential for impacts on the known sites and geophysical anomalies identified above in Section 19.6.1.1. Direct and indirect impacts arising from the placement of anchors or vessels deployed during periodic maintenance and by legs of jack-up barges in the event of turbine component replacement during the operation and maintenance could result in damage, disturbance or destruction of submerged prehistoric archaeology, shipwrecks, and crashed aircraft. As such, the severity is regarded as high to medium negative, and the potential magnitude of effect is high to medium. The value of the receptors noted above is medium to high and therefore of medium to high vulnerability. The significance of impact is regarded as **moderate** to **major significance** (refer to Table 19.13).

90 It is considered that there will be no significant direct or indirect physical impacts on cultural heritage assets due to changes to tidal currents or the sedimentary regime as a result of the presence of the offshore development. During the operational phase for the proposed wind farm, the possibility of alteration to the tidal and wave regimes leading to long term effects on patterns of sediment transport within the application area have been considered. Changes to the tidal, wave and sediment transport regime have been assessed and reported in Chapter 9: Physical Processes. Effects have been described as low to negligible magnitude, and therefore the impacts to archaeology are judged to be **not significant** (refer to Table 19.13).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Vessel or barge siting	Anchor and jack-up barge leg placement	Sites EA62, EA63, EA64, EA65, EA67, EA68, EA70, EMU_0095, EMU_0098, EMU_0100, EMU_0106, EMU_0199, EMU_0327, EMU_0384 EMU_0413 EMU_0134, EMU_0177, EMU_0259, EMU_0262, EMU_0291, EMU_0294 and EMU_0367.	Moderate to high	Moderate to high	Moderate to major significance

Table 19.13: Impact assessment – site - known sites and geophysical anomalies - operation and maintenance phase

19.6.3.2 Export Cable Route

91 There is potential for impacts on the known sites and geophysical anomalies identified above in Section 19.6.1.2. Direct impacts and indirect impacts during the operation and maintenance could comprise damage, disturbance or destruction of submerged prehistoric archaeology, shipwrecks, and crashed aircraft from anchors or vessels deployed during periodic maintenance. As such, the severity is regarded as high to medium negative, and the potential magnitude of effect is high to medium. The value of the receptors noted above is medium to high and therefore of medium to high vulnerability. The significance of impact is regarded as **moderate** to **major** (refer to Table 19.14).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Vessel or barge siting	Anchor and jack-up barge leg placement	EA53, EMU_004, RP6	Moderate	Moderate	Moderate significance

Table 19.14: Impact assessment – cable route - known sites and geophysical anomalies - operation and maintenance

19.6.4 Impact Assessment - Setting - Operation and Maintenance Phase

92 The assets listed in Section 19.6.4 have been assessed on request from Historic Scotland, with the exception of the Ladyloan Signal Tower (HB21230), which has been included as it is intrinsically linked with the Bell Rock Lighthouse (HB45197) and together they make up a Grouping of Category A Listed Buildings. Additional information is contained in Appendix 19.1: Maritime Archaeology and Cultural Heritage Technical Report.

93 Given the turbines’ distance from the shore, the degree to which they are visible will depend substantially on weather conditions. Chapter 21: Seascape, Landscape and Visual Impact indicates the percentage of time the turbines will be visible depending on their distance from Leuchars. These values have been taken as an indication of how often the turbines will be visible from cultural heritage sites. If a site is between 20 and 25 km from the proposed wind farm, it is estimated that the turbines will be visible for approximately 63% of the time. If an asset is between 25 and 30 km from the proposed wind farm, the turbines will be visible for approximately 54% of the time, and if an asset is between 30 and 35 km away, they will be visible approximately 41% of the time. Thus, the percentage visibility is inversely proportional to the distance from the turbines.

94 Impacts on setting are judged only to be relevant during operation. Any maintenance programme is likely to consist of vessel movements with periodic repair of the offshore structures.

Isle of May Priory (SM838)

95 Isle of May Priory is a scheduled monument located on southwest of the Isle of May (refer to Figure 21.21a-d in Chapter 21: Seascape, Landscape and Visual Impact). The monument includes the upstanding and excavated remains of a Benedictine Priory, which dates to the 13th century. It has an open aspect to the east while to the west a high rock face restricts views.

96 The Isle of May Priory has a clear relationship with its surroundings in that it has been located in a relatively sheltered location on an isolated island. The introduction of the lighthouse buildings has reduced this sense of isolation. However, the visitor can still readily appreciate why this location was chosen for the Priory. It is concluded that it is of medium sensitivity to impacts upon its setting.

97 The development will be visible from the Priory at a distance of approximately 17 km to the northwest (Figure 19.7). The development will represent a new modern element within the seascape. However, the understanding and sense of place afforded the Isle of May Priory will still be readily appreciable, the distance of the turbines allowing the sense of isolation to be preserved. It is therefore considered that a negative impact of low magnitude will occur. This will constitute an impact of **minor significance** (refer to Table 19.15).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of Impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Isle of May Priory (SM838)	Low	Moderate	Minor significance

Table 19.15: Impact assessment – setting - operation and maintenance phase

Isle of May Old Lighthouse (SM887)

98 The scheduled Isle of May Old Lighthouse comprises the remains of a coal-fired lighthouse dating to 1636 (see Figure 21.21a-d in Chapter 21: Seascape, Landscape and Visual Impact). The lighthouse was originally 12.2 m high with capacity to burn coals on the top. It now stands to 7.3 m and is built square in plan, painted with a white harl.

99 The Old Lighthouse is located on the summit of the Isle of May with wide views out to the sea in all directions. The exception to this is the immediate southwest, where the current lighthouse blocks the view to the sea.

100 Views to the Isle of May are possible from the Fife coast, Mid Lothian and East Lothian. However, the Old Lighthouse is barely, if at all, discernible at these distances. The typical approach of visitors to the Isle of May is by boat from Anstruther. To the visitor the Old Lighthouse is one of the more apparent structures on the island due to its white colour; it, along with the present lighthouse and the other lighthouse structures, gives the visitor a ready appreciation of its importance as a lighthouse island. However, for the majority of visitors to the island the true attraction is the bird colonies of the nature reserve and the presence of the lighthouses will be of secondary interest.

101 The lighthouse has a clearly defined relationship with its surroundings which is readily apparent in its relationship with the surrounding seascape. It is considered to be of high sensitivity to impacts on its setting.

102 The development will be located approximately 16.5 km to the northeast and will not be visible in the main views to the Old Lighthouse or will appear off to the east. As such, the development will not detract from the views of the Old Lighthouse, which is only readily apparent from the island itself or passing vessels. The development will add a modern element within the seascape. However, the presence of the turbines will not detract from the understanding or appreciation of the Isle of May Lighthouse. It is considered that a negative impact of negligible magnitude will occur. This will constitute an impact of **minor significance** (refer to Table 19.16).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Isle of May Old Lighthouse (SM887)	Negligible	High	Minor significance

Table 19.16: Impact assessment – setting - operation and maintenance phase

Crail Airfield Pillbox (SM6461)

103 Crail Pillbox is a Second World War pillbox located at the easternmost tip of the south coast of Fife (refer to Figure 21.19a-d in Chapter 21: Seascape, Landscape and Visual Impacts). This pillbox has been scheduled as a well preserved example of a pillbox. The pillbox is located just above the coastline, immediately to the northeast of Fife Ness automated lighthouse.

104 Situated approximately 15.5 km from the development the Crail Pillbox will have views of the development, however, these will not detract from the understanding of this pillbox structure. It is considered that there will be no impact on the setting of the Crail Pillbox (refer to Table 19.17).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Crail Airfield Pillbox (SM6461)	None	Moderate	No Impact

Table 19.17: Impact assessment – setting - operation and maintenance phase

Crail Airfield (SM6642)

105 Crail Airfield was built during the First World War and later reused during the Second World War and the Cold War (the scheduling description also notes the presence of two cropmarks of possible prehistoric settlements within the area). This airfield is one of the best preserved abandoned airfields in Scotland. The airfield is presently used as a racetrack for drag racing.

106 The proposed development will be visible approximately 16 km to the east of the airfield. The turbines will introduce a modern element to the seascape when viewed from the airfield. The control tower of the airfield is located in the north of the site with the runways to the south and west, the important views from the control tower are to the airfield, the turbines will not be visible in these views. The turbines will not affect the ability to understand or interpret the airfield, nor will it detract from the sense of place. It is considered that the development will have no impact on the setting of the Crail Airfield (refer to Table 19.18).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Crail Airfield (SM6642)	None	Moderate	No Impact

Table 19.18: Impact assessment – setting - operation and maintenance phase

St Andrews Castle (SM90259)

107 St Andrews Castle is a Property in Care and Scheduled Monument. St Andrews Castle stands on a rocky promontory overlooking the beach of Castle Sands and the sea below. Looking along the cliffs to the southeast beyond more recent housing are the remains of St Andrews Cathedral and the harbour. Views out to the south and west are highly restricted by more recent buildings. To the north the view is over St Andrews Bay with the coast of Angus in the distance, to the west is an open aspect to the North Sea.

108 The development lies approximately 29 km to the southwest from St Andrews Castle. When visible, the turbines will appear as a line on the horizon extending east from the Fife coast. The turbines will introduce a modern element to the seascape when viewed from the castle, however they will not distract from the important views to the cathedral and harbour nor distract from the understanding or the sense of place of the castle. The turbines will not be visible in the main views to the castle as part of the historic skyline of St Andrews as these views are largely afforded from the south and southeast of St Andrews and the turbines will be further to the south. It is therefore considered that the development will have no impact on the setting of St Andrews Castle (refer to Table 19.19).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	St Andrews Castle (SM90259)	None	Moderate	No Impact

Table 19.19: Impact assessment – setting - operation and maintenance phase

St Andrews Cathedral (SM90260)

- 109 St Andrews Cathedral is a Property in Care and a scheduled monument. It comprises the substantial remains of the cathedral (see Figure 21.18a-d Chapter 21: Seascape, Landscape and Visual Impacts). The remains include the cathedral church and cloisters, the churches of St Rule and St Mary Kirkheugh, the Pends Yett, the burial grounds and the large precinct walls and gateway.
- 110 The Cathedral is located on the coastal edge of St Andrews, above the sea cliffs. Views out of the cathedral, from within the precinct walls, are very limited at ground level. However, if one climbs to the top of the Cathedral tower wide views over the surrounding town, countryside, seascape and harbour are possible.
- 111 The development lies approximately 28 km to the southeast of St Andrews Cathedral. The proposed wind farm will not be visible from within the Cathedral precinct except from the top of the towers. This is due to the precinct walls blocking views out to the coast. From the top of the towers the turbines will be visible, however from this viewpoint the townscape of St Andrews, both contemporary and modern as well as the surrounding countryside and seascape, can be seen. The turbines will therefore become one more feature in a wide and varied view. The most important views to the Cathedral are along the coast from the south and east; in such views the development will not be visible as turbines will lie to the south and east of the viewer. The development is not considered to have an impact on the setting of St Andrews Cathedral (refer to Table 19.20).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	St Andrews Cathedral (SM90260)	None	Moderate	No Impact

Table 19.20: Impact assessment – setting - operation and maintenance phase

St Andrews Harbour (HB40596)

- 112 St Andrews Harbour is a Category A listed building. The harbour as it survives today is largely 18th century in date with later repairs and improvements (see Chapter 21: Landscape, Seascape and Visual Impacts - Figure 21.18a-d).
- 113 The Harbour’s setting is therefore defined as the river mouth it occupies, and the views along the cliffs to St Andrews Castle and Cathedral which are contemporary with the original harbour. The Harbour is also linked with views out to the sea which are intrinsically linked through the harbour’s function and contribute to its sense of place.
- 114 The development lies approximately 28 km to the southwest from St Andrews Harbour. The turbines will appear as a line on the horizon extending east from the Fife coast. It is considered that while this will introduce a modern element to the seascape when viewed from St Andrews Harbour it will not distract from the understanding or appreciation of the Harbour. The development is not considered to have an impact on the setting of St Andrews Harbour (refer to Table 19.21).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	St Andrews Harbour (HB40596)	None	Moderate	No Impact

Table 19.21: Impact assessment – setting - operation and maintenance phase

Tentsmuir Coastal Defences (SM9712)

- 115 The scheduled Tentsmuir Coastal Defences were built as part of the defence of Britain in 1940 (see Chapter 21: Seascape, Landscape and Visual Impacts Figure 21.16a-c). The defences included a line of anti-tank blocks along the coast, pill boxes, quadrant towers, barbed wire entanglements and a camp for those that built and defended the line. These defences have been partially removed, or lost, through coastal erosion and deliberate removal whilst other parts will have been covered by the movements of the sand. Today, visitors to the Tentsmuir Nature Reserve can visit the area without noticing the presence of the coastal defences.
- 116 The proposed wind farm will be visible 32 km to the southeast from much of the coastal area of Tentsmuir Coastal Defences. The turbines will not be visible from the scheduled area located within the woodlands nor from the defences that lie along the south coast of the Firth of Tay. At this distance the turbines will not reduce the ability to understand or appreciate the cultural importance of the setting of the defences. It is therefore considered that the proposed development will not have an impact on the setting of Tentsmuir Coastal Defences (refer to Table 19.22).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Tentsmuir Coastal Defences (SM9712)	None	Moderate	No Impact

Table 19.22: Impact assessment – setting - operation and maintenance phase

Bell Rock Lighthouse (HB45197)

- 117 The scheduled Bell Rock Lighthouse is a well-preserved and operational lighthouse built between 1806 and 1811. The Bell Rock is the oldest surviving rock built lighthouse in Britain. The lighthouse was automated in 1988.
- 118 The Bell Rock Lighthouse was built on a small rock outcrop which is barely exposed at low tide, located over 18 km from the coast between Angus and Fife Ness. From its location there are wide views over the surrounding seascape with the coasts of Angus, Fife, the Lothians and the Scottish Borders in the distance. However, due to the distance from the shore the Bell Rock Lighthouse is rarely seen from the land as anything more than a small white feature, or as an intermittent light during the night. In anything but clear weather conditions the Bell Rock Lighthouse is not visible from the land.
- 119 The Proposed Development will be visible across the Forth Estuary at a distance of 12.6 km to the southeast from the Bell Rock Lighthouse. At this distance the proposed turbines will add a modern element into the seascape visible from the lighthouse in one direction. At this distance the turbines will not compete in scale with the lighthouse nor will they surround it and they will only be visible within a small percentage of the seascape visible from the lighthouse. From the coast of Fife the view to Bell Rock (when possible) is to the northeast while to the turbines is largely to the east it will be rare that the turbines and the lighthouse will be visible in unison. The view from Angus and in particular from the Ladyloan Signal Tower is unlikely to be effected, due to the distance from the Angus coast, however when visible the turbines will appear in a band to the south and west of the lighthouse. It is considered that there will be no impact on the setting of the Bell Rock Lighthouse (refer to Table 19.23).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Bell Rock Lighthouse (HB45197)	None	Moderate	No Impact

Table 19.23: Impact assessment – setting - operation and maintenance phase

Ladyloan Signal Tower (HB21230)

120 Ladyloan Signal Tower is a Category A Listed Building which was built in 1813 to enable signals to be sent to and from the operators of the Bell Rock Lighthouse (see Figure 21.13a-d in Chapter 21: Seascape, Landscape and Visual Impacts). Although the signal tower is intrinsically linked with the Bell Rock Lighthouse intervisibility is only achievable using a telescope and under clear weather conditions.

121 The proposed development is located 30 km to the southeast from Ladyloan Signal Tower. At this distance the turbines will be visible approximately 50% of the time and when visible they will appear as small features on the horizon. As the Bell Rock Lighthouse is rarely visible to any extent with the naked eye from the signal tower it is considered that the addition of the turbines further to the south and west of the Bell Rock Lighthouse will not alter the understanding of the relationship between the tower and the lighthouse and will not have an impact on the setting of Ladyloan Signal Tower (refer to Table 19.24).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Ladyloan Signal Tower (HB21230)	None	Moderate	No Impact

Table 19.24: Impact assessment – setting - operation and maintenance phase

St Andrews Links (HGDL)

122 St Andrews Links is an Inventory Historic Garden and Designed Landscape (HGDL). St Andrews Links is a series of some of the oldest golf courses in the world. It is renowned worldwide as the ‘Home of Golf’. There are six public links golf courses within the area defined as the Inventory landscape. The new Seventh Links course was officially opened in 2008, and is not located within the HGDL.

123 The proposed wind farm will be visible from much of St Andrews Links (under suitable weather conditions) at a distance of 30 km to the southeast extending eastwards from the coast of Fife. At this distance the development will not detract or distract from the setting of St Andrews Links, the open aspect of the Links and the exposure of the courses to the sea will be retained. The views of the Links in relationship to the clubhouse will not be affected and the turbines will not affect the appreciation of the Links or its relationship with the town of St Andrews. It is considered that the development will not have an impact on the setting of St Andrews Links (refer to Table 19.25).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	St Andrews Links (HGDL)	None	Moderate	No Impact

Table 19.25: Impact assessment – setting - operation and maintenance phase

Cambo (HGDL)

124 Cambo Inventory Historic Garden and Designed Landscape dates from the late 18th/19th century. The area designated includes the area of Cambo House and its surrounding gardens and drives as well as the woodland walk areas, the estate farmland to the north and south of Cambo House and the Kingsbarns golf course which is located along the coastal edge of the designated area. Cambo House and Gardens are very enclosed while the farmlands and golf course have open aspects broken up by well placed shelterbelts.

125 The area defined by the Inventory of HGDL as Cambo HGDL includes the surrounding farm and golf course. These areas would always have been farmland of the Cambo Estate and not designed aesthetically but functionally. Kingsbarns golf course was opened in 2000 and whilst it has open outlooks to the sea the golf course is not considered to have any cultural heritage significance. Cambo House sits in the area of designed landscape within the wooded lawns and gardens, and designed walks that surround it. However, within the gardens and designed woodland walks of Cambo House there are no views out to the coast (with the exception of the end of the woodland walk to the sea which directs the visitor along the side of a small stream surrounded by deciduous woods). The experience is one of feeling enclosed by the surrounding trees and in general there are no long views from Cambo House, along any drives or within the gardens, with the exception of a long view to the southwest from Cambo House over open parkland with mature deciduous trees.

126 This view will be unaffected and it is considered that there will be no impact on the setting of Cambo Inventory HGDL from the development which is located 18.2 km to the southeast (refer to Table 19.26).

Source	Pathway	Receptor	Magnitude of effect	Vulnerability of receptor	Significance of impact
Wind turbines	Turbine height and layout in relation to the setting of onshore receptors	Cambo (HGDL)	None	Moderate	No Impact

Table 19.26: Impact assessment – setting - operation and maintenance phase

19.6.5 Impact Assessment – Decommissioning

127 Impacts arising from the decommissioning of the offshore site and cable route infrastructure are considered to be analogous to those arising in the construction phase and are not discussed further.

19.7 Mitigation and Residual Impacts

128 The mitigation measures are presented for potential impacts during the construction, operation and maintenance and decommissioning phases of the proposed development.

19.7.1 Mitigation Measures

129 Direct physical impact on all sites of cultural heritage interest identified in this assessment will be avoided where possible through micro-siting of both turbines and installation equipment (e.g., jack-ups).

130 Where cultural heritage assets may potentially be subject to direct or indirect impacts, temporary exclusion zones (TEZ) will be implemented to prevent potential impacts from anchoring or installation of jack-up vessels. Exclusion zones of at least 100 m will be established around sites identified as being of high vulnerability in this assessment, while an exclusion zone of a minimum 50 m will be established around those of medium vulnerability. In addition to the construction phase it is also anticipated that the implementation of TEZs will ensure cultural heritage assets are protected from potential impacts during the operation and decommissioning phases. Should further survey or investigation confirm the nature and characteristics of an identified asset then a TEZ can be maintained or removed as appropriate and in consultation and agreement with Historic Scotland. The implementation and monitoring of the TEZs will be maintained through the Written Scheme of Investigation (WSI) and Protocol for Archaeological Discoveries (PAD) highlighted below.

- 131 In order to mitigate the risk of damage to any previously unrecorded archaeological remains a WSI and PAD will be prepared to mitigate construction impacts in the event of any unexpected archaeological discoveries during construction. This protocol will also include appropriate archaeological briefings for all personnel involved in the construction, operation and decommissioning activities associated with the proposed development. The PAD will be in place for the life of the proposed development and will be updated when required should details within the document change, for example contact details for key stakeholders.
- 132 Should it not be possible to avoid sites of cultural heritage interest, a full programme of archaeological investigation, which may include diver survey or Remotely Operated Vehicle (ROV) investigation, will be undertaken to identify the nature and extent of these sites. Subject to these investigations an appropriate mitigation strategy will be agreed with Historic Scotland.

19.7.2 Residual Impacts

- 133 It is considered that through the mitigation detailed above all potential physical impacts considered to be of moderate significance or above will be reduced to **not significant**.
- 134 No mitigation is proposed in relation to setting impacts. All predicted impacts are considered to be of minor significance to not significant. These are considered to be temporary in nature and will cease upon decommissioning of the Offshore Project. A summary of the residual impacts is given in Table 19.27.

Source	Pathway	Receptor	Significance pre-mitigation	Mitigation	Residual impact significance	Qualification of significance
Seabed preparation	Dredging / cable ploughing/ anchoring	Known Sites	Major significance	Exclusion zones	Not Significant	With a temporary exclusion zone established assets would be avoided during vessel operations and works
Seabed preparation	Dredging / cable ploughing/ anchoring	Known Sites	Moderate significance	Exclusion zones	Not Significant	As above
Seabed preparation	Dredging / cable ploughing/ anchoring	High potential geophysical targets	Major Significance	Exclusion zones	Not Significant	As above
Seabed preparation	Dredging / cable ploughing/ anchoring	Medium potential geophysical targets	Moderate significance	Exclusion zones	Not Significant	As above

Table 19.27: Mitigation and reassessment process

19.8 Cumulative and In-Combination Impacts

- 135 The cumulative and in-combination effects considered are:
- Physical effects: these may include changes in the sediment regime and potential increases in suspended sediment concentration during installation, operation and decommissioning. These effects have potential for beneficial and adverse impacts on the survival of cultural heritage assets such as relict submerged archaeology and palaeolandscapes over a wider area and known or potential wreck remains and associated debris. Assessment of meteorological/oceanographic (metocean) and coastal processes relating to each development, as well as the wider region as a whole, has been undertaken and incorporated within the archaeological considerations.
 - Setting effects: cumulative setting effects upon onshore cultural heritage assets may result from the Neart na Gaoithe offshore wind farm, Inch Cape offshore wind farm and the Firth of Forth Round 3 Zone 2 offshore wind farm being seen in-combination in views that are relevant to the setting of cultural heritage assets. Similarly, a cumulative impact may occur where onshore wind farms are visible in succession with the offshore wind farms from a viewpoint that is relevant to the setting of an asset.

19.8.1 Construction, Operation and Decommissioning

19.8.1.1 Known Sites and Geophysical Anomalies

- 136 This assessment considers the potential for physical and setting cumulative impacts on sites, features and artefacts of cultural heritage interest associated with the proposed developments in the Outer Firth of Forth and Firth of Tay. Assessment of the physical processes relating to each development, as well as the wider region as a whole, has also been undertaken and assessed in support of this chapter (see Chapter 9: Physical Processes). In-combination impacts have not been considered as only the proposed offshore wind farms noted above are relevant to this assessment.
- 137 The predicted cumulative changes to sediment transport processes, wave climate, water level and tidal regime during the construction, operation and decommissioning of the Neart na Gaoithe development are considered to be low to negligible. Given these findings the potential for physical impacts on cultural heritage assets is low.
- 138 The predicted cumulative impacts on cultural heritage assets due to the Neart na Gaoithe development and other nearby developments are considered to be low to negligible, and therefore **not significant**.

19.8.1.2 Setting

- 139 The predicted cumulative impacts due to the Neart na Gaoithe development and other nearby developments (Inch Cape and the Firth of Forth Round 3 Zone 2) being seen in-combination in views are considered to be low to negligible, and therefore **not significant**, as this impact will be limited to more turbines being visible, rather than any greater loss of significance.

19.9 Monitoring

- 140 A WSI will be prepared for the offshore works to set out procedures for managing any features that appear to be of archaeological importance that are discovered in the course of construction works. The WSI will ensure compliance with the relevant legislation and will be finalised and agreed in consultation with the relevant regulator prior to construction works.

19.10 Summary and Conclusions

141 A desk based study and archaeological assessment of geophysical and geotechnical survey data have been carried out to identify potential cultural heritage assets that may be affected by the wind farm and to establish their current condition. This work also provided information upon which to base the assessment of archaeological potential. A summary of the assessment is presented in Table 19.28.

142 There are six known 'Live' wrecks and one unknown 'Live' seabed obstruction from the SeaZone/UKHO within the wind farm footprint (refer to Figure 19.3).

143 There are six wrecks from the NMRS data that have been accurately located by survey and eight anomalies of high archaeological potential within the offshore site. These sites correspond to those recorded in the SeaZone/UKHO records (refer to Figure 19.3).

144 There are seven anomalies of medium archaeological potential within the offshore site and one anomaly of medium archaeological potential identified within the wind farm 1 km buffer (refer to Figure 19.4).

145 There is one known 'Live' wreck from the SeaZone/UKHO records within the cable corridor (EA53). One site from the NMRS dataset (RP6) is located 350 m from this site. There is also a sidescan target of medium potential (EMU_004) within the buffered cable route corridor that could be associated with this wreck (refer to Figures 19.5 and 19.6).

146 The potential for the discovery of unrecorded cultural heritage assets is regarded as low.

147 The archaeological geotechnical assessment indicated that the potential for the presence of submerged prehistoric archaeology or deposits of palaeoenvironmental interest is low; however the presence of residual flints and lithic artefacts located within the marine sediments remains a possibility.

148 Potential construction impacts will be mitigated as far as possible through establishing exclusion zones, micro-siting and pre-construction seabed investigations.

149 Mitigation of potential impacts offshore will involve the development and enforcement of a WSI and PAD for any unexpected archaeological discoveries.

150 Any proposed mitigation measures are subject to approval by Historic Scotland.

151 Impacts upon the setting of two cultural heritage assets have been identified: Isle of May Priory and Old Lighthouse (SM 838 and 887 respectively). In both cases these have been assessed as being of minor significance. No mitigation is proposed in relation to these and the impacts will cease upon decommissioning.

152 Impacts from decommissioning are considered to be analogous to those during construction.

Source	Pathway	Receptor	Significance pre-mitigation	Mitigation	Significance post-mitigation	Cumulative/in-combination impact significance	Qualification of significance
Seabed preparation	Dredging / cable ploughing/ anchoring	Known wreck sites EA62, EA64, EA65, EA67, EA68 and EA70	Major Significance	Sites avoided; Exclusion zones established around sites; Anchor patterns will be designed to avoid known targets; and Archaeological reporting protocol to be established and followed during construction, operation and decommissioning.	Not Significant	Not Significant	
Seabed preparation	Dredging / cable ploughing/ anchoring	Known wreck sites EA53, EA63	Moderate Significance	Sites avoided; Exclusion zones established around sites; Anchor patterns will be designed to avoid known targets; and Archaeological reporting protocol to be established and followed during construction, operation and decommissioning.	Not Significant	Not Significant	
Seabed preparation	Dredging / cable ploughing/ anchoring	High potential geophysical targets EMU_0095, EMU_0098, EMU_0100, EMU_0106 and EMU_0413 High potential geophysical targets EMU_0199, EMU_0327, EMU_0384 and EMU_0413	Major Significance	Sites avoided; Exclusion zones established around sites; Anchor patterns will be designed to avoid known targets; and Archaeological reporting protocol to be established and followed during construction, operation and decommissioning.	Not Significant	Not Significant	
Seabed preparation	Dredging / cable ploughing/ anchoring	Medium potential geophysical targets EMU_004, EMU_0134, EMU_0177, EMU_0259, EMU_0262, EMU_0291, EMU_0294 and EMU_0367	Moderate Significance	Sites avoided; Exclusion zones established around sites; Anchor patterns will be designed to avoid known targets; and Archaeological reporting protocol to be established and followed during construction, operation and decommissioning.	Not Significant	Not Significant	
Wind turbine generators and offshore platforms	Turbine/platform height and layout in relation to the setting of onshore receptors	Isle of May Priory (SM838)	Minor Significance	None	Minor	Minor significance	Temporary in nature and will cease upon decommissioning of the Offshore Project
Wind turbine generators and offshore platforms	Turbine/platform height and layout in relation to the setting of onshore receptors	Isle of May Old Lighthouse (SM887)	Minor Significance	None	Minor	Minor significance	Temporary in nature and will cease upon decommissioning of the Offshore Project

Table 19.28: Receptor specific assessment output

19.11 References

- COWRIE, 2008. *Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy*. Commissioned by COWRIE Ltd (project reference CIARCH-11-2006).
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Appendices

Appendix 19.1: Maritime Archaeology and Cultural Heritage Technical Report

Appendix 19.2: Gazetteer and Concordance