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Note: This document is only a section of the Final Environmental Report

Scottish Marine Renewables SEA
Environmental Report Section C SEA Assessment: Chapter C11 Marine and Coastal Historic Environment

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Glossary & Abbreviations

AMAAA	The Ancient Monuments and Archaeological Areas Act
Archipelago	A chain or cluster of islands
Attenuation	Reduction in energy per unit area with distance from the source as a result of absorption, dispersion, scattering, etc
BP	Before Present
Cairns	A man-made pile of stones believed to act as way markers or to mark important sites.
DTI	Department of Trade and Industry
Fetch	The area of the surface of a water body over which a wind has blown in order to generate a wave
Hominid	Any member of the Hominidae biological family (“apes”) characterised by bipedal locomotion and relatively large brains (taxonomically); anthropologically, the term is used to mean humans and their close ancestors.
JCCC	The Joint Casualty and Compassionate Centre (JCCC)
JNAPC	The Joint Nautical Archaeology Policy Committee
Kilns	An oven like structure used for drying out, cooking or burning materials.
MCA	Maritime & Coastguard Agency
Mesolithic	A period of human development in the middle part of the stone age before the Neolithic and after the Palaeolithic during which advancements in human technologies were made.
Middens	A domestic waste heap.
MoD	Ministry of Defence
MSA	The Merchant Shipping Act
Nautical Miles	An internationally accepted unit of length used for maritime and aviation purposes. 1 Nautical Mile equals approximately 1852 metres.
Neolithic	A period in human development at the latter part of the stone age during which advancements were made in human technologies and agriculture.
NMRS	The National Monuments Record of Scotland
Nomadic	A lifestyle involving movement from place to place without taking permanent residence anywhere.
Palaeolithic	The initial period of human industrial development between 2.5 million years and 11,000 years ago (approximately). The period was characterised by the development of simple tools such as hand axes and flints tools.
PMRA	The Protection of Military Remains Act
PWA	The Protected Wrecks Act
RCAHMS	The Royal Commission on the Ancient and Historical Monuments of Scotland
Surf Zone	The region in which waves break
UNCLOS	The United Nations Convention on the Laws of the Sea
UNESCO	The United Nations Educational, Scientific and Cultural Organization.
WHS	World Heritage Sites

C11 Marine and Coastal Historic Environment

C11.1 Introduction

This chapter considers the effects on the marine and coastal historic environment in the areas identified as having the potential for wave or tidal stream energy extraction. It covers the effects of tidal and wave devices and their associated infrastructure such as foundations, anchors and cables. Effects on-shore from transmission lines and substations are covered in Chapter C21. Effects on the setting of Historic Gardens, Designed Landscapes and World Heritage Sites are covered in Chapter C19 Seascape Assessment.

Features of the historic environment provide an important physical link with the past. This chapter includes those aspects of the historic environment which may be affected including Scheduled Ancient Monuments (SAMs), Listed Buildings, Designated Wreck Sites, other wrecks, historic structures, coastal and submerged archaeology. These features are a finite and non-renewable resource, providing information about Scotland's cultural heritage and are valuable for education, leisure and tourism.

This section summarises key elements of the baseline historic environment. It then goes on to predict the likely effects on these aspects of the historic environment (marine and coastal). Possible methods for mitigating these effects are then highlighted, followed by a discussion of the likelihood of effects occurring. Finally, recommendations for monitoring the predicted effects are presented.

Figure C11.1 accompanies this chapter.

C11.2 Baseline Environment

The following baseline section covers the following aspects of the marine and coastal historic environment:

Marine Environment:

- Submarine Archaeological Remains
- Historic Environment – Wrecks

World Heritage Sites

Coastal Environment:

- Coastal Environment:
- Coastal Archaeological Remains
- SAMs
- Listed Buildings
- Related Designations

C11.3 Marine Baseline Historic Environment

The information presented in this sub-section is largely based on reports in the Strategic Environmental Assessments for Offshore Energy Licensing, for areas 4, 5, 6 and 7, prepared on behalf of the DTI by Fleming (2003, 2004, 2005), Wessex Archaeology (2005, 2006) and Wickham-Jones and Dawson (2006).

C11.3.1 Submarine Archaeological Remains

Submarine archaeological heritage is of considerable cultural importance internationally and nationally. The United Nations Convention on the Law of the Sea 1982 (UNCLOS 1982), the European Convention on the Protection of the Archaeological Heritage (Revised) 1992 (the Valletta Convention) and the UNESCO Convention on the Protection of the Underwater Cultural Heritage 2001(UNESCO 2001) all deal directly with such remains. UNCLOS 1982 was ratified by the UK in 1997. Article 303 stipulates that 'states have the duty to protect objects of an archaeological and historical nature found at sea and shall co-operate for this purpose' and provides for coastal states to exert a degree of control over the archaeological heritage to 24 nautical miles.

Under UK legislation various Acts exist which can be applied to protect submerged remains, whether these are fixed sites or wrecks, in territorial waters and these are discussed below. The Joint Nautical Archaeology Policy Committee (JNAPC) Code of Practice for Seabed Developers (JNAPC 2007) is a UK-wide code developed in conjunction with key industries. The JNAPC Code is voluntary but provides a framework that seabed developers can use in conducting their activities in an archaeologically sensitive manner. There is also a guidance note on protocols to deal with the marine historic environment developed specifically for the offshore renewable energy sector (Wessex Archaeology, 2007).

There is an interest in the finding, recording and preserving of remains dating from the earliest hominid advances into northern Europe up until the present day. Unusually, in terms of environmental impact, the discovery of submarine artefacts, when they are properly reported and when sites are subsequently preserved can be beneficial. "No environmental impact" can become "positive environmental impact", with benefits to the developer and to the wider community.

C11.3.2 Preservation and Discovery of Submarine Archaeological Remains

In order for archaeologists to find evidence of human (or hominid) presence in a region it is first necessary that such remains were initially present and that they have been preserved. Assuming the former (and a sea level rise since occupation), the optimum conditions (Flemming, 2004) for preservation of submarine archaeological sites include

- Very low beach gradient and offshore gradient so that wave action is attenuated and is constructional in the surf zone
- Minimum fetch so that wave amplitude is small, wavelength is short, and wave action on the seabed is minimum
- Original deposit to be embedded in peat, packed lagoonal deposits or sediments to give resistance and cohesion during marine transgression. Drowned forests and peat are good indicator environments
- Where deposits are in a cave or rock shelter, accumulated debris, roof falls, concretions, breccia, conglomerate formation and indurated wind-blown sand, all help to secure the archaeological strata
- Local topography contains indentations, re-entrants, bays, estuaries, beach-bars, lagoons, nearshore islands, or other localised shelter from dominant wind fetch and currents at the time of transgression of the surf zone
- Frozen ground or permafrost enclosing any archaeological deposits at time of inundation

Potential discovery "hot-spots":

- "Fossil" estuaries and river valleys
- The flanks of banks and ridges which have been proven to have peat layers, or which are likely to have peat layers
- Valleys, depressions, or basins with wetland or marsh deposits
- Nearshore creeks, mudflats, and peat deposits

- "Fossil" archipelago topographies where sites would have been sheltered by low-lying islands as the sea level rose
- Niche environments in present coastal zones, wetlands, intertidal mudflats, lochs, and estuaries
- Caves and rock shelters in re-entrant bays, fossil erosional shorelines, submerged rocky shores protected by other islands, or in archipelagos
- Deposits of sediments formed within, or washed into rocky gullies and depressions
- "Fossil" Coastal sites comparable by analogy to modern Inuit migratory sites, adjacent to sea ice, giving access to marine mammals as a food resource.
- Areas of permafrost containing archaeological deposits which were then inundated, and protected by other factors listed above.

Summarising the above, for evidence to be preserved at sites now underwater requires low energy in the flooding waters, ideally combined with protection of the remains by burial. Long term (i.e. to present day) preservation implies that any protective layer has remained, so that any artefacts are likely to be buried under stable sediments or enclosed in caves.

The conditions promoting subsequent discovery are:

- Low net sediment accumulation rate since initial burial so that the artefacts are not buried too deeply.
- No fields of sand waves or megaripples over the site.
- Ideally, a slight change in oceanographic conditions so that the site is being gently eroded to expose deposits. (This factor is sufficiently common in known sites to be a serious factor, and should not be regarded as an unlikely fluke).

It should be noted that the best conditions for preservation of archaeological remains are unlikely to be found in areas where tidal and wave energy resources are most likely to be exploitable; however, seabed surveys and infrastructure installations may reveal such sites. Areas where this is considered as most likely are discussed below.

C11.3.3 Types of Submarine Archaeological Remains

A summary of the types of prehistoric remains that could be found in the study area is presented in sub-sections C6.3.2.1 - C6.3.3.3. This information is important to note as it defines the sensitivity of receptors, thereby affecting the significance of predicted effects.

C11.3.3.1 Palaeolithic Remains (Preglacial >12,000 years BP)

While it is possible that early hominid and human (Palaeolithic) sites dating from before the last glaciation existed in the study region, as yet no evidence for them has been found. While elsewhere in the British Isles remains have been found dating from up to 700,000 yrs BP, it is probable that any sites in the study region dating from before the end of last ice age (11,000 to 15,000 yrs BP, marked by a gradual but continuous retreat of the Scottish ice cap) have been destroyed by glaciation. However, it is possible that remains exist within the continental shelf zone. Discoveries elsewhere in the British Isles suggest that any remain from this period are likely to take the form of hominid skeletal remains, flaked stone tools and animal bones showing signs of butchery or other working, The most favourable conditions for preservation of such remains are likely to be sediment filled caves. Such sites have been shown to be resistant even to glaciation. Sea caves are common on the current coastline in the study site, suggesting that they were also common in the past and thus might be found below the current sea level.

C11.3.3.2 Mesolithic Period Remains (Nomadic >5,000 years BP)

There is limited evidence for human activity in the study region from the end of the last glaciation up until 5000 yrs BP. There is; however, a record of intriguing finds from the North Sea, including a flint tool found in a core from the Viking Bank at the northern edge of the North Sea, equidistant between the Shetland Isles and Norway. It is likely that the whole exposed floor of the North Sea was visited by nomadic hunter-fisher-gatherers, although the majority of finds to date have been from the southern sector.

The distribution of Mesolithic finds in Scotland (e.g. Rum, Skye, Oban, Jura, Fife, Orkney) suggests that settlement, probably temporary in nature reflecting a predominantly nomadic culture, was likely to have been widespread away from regions of permanent ice cover. As sea levels have risen to the north and west of the study area, it is likely that many archaeological sites from this period are now underwater, at suggested depths of up to 190 m.

Types of remains from this period found at terrestrial sites within the study region include hut foundations, middens and tools. Sea cut caves may again present the best chance of submarine discoveries, dating from this period, in the study region. There is also the chance of finding remains in submerged glacial deposit, peat and forest layers and sediment filled coastal features.

C11.3.3.3 Neolithic and Late Pre-Historic (Settled >1,900 years BP)

By contrast to the Mesolithic period, there are many Neolithic (i.e. up to 3800 yrs BP), Bronze Age (up to 2800 yrs BP) and Iron Age (up to about 1900 yrs BP in southern Scotland with termination largely co-incident with the spread of Christianity) sites throughout Scotland, reflecting a similarity in settlement patterns, based on agriculture, throughout this period and into the Mediaeval. Known submerged sites in Britain include fish traps and weirs (among the first intentionally sub-marine artefacts) (James and James, 2003) and near shore settlements including postulated ceremonial sites such as henges. There is also the possibility of finding evidence for transport routes, either through complete or partial remains of trading vessels or their cargoes. In this context the oldest known remains of logboats (from the Netherlands) date as far back as 9000 yrs BP while remains in Britain and Ireland date back to late Mesolithic/early Neolithic. There is also abundant circumstantial evidence for offshore fishing and overseas trade during the Neolithic period.

C11.3.3.4 Historic (Post 1,900 years BP)

Sub-marine archaeology from the Roman occupation of Britain on is predominantly concerned with the search for, and preservation of, evidence of commerce and war. Finds (or known sites) range from single isolated items to virtually complete vessels and cargoes. While the nature of shipwreck, particularly prior to the 20th century, means that the majority of vessels are likely to have been broken up as a result of impact with coastal features, some items can be preserved even among the most adverse conditions. In particular metal ingots and artefacts and ceramic are resistant to destruction or relocation (except by a range of salvors), and can be found in extremely high energy environments. Where vessels have sunk in harbours or enclosed waters a considerable degree of preservation can result through burial, although such wrecks are likely to have been subject to some degree of looting. Further, throughout the period, and particularly during the 20th century a proportion of vessels (including aircraft) will have been lost through incidents not involving grounding (e.g. adverse weather, icebergs, human error, fire, enemy action). The locations of wreckage from such incidents are likely to be unknown or, at best, unsure; particularly in deep water or where smaller vessels were concerned. Designated wrecks are protected under a number of regulations, and such protection applies even where the current location is not known. Military aircraft remains are protected by the Protection of Military Remains Act 1986. Wartime wrecks may also contain munitions and while these are normally considered safe on the seabed they may become highly unstable or toxic on the surface. This aspect of submarine archaeology is considered in more detail elsewhere.

C11.3.3.5 Possibilities for Discovery

The possibility of finding evidence of prehistoric settlements within the study region is uncertain. It is highly likely that there was early occupation of Scottish coastal lands, but little systematic survey work has been undertaken with these site types in mind and no such remains have yet been found. However, there are some areas within the study region that are considered to be of particular interest as fulfilling all the requirements for possible archaeological sites:

Irish Sea/North Channel

The Irish Sea is unique among the North European shelf seas in that no submarine pre-historic sites are known. It appears highly probable that coastal areas, including parts of what is now the Irish Sea floor, were occupied during the Mesolithic and Neolithic periods. Conditions within Luce Bay appear most favourable for possible archaeological sites. This area may be impacted by tidal energy extraction off the Rhins and Barrow head and through cable laying operations.

Outer Hebrides and St Kilda

There are extensive prehistoric sites on the islands of the Outer Hebrides and of St Kilda from the Neolithic onwards. Additionally the now continental shelf was at times exposed out to near the 200 m contour (linking St Kilda to the mainland some 12,000 yrs ago, although there is no evidence for occupation at this early stage). The outer face of the Hebridean Archipelago and the St Kilda group are considered highly likely areas for preservation of sub-marine archaeological remains, particularly down to about 45 m. This area is of considerable interest for the extraction of wave and, locally, tidal energy, thus the possibility of discovering significant remains exists.

Shetland and Orkney Islands

Early retreat of ice from the northern islands (the first Scottish region uncovered), combined with either a land link (possibly via glaciated areas) or a short sea crossing from the exposed make the Shetland and Orkney Islands likely candidates for late Paleo- and early Mesolithic settlement. Again, considerable areas of current seabed were exposed and thus inundated sites are likely to have existed. This area is of considerable interest for the extraction of wave and, locally, tidal energy, thus the possibility of discovering significant remains exists.

C11.3.4 Historic Environment – Wrecks

C11.3.4.1 Ship and Aircraft Wreck Sites

By contrast to prehistoric settlement remains, wreck sites are common in the study region and may be found at all depths, although knowledge of what exists on the seabed is very low. Some have been accurately charted (particularly the more recent, accessible or historically significant sites), although this is by no means certain, and for deep sea wrecks fixes tend to represent the last known position.

While maritime activity is deduced from Mesolithic times onwards and there are written records of shipwrecks from Roman times on, the earliest known wreck site in the study region appears to be that of the Tobermory galleon (Tobermory Bay, Mull), dating from the Armada. There are a few known wrecks of wooden vessels in Scottish waters. Verifiable wreck sites become more common after the advent of the iron built ship, with a number of examples on the west coast of Scotland dating from the 19th century. However, the vast majority of wrecks in the study region date from the major conflicts of the twentieth century.

Wrecks in UK waters are the subject of a number of Acts of Parliament and International agreements designed to conserve, preserve or maintain ownership rights (frequently devolved to the Crown) over them.

C11.3.4.2 Wreck Laws

There are three main UK laws (incorporated directly into Scottish law) which apply specifically to shipwrecks: The Merchant Shipping Act (MSA) 1995, the Protection of Wrecks Act (PWA) 1973, and the Protection of Military Remains Act (PMRA) 1986 (Maritime and Coastguard Agency, 2007). The Ancient Monuments and Archaeological Areas Act (AMAAA) 1979, although mainly directed at terrestrial sites is the main piece of legislation regarding archaeological sites in general (Historic Scotland, 2007).

C11.3.4.3 Merchant Shipping Act 1995

All wreck material which comes from UK territorial waters, and any wreck which is landed in the UK from outside UK territorial waters must by law (Section 236 of the Merchant Shipping Act 1995) be declared to the Receiver of Wreck (MCA 2006). The term wreck is defined as anything which is found in or on the sea, or washed ashore from tidal water. All items which are raised, regardless of age or importance, must be reported to the Receiver of Wreck. Finders who report their finds to the Receiver of Wreck have salvage rights. The Receiver of Wreck acts to settle questions of ownership and salvage.

This part of the 1995 Merchant Shipping Act is administered by the Maritime & Coastguard Agency (MCA) through the Receiver of Wreck (Maritime and Coastguard Agency, 2007).

C11.3.4.4 Protection of Wrecks Act (PWA) 1973

The PWA is a UK wide piece of legislation that enables the Secretary of State to protect wreck sites from unauthorised interference. The Act is divided into two broad categories, Section 1 and Section 2.

Section 1 is designed to protect wrecks which are of historic, archaeological or artistic importance. The PWA Act creates a protected area around a central point. Within the protected area, it is an offence to carry out certain activities (including diving) without a licence. This section of the Act is administered, in Scotland, by Historic Scotland on behalf of Scottish Ministers.

Section 2 of the Act is designed to prevent harm to the public. Under it vessels may be designated as being dangerous by virtue of their contents. There is a strict no entry policy. This is in the interest of safety of both divers and members of the public. This section of the act is administered by the MCA through the Receiver of Wreck.

There are six wrecks (Table C11.1) currently protected under the PWA (Part 1) off the Scottish coast within or near the study area. No Scottish wreck sites are listed under part 2 of the Act. (MCA 2006)

Table C11.1: Wrecks Protected Under the PWA (Part 1)

Site Name	Date of Wreck	Date of Designation	Position	Exclusion Zone
Dartmouth	1690	11-Apr-1974 Re-designated 25-Jun-1992	Sound of Mull, Argyll and Bute 56 30 11N 05 41 57W	50m
Kennemerland	1664	01-Jun-1978	Out Skerries, Shetland 60 25 30N 00 45 00W	250m
Wrangels Palais	1687	18-Aug-1990 Re-designated 10-Jan-1991	Out Skerries, Shetland 60 25 30N 00 43 16.2W	100m
Duart Point Wreck	1653	15-May-1992	Sound of Mull, Argyll and Bute 56 27 27N 05 39 19 W	75m
Mingary Castle Wreck	C17th	19-Aug-2000	Sound of Mull, Argyll and Bute 56 41 30N 06 04 21 W	250m
Kinlochbervie Wreck	Early C17th	29-Jun-2001	Kinlochbervie, Sutherland 58 26 12N 05 06 25W	100m

C11.3.4.5 Protection of Military Remains Act 1986

The Protection of Military Remains Act (PMRA), administered by the Ministry of Defence deals, with military remains of both aircraft and ships.

All military aircraft lost on active service are automatically designated under this legislation as “All crashed British aircraft in the UK or its coastal waters are deemed Crown property, all Luftwaffe crash sites are considered captured property surrendered to the crown, and for US aircraft the Ministry of Defence (MoD) acts as the representative for the US government.” This protection does not require that human remains are present in the wreck. The Joint Casualty and Compassionate Centre (JCCC), part of the Armed Forces Personnel Administration Agency based at RAF Innsworth, is responsible for a number of issues relating to aircraft crash sites. They respond to inquiry into historical records concerning RAF casualties and deal with proposed excavations or interference with aircraft wreck sites. Proposed excavations of, or interference to military aircraft crash sites require a licence issued by the JCCC. This licence will normally only be issued when the MoD can demonstrate that no human remains or unexploded ordnance are in, or associated with, the wreckage. (Ministry of Defence, 2007).

Military wrecks may be designated under this Act either as a Protected Place (for vessels lost after the 4th August 1914) or as a Controlled Site (for wrecks up to 200 years old). The MoD can designate named vessels as Protected Places even if the position of the wreck is not known. Divers may visit a Protected Place on a "look but don't touch" basis. Divers are prohibited from visiting Controlled Sites. There are currently 4 wrecks listed as Controlled sites in the relevant Scottish Waters (MCA 2006, Table C11.2).

Table C11.2 Wrecks Listed as Controlled Sites in Scottish Waters

Site Name	Place	ERA	History
HMS Dasher	Strathclyde	WWII	The escort aircraft carrier HMS Dasher was destroyed by an internal explosion in the Firth of Clyde on March 27th 1943. While engaged in deck/landing operation training, the Dasher suffered an aviation gasoline explosion as a result of which she sank within 3 minutes with the loss of 379 lives. No absolute cause was determined at the time.
HMS Hampshire	Off Marwick Head, Orkney	WWI	The armoured cruiser HMS Hampshire was detached from the Grand Fleet for the special duty of conveying Lord Kitchener and his staff to Russia. She left the Scapa Flow on 5th June 1916. A gale rendered her destroyer escort useless as the returned to Scapa. HMS Hampshire carried on alone. At about 7:40pm she hit a mine and sank within 15 minutes. Of her compliment of 655 men and 7 passengers only 12 men survived. Lord Kitchener and his staff all perished.
HMS Vanguard	Scapa Flow, Orkney	WWI	The battleship HMS Vanguard served with the grand fleet during WWI until the time of her destruction. On July 9th 1917, whilst at anchor in the Scapa Flow, she blew up, killing all but 3 of her compliment of 670. No cause for the explosion was ascertained.
HMS Royal Oak	Scapa Flow, Orkney	WWII	The battleship HMS Royal Oak was with the Home Fleet at Scapa Flow. On the morning of the 13th October 1939, the ship was laying at anchor at the extreme end of the harbour at Scapa, when she was struck by a salvo of torpedoes from a U-Boat which had managed to penetrate the incomplete coastal defences and attack the battleship. Of her compliment of 1,234 men and officers 833 lost their lives.

C11.4 World Heritage Sites

The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world. There are two World Heritage Sites (WHSs) within the study area; St. Kilda and the Heart of Neolithic Orkney.

St.Kilda is protected as a World Heritage Site because of the quality of archaeological remains and natural heritage located both on land and underwater. St. Kilda which is 40miles west of Benbecula in the Outer Hebrides is made up of 8 small islands, the largest of which is Hirta. Uninhabited since 1930 it is likely that St Kilda was once linked to mainland Scotland as it bears the evidence of more than 2,000 years of human occupation. St. Kilda contains built structures and field systems, including cleits and traditional Highland stone houses.

The Heart of Neolithic Orkney located on West Mainland of Orkney consists of a large chambered tomb (Maes Howe), two ceremonial stone circles (the Stones of Stenness and the Ring of Brodgar) and a settlement (Skara Brae), together with a number of unexcavated burial, ceremonial and settlement sites. The group constitutes a major prehistoric cultural landscape which gives a graphic depiction of life in this remote archipelago in the far north of Scotland some 5,000 years ago.

C11.5 Coastal Baseline Historic Environment

There are a vast number of archaeological remains and sites located within the coastal area of the SEA study area. These include SAMs, which are of national importance and are afforded protection under the Ancient Monuments and Archaeological Areas Act 1979, and sites of regional and local importance. All sites and remains identified to date are recorded in the National Monuments Record of Scotland which is maintained by the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS).

C11.5.1 Scheduled Ancient Monuments

The Ancient Monuments & Archaeological Areas Act 1979 provides for the scheduling of 'monuments'. These include buildings, structures or work, cave or excavation, vehicle, vessel, aircraft or other movable structures. In order to be eligible for scheduling, a 'monument' must be of national importance.

The Act, which is administered by Historic Scotland, primarily deals with terrestrial locations but there is provision to designate submarine sites (e.g. buildings, structures, works, caves and excavations) in territorial waters as SAMs if they are of national importance. Once a monument has been scheduled, visiting or diving on the site is not necessarily restricted but it is an offence to demolish, destroy, alter or repair the monument without prior authorisation, in the form of Scheduled Monument Consent. It is likely that any prehistoric site discovered in Scotland's territorial waters would rapidly receive designation as a Scheduled Monument.

SAMs are of greatest relevance to this study where they occur in coastal locations. For example the Light Cruisers: Brummer; Dresden; Karlsruhe; and Koln, along with the Battleships: Konig; Kronprinz Wilhelm; and Markgraf of the German High Seas Fleet, that were all scuttled at Scapa Flow, Orkney, on 21st June, 1919 are protected under the Act.

The SEA study area contains 2911 SAMs within 5km of the coast and 647 SAMs within 1km of the coast. Table C11.3 lists the number of SAMs within 5km of the coast within each potential development area. The SAMs include forts, burial grounds, castle churches, standing stones, tombs, chambered cairns ice houses, brooches mounds duns, hut circles, settlements, cup and ring marked rocks, cottages, farmsteads and kilns.

Table C11.3: SAMs within 5km of the Coast

SEA Development Area	Number of Sites
Northern Isles (Shetland and Orkney)	720
North Coast/Western Scotland and Inner Isles	716
Outer Isles	No data
Western Isles	213
Argyll and Bute	875
North Channel and Solway Firth	312

The SAMs listed above generally have a scattered distribution along the coast of each of the potential development areas. The areas demonstrating the greatest amount of clustering is the Northern Isles (Orkney and Shetland). Here concentrations of SAMs can be seen in certain coastal locations.

C11.5.2 Coastal Archaeological Remains

The DTI Oil and Gas SEAs 4 and 6 both contain substantial information about the historic marine and coastal environment of Scotland. A discussion of the potential for prehistoric submarine remains was presented earlier in this chapter. Table C11.4 provides a summary of the potential for prehistoric coastal remains. The information presented in this table is based on the DTI Oil and Gas SEA 6 Archaeological Report by Wessex Archaeology and the National Monuments Register of Scotland (NMRS).

Table C11.4: Potential Coastal Prehistoric Remains

Development Area (SEA)	Location	Description
Northern Isles	**Shetland**	845 recorded coastal archaeological sites on or extremely close to the shore of which 181 are prehistoric (earlier than 2000 years BP) and 37 sites date to 6000-5000 years BP. The percentage of prehistoric sites is 21%. Mousa, on the coast has one of the tallest standing broochs (circular tapering tower stands at 13m).
	Orkney	744 total recorded coastal sites, of which about 150 are classified as belonging to various ranges of early millennia such as "4th to 3rd millennium BC" etc. Because of the overlap of these brackets, there is a risk of double counting. Approximately 40 sites date to the 1st millennium BC, 20 to the 2nd millennium, 70 to the 3rd millennium, and 20 to the 4th millennium. The percentage of coastal sites which are prehistoric is about 20%. Amongst the most dramatic structures are two houses at Knap of Howar on Papa Westray, Skara Brae on the Bay of Skaill, the Broch at Midhowe, and the burial tombs on Holm of Papa Westray.
Western Isles	**The Outer Hebrides (Lewis to Barra)**	With 1907 recorded coastal archaeological sites, of which 19 are Iron Age, 8 Bronze Age, 10 Neolithic, and 202 broadly classified as Prehistoric. This makes a total of 239 prehistoric sites, or 12%. Neolithic archaeological sites are frequent on land and provide an indication of the submerged landscape, especially for the earlier periods. There are a total of 6816 entries in the NMRS for the Western Isles. The greatest numbers of entries are recorded for Lewis and Harris (5393 in total). North Uist and South Uist have 656 and 518 respectively.
	Baleshare	The small tidal island off the west coast of north Uist has had many archaeological sites recorded, particularly along the coast.
Inner Isles	**Rum**	Excavations of revealed post-holes for dwellings, traces of fire, and over 140,000 pieces of bone, stone tools and waste materials. The stone tools included arrowheads, scrapers, awls, blades and flakes. Hazelnut shells found in hearth sites dated to 8500 radiocarbon years BP, older than any other site in Scotland.
	Skye	Up to 1794 (33%) of the 5385 records in the NMRS for the Inner Isles relate to archaeological remains identified on Skye.
	Inner Sound	Scotland's first settler's project recorded 198 sites around the inner sound, 129 of which were previously unknown. There is potential for archaeological remains associated with submerged landscapes along the Applecross coastline and the west coasts of Raasay and Rona.
	Eigg, Muck, Rum and Canna	Rum is especially valuable with regard to its historical archaeological remains. Sites have survived with little deterioration and a unique, well preserved (sometimes eccentric) suite of archaeological sites have been found.
Inner Isles/North Coast	**West Coast of Scotland: Kintyre to Cape Wrath**	There is a potential for submerged prehistoric sites where favourable conditions combine with areas of shallower water and protected bays and inlets particularly to the south.
North Coast	**North Sutherland**	On the mainland north coast there are 498 recorded coastal sites in total, of which only 13 are recorded as prehistoric, with promontory forts, cairns, shell mounds, and some cave sites. The percentage of coastal sites which are prehistoric is about 3%.
Argyll and Bute	**Mull, Tiree and Coll**	There have been many archaeological sites recorded in these locations, but there has been a lack of detailed archaeological work
	Islay and Jura	The islands contain many archaeological sites. The seabed between the islands is regarded as having a particular potential of early archaeological remains

C11.5.3 Listed Buildings

Certain buildings of historic interest or architectural importance are designated as Listed Buildings under the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. Historic Scotland, on behalf of the Scottish Ministers, compiles lists of these buildings and in assessing which buildings to list, considers a range of criteria, including;

- individual merit of the building and its relationship to other buildings
- the buildings role in a streetscape or landscape
- works of important architects
- major connections with historical figures or events
- age or rarity or because they represent an influential design concept or use of materials as landmark
- buildings dominating a landscape
- for a more modest role in forming a group which characterise a particular regional style
- use of materials which help to retain a sense of local identity

They are assigned to one of three categories depending on relative importance:

Category A - Of national or international importance either historic or architectural, or fine little-altered examples of a particular period, style or building type

Category B - Of regional or more than local importance, or major examples of a particular period, style or building type which may have been altered

Category C(S) - Of local importance, lesser examples of any period, style or building type, as originally constructed or altered; and simple, traditional buildings grouped well with other in categories A and B or part of a planned group such as an estate or industrial complex

Listed Buildings are located in coastal areas and as such there is the potential for direct impacts from cable laying activities. At a project level it will be important to avoid such buildings. Listed buildings are distributed throughout the study area.

C11.5.4 Related Designations

Often overlapping with Listed Buildings, the Inventory of Gardens and Designed Landscapes identifies significant gardens/landscapes which are protected under the GDP Order, part of the Town and Country Planning Act (1992). Gardens and designed landscapes included in the Inventory are considered to be of national importance. Baseline information and potential effects on Gardens and Designed Landscapes are discussed in Section C19: Seascape Assessment.

Local Authorities are responsible for the identification and designation of Conservation Areas; areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance.

Conservation Areas can include:

- building groups, where the whole is more than the sum of the parts
- visible archaeology, such as historic street, plot layouts, and town walls
- important set pieces of public realm (squares, railings, setted street surfaces)
- trees, rivers, lades, for both amenity and cultural value
- open spaces, public parks, designed gardens and landscapes
- places of memory, such as the Culloden battlefield
- generally occur in settlements and as a result coastal impacts from marine renewable infrastructure is not expected to affect such areas

Conservation Areas are of limited relevance to this study as the vast majority exist in built areas; where the impacts of devices and associated infrastructure are highly unlikely to occur. As a result, this study does not consider effects on such designations.

There is however the potential for Conservation Areas to be designated out with settlements, for example in locations considered as important 'places of memory'. At the project level it is therefore important to be aware of the effects on such sites and on their setting.

C11.6 Potential Key Effects

The potential key effects have been identified in terms of the effect of device installation and operation on the marine and coastal historic environment. The potential for damaging a historic site is, in part, related to the ease of finding it. Recent, metal built wrecks (including aircraft, if intact) are likely to be reasonably detectable. Older, wooden vessels vary from scattered but ordered sites often with buried artefacts and hull structure, to scattered but disordered sites where only selective survival of durable artefacts has transpired. Remains of prehistoric settlement sites are likely to consist of scattered artefacts or structures (often semi-natural) buried beneath considerable layers of sediment. In the latter case recognition is likely to be a major problem. Similarly, the effects on coastal archaeological remains will also be influenced by the ease of their detection. This can be significantly improved by examining existing records to identify key hotspots or areas of archaeological potential.

The following is a description of the potential effects that the installation and operation of wave and tidal devices could have on marine and coastal historic remains if intersected. A summary of the potential key effects is presented in Table C11.5.

C11.6.1 Installation Effects

C11.6.1.1 Effects on Submarine Archaeological Remains

During installation of devices and cables, submarine historic sites and remains in the vicinity of installation operations could be impacted in the following ways:

Major operations (piling, dredging, placing structures on seabed)

There is a potential for significant impact causing destruction of sites and artefacts, both surface and buried. Suitable pre-installation surveys are required to obviate this possibility. Siting of structures on rocky substrates would avoid this possibility.

Displacement/dumping of waste material

While most dumped material is unlikely to cause damage to any but the most fragile artefacts, there is a risk of damage when large fragments are displaced. Displaced sedimentary material might bury a site delaying or preventing discovery.

Cable laying operations (trenching)

There is a potential for impact, causing damage to sites and destroying artefacts, along the line of trenches.

Exploratory operations (coring)

There is possibility of damaging artefacts. Cores should be inspected for presence of archaeological material.

C11.6.1.2 Effects on Coastal Archaeological Rmains

Cable laying operations (trenching)

There is a potential for impact, causing damage to sites and destroying artefacts, along the line of trenches. Trenching systems should, if possible, be designed to allow recognition of artefacts.

Installation of onshore wave devices

There is potential that the installation of onshore devices could lead to the disturbance or destruction of coastal archaeological features through excavation and construction activities. This is of particular relevance for remains that exist in high energy environments or sea caves in exposed coastal locations. Onshore devices could also have adverse effects on the setting of historic sites and features, listed buildings or conservation areas.

Substations and grid connection

The potential effects on coastal archaeological remains associated with substations and grid connections (e.g. damage or destruction of sites/remains, effects on setting of historic features, listed buildings or conservation areas) are discussed in Chapter C21.

C11.6.2 Operation Effects

C11.6.2.1 Effects on Submarine Archaeological Remains

Energy extraction/flow changes

Changes in tidal flow or wave energy could have beneficial effects on historic remains or sites where changes in sedimentation patterns lead to sites or remains being exposed, increasing opportunities for their discovery.

C11.6.2.2 Effects on Coastal Archaeological Remains

Once installation is complete there will be no further requirements for excavations or trenching, therefore there will be no further potential for the disturbance or destruction of coastal remains.

Table C11.5: Potential Effects – Marine and Coastal Historic Environment

Effect	Development Phase	Direct/Indirect	Duration	Extent
Marine Environment				
Major operations	CD	Direct	Permanent	Within disturbed area
Displacement/dumping of waste material	CD and CC	Indirect	Temporary to permanent	Within disturbed area
Cable laying	CC	Direct	Permanent	Within disturbed area
Exploratory coring	CD	Direct	Permanent	Within disturbed area
Energy extraction	OD	Indirect	Permanent	Unknown
Coastal Environment				
Cable laying	CC	Direct	Permanent	Within disturbed area
Onshore Device Installation	DC	Direct	Permanent	Within disturbed area and setting of protected sites, listed buildings, conservation areas
Substations and grid connection	See Chapter C21			

CD = Construction of Devices
CC = Construction of Cables
OD = Operation of Device
OC = Operation of Cables

C11.7 Sensitivity

C11.7.1 Submarine Archaeological Remains

In general the earlier a site is the more important it is likely to be. Any settlement site remains dating from the Palaeolithic or Mesolithic periods will be therefore be highly sensitive to any level of interference or damage. Remains dating from the later prehistoric periods are less likely to represent a unique contribution to archaeological knowledge; however, they will still be of importance and of high sensitivity to the potential effects identified previously. Similarly any examples of wooden ships or smaller vessels, particularly if well preserved, would be extremely valuable. The legal protections offered to military wrecks (ship and aircraft) indicate both their cultural significance (often as war graves) and their potential hazards.

C11.7.2 World Heritage Sites

World Heritage Sites are sites or areas of educational, cultural and nature heritage that are of international importance. World Heritage Sites will be highly sensitive to any level of damage or interference.

C11.7.3 Coastal Archaeological Remains

The importance of coastal archaeological remains, and therefore their relative sensitivity to the effects identified previously, is depicted by the level of protection afforded to them. SAMs are legally protected under the Ancient Monuments and Archaeological Areas Act 1979 for virtue of their national importance. These sites will therefore be highly sensitive to any level of interference or damage. Sites of local and regional importance, recorded on the NMRS, although not having been identified as requiring protection under the Act, still provide a valuable contribution to our knowledge and understanding of the historic environment. These sites and remains will therefore be moderately sensitive to interference or damage. The grade of listed building, which is based upon its importance, will determine the level of sensitivity to potential effects. Generally the higher the grade attributed to the building (e.g. Category A), the higher the level of sensitivity.

C11.8 Significance

The assessment of effect significance has been undertaken based on the criteria below. These have been developed specifically for the SEA, and take into account the information available to inform the assessment of significance. Due to the strategic nature of this assessment, it has not been possible to quantify magnitude of impacts, and the assessment of significance is therefore based primarily on the sensitivity and importance of receptors, as described in Table C11.6 below.

Table C11. 6: Significance Assessment Criteria – Marine and Coastal Historic Environment

Significance Level	Determining Criteria
Major	▪ Effect would lead to the destruction of a site or remains ▪ Interference, damage or destruction of a World Heritage Site ▪ Damage or destruction to a Scheduled Monument ▪ Damage or destruction to prehistoric submarine remains ▪ Damage or destruction of PMRA (Protection of Military Remains Act) site ▪ Damage or destruction of PWA (Protection of Wrecks Act) site ▪ Damage or destruction of a remains/site that warrants protection after discovery ▪ Damage or destruction of a remains/site where no other examples are known
Moderate	▪ Disturbance of or interference with a Scheduled Monument, prehistoric submarine remains, PMRA site or PWA site ▪ Damage or destruction of unprotected wreck sites ▪ Damage or destruction of a coastal site of local or regional importance (NMRS) ▪ Damage or destruction of a site where other examples are known
Minor	▪ Disturbance or interference with a unprotected wreck site ▪ Disturbance or interference with a site of local or regional importance (NMRS) ▪ Minor damage to remains or sites where examples are known from a region

The possibility of the presence of archaeological remains is an important factor in the planning application process, thus: “Investigation of submerged and buried land surfaces, settlements, boats, aircraft, ships, harbours and quays can open windows to a past that would be lost if their archaeological remains go unrecorded. Increased understanding of cultural material from both the inter-tidal zone and deep water can feed directly into heritage and education initiatives and plays an important role within the planning system. Once destroyed, these important archaeological remains are lost forever and the nation has a responsibility to preserve these intact, or by record, for current and future generations” (Crown Estate 2007).

Discovery of archaeological remains presents both a risk and an opportunity for the developer. Correctly handled such finds can lead to preservation of important sites and to improved public relations. Good initial surveys, carried out with the involvement of archaeological experts facilitate this.

C11.8.1 Results of Potential Effect Significance without Mitigation

It should be noted that that the assessment of significance has been undertaken at a strategic level. The significance of impacts on the historic environment has been determined by creating a buffer drawn around areas that are considered likely to contain important sites or areas where protected sites already exist. The measures of significance are based on the potential adverse effects that would occur without mitigation, unless stated otherwise.

Table C11. 7: Potential Significance of Effects – Marine and Costal Historic Environment

Potential Effects	Device Characteristics	Development Phase	Receptor	Potential Significance of Effects	Likely Impact Extent	Source	Confidence
Submarine Historic Environment							
Major operations	Wave and Tidal	CD	Submarine prehistoric remains Wreck sites WHS (St Kilda)	Major	Within disturbed area	Expert knowledge and experience	High
Displacement/dumping of waste material	Wave and Tidal	CD and CC	Submarine prehistoric remains Wreck sites WHS (St Kilda)	Moderate	Within disturbed area	Expert knowledge and experience	Low
Cable laying	Wave and Tidal	CC	Submarine prehistoric remains Wreck sites WHS (St Kilda)	Major	Within disturbed area	Expert knowledge and experience	High
Exploratory coring	Wave and Tidal	CD	Submarine prehistoric remains Wreck sites WHS (St Kilda)	Moderate to Major	Within disturbed area	Expert knowledge and experience	Medium
Energy extraction	Wave and Tidal	OD	Submarine prehistoric remains Wreck sites WHS (St Kilda)	Minor (beneficial)	Unknown	Expert knowledge and experience	Low
Coastal Historic Environment							
Cable laying	Wave and Tidal	CC	SAMs NMRS recorded sites Listed Buildings	Moderate to Major	Within disturbed area	Expert knowledge and experience	High
Onshore Device Installation	Wave and Tidal	CD	Prehistoric remains SAMs NMRS recorded sites Listed Buildings	Major	Within disturbed area	Expert knowledge and experience	Low
Substations and Grid Connection	See Chapter C21						

CD = Construction of Devices
CC = Construction of Cables
OD = Operation of Device
OC = Operation of Cables

C11.9 Mitigation Measures

By the nature of many sub-marine archaeological sites, particularly in a context where no known examples of a particular type of site exist in the study area, it is impossible to predict where they may occur. Accordingly, the main measure to mitigate the possibility of adverse impact to new sites is through adherence to the principals of the JNAPC code (2007).

Initial surveys and intrusive works should be carried out in full consultation with experts in both sub-marine and coastal/terrestrial archaeology and methods employed which, as far as possible, maximise the chance of finding new sites. Where possible, disturbed seabed material should routinely be checked for the presence of artefacts. There is a legal obligation to report submarine finds to the appropriate authorities (normally the Receiver of Wreck in the first instance).

Wessex Archaeology (2007) has published a full protocol for reporting discoveries of possible archaeological interest, in consultation primarily with the wind farm industry. This protocol is relevant to marine renewable energy development.

In case of discovery of archaeological sites the preferred outcome is to leave them in-situ. Thus flexibility should be built into planning so as to be able to avoid sites.

Table C11.8 summarises standard mitigation measures that could be applied to avoid, reduce or offset the level of significance of the predicted effects.

Table C11.8: Mitigation Measures – Marine and Coastal Historic Environment

Effect	Development Phase	Standard Practice Mitigation
Submarine Historic Environment		
Major operations	CD	▪ Follow Crown Estates 2007 JNAPC code of conduct and guidance note for the offshore renewable energy sector. ▪ Involve Archaeologists at site survey stage ▪ Carry out seabed investigations in preferred site locations prior to device installation ▪ Avoid exclusion zones for protected sites ▪ Report unusual objects
Displacement/dumping of waste material	CD and CC	
Cable laying	CC	
Exploratory coring	CD	
Energy extraction	OD	
Coastal Historic Environment		
Cable laying	CD	▪ Consult with Historic Scotland and RCAHMS at site survey stage ▪ Carry out field walkovers in preferred site locations to determine need for site investigations (geophysical surveys/trial trenching) ▪ Employ a watching brief during installation to aid identification of archaeological remains in disturbed materials ▪ Avoid protected sites ▪ Report unusual objects
Onshore Device Installation	CD	

CD = Construction of Devices
CC = Construction of Cables
OD = Operation of Device
OC = Operation of Cables

C11.10 Likelihood of Occurrence

Areas identified as most likely for submarine pre-historic sites and artefacts are:

- West of Outer Hebrides and vicinity of St Kilda group to about 50 m depth
- West of Orkneys group and Shetland group to 190 m depth
- Sediment filled sea caves, submerged glacial deposits, submerged peat and forest layers, sheltered sea lochs and areas of thick sediment throughout the study area
- Remains of wrecks of wooden vessels may be found anywhere in the study regions. Well preserved remains with hull structure present are only likely to be found in zones where abundant sediment exists
- Wartime vessel and aircraft wrecks may be encountered throughout the study region, but particularly in the approaches to the Clyde and Irish Sea. Metal remains may exist in high energy environments

Areas identified as most likely for coastal historic sites and artefacts are:

- West coast of Shetland and Orkney - concentrations
- Scattered distribution along all coastal areas
- Increased concentrations around Argyll and Bute, North Channel and Solway Firth

C11.11 Confidence and Data Gaps

Table C11.9 below summarises the current data gaps requiring further research/investigation in order to assign greater confidence to the assessment of potential effect significance.

Table C11. 9: Data Gaps – Marine and Coastal Historic Environment

Data Gap	Potential to Fill Data Gap	Priority
Pre-historic archaeological remains	Seabed survey	Project specific
Wreck sites	Seabed survey	Project specific

C11.12 Residual Effects (Significance of Effects with Mitigation)

Table C11.10 below, identifies the likely residual effects on the marine and coastal historic environment taking into account the mitigation measures identified above. The level of confidence in this assessment is also provided. An overview of these effects in relation to each of the development areas is provided in substation C11.13.

Table C11. 10: Potential and Residual Significance of Effect – Marine and Coastal Historic Environment

Potential Effects	Device Characteristics	Development Phase	Receptor	Potential Significance of Effects (without Mitigation	Standard Practice Mitigation	Likelihood of Occurrence	Residual Significance of Effects with Mitigation	Confidence
Submarine Historic Environment								
Major operations	Wave Tidal	CD	Prehistoric remains Wreck sites WHS (St Kilda)	Major	See Table C11..7	Low	**Negligible to Minor**	High
Displacement/ dumping of waste material	Wave Tidal	CD and CC	Prehistoric remains Wreck sites WHS (St Kilda)	Moderate	See Table C11.7	Low	**Minor**	Low
Cable laying	Wave Tidal	CC	Prehistoric remains Wreck sites WHS (St Kilda)	Major	See Table C11..7	Low	**Minor**	High
Exploratory coring	Wave Tidal	CD	Prehistoric remains Wreck sites WHS (St Kilda)	Moderate to Major	See Table C11.7	Low	**Minor**	Med
Energy extraction	Wave Tidal	OD	Prehistoric remains Wreck sites WHS (St Kilda)	Minor (beneficial)	See Table C11.7	Low	**Minor beneficial**	Low
Coastal Historic Environment								
Cable laying	Wave Tidal	CD	SAMs NMRS sites Listed Buildings	Moderate to Major	See Table C11.7	V Low	**Negligible**	High
Onshore Device Installation	Wave Tidal	CD	Prehistoric remains (Maine and Coastal) SAMs NMRS sites Listed Buildings	Major	See Table C11.7	Low	**Minor**	High

CD = Construction of Devices
CC = Construction of Cables
OD = Operation of Device
OC = Operation of Cables

C11.13 Monitoring

Table C11.11 below provides a summary of key monitoring requirements that could be developed to improve the understanding of the effects of marine devices on the submarine and coastal historic environment.

Table C11. 11: Monitoring Requirements

Phase	Monitoring Requirement
Submarine Historic Environment	
Construction of marine devices	• Pre-installation surveys should be carried out in co-operation with archaeologists

References

Ashmore, P., & Dawson, T. (2002) A Strategy for Scotland's Coasts and Inshore Waters. Scottish Coastal Forum

Ed. Dawson, T., (2003) Coastal Archaeology and Erosion in Scotland - Conference Proceedings

Crown Estate 2007 Maritime Cultural Heritage & Seabed Development JNAPC Code of Practice for Seabed Development.
http://www.thecrownestate.co.uk/jnapc_code_of_practice.pdf

Flemming N C 2003 The scope of Strategic Environmental Assessment of Continental Shelf Area SEA4 in regard to prehistoric archaeological remains

Flemming N C 2004 The scope of Strategic Environmental Assessment of Continental Shelf Area SEA5 in regard to prehistoric archaeological remains

Flemming N C 2005 The scope of Strategic Environmental Assessment of Continental Shelf Area SEA6 in regard to prehistoric archaeological remains

Historic Scotland 2007, Protecting underwater sites of national significance, http://www.historic-scotland.gov.uk/wrecks

James H. and T. James 2003 Fish weirs on the Tâf, Towy and Gwendraeth estuaries, Carmarthenshire.

The Carmarthenshire Antiquary, Vol.39
http://www.terra-demetarum.org.uk/Fish_weirs/fish_weirs.htm

Maritime and Coastguard Agency 2007
http://www.mcga.gov.uk/c4mca/mcga-environmental/mcga-dops_row_receiver_of_wreck.htm

Ministry of Defence 2007 Aviation Archaeology
http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/Personnel/AFPAA/AviationArchaeology.htm

Wessex Archaeology 2005 Strategic Environmental Assessment SEA 6: Irish Sea Maritime Archaeology Technical Report Ref: 58890

Wessex Archaeology 2005 Protocol for reporting finds of archaeological interest
http://www.wessexarch.co.uk/projects/marine/bmapa/protocol_documentation/protocol_text.pdf

Wessex Archaeology 2006 Strategic Environmental Assessment SEA 7 Maritime Archaeology Technical Report Ref: 62170.02

Wessex Wessex Archaeology 2007 Historic Environment Guidance for the Offshore Renewable Energy Sector

Wickham-Jones CR & S Dawson 2006 The scope of Strategic Environmental Assessment of North Sea Area SEA7 with regard to prehistoric and early historic archaeological remains

Figures

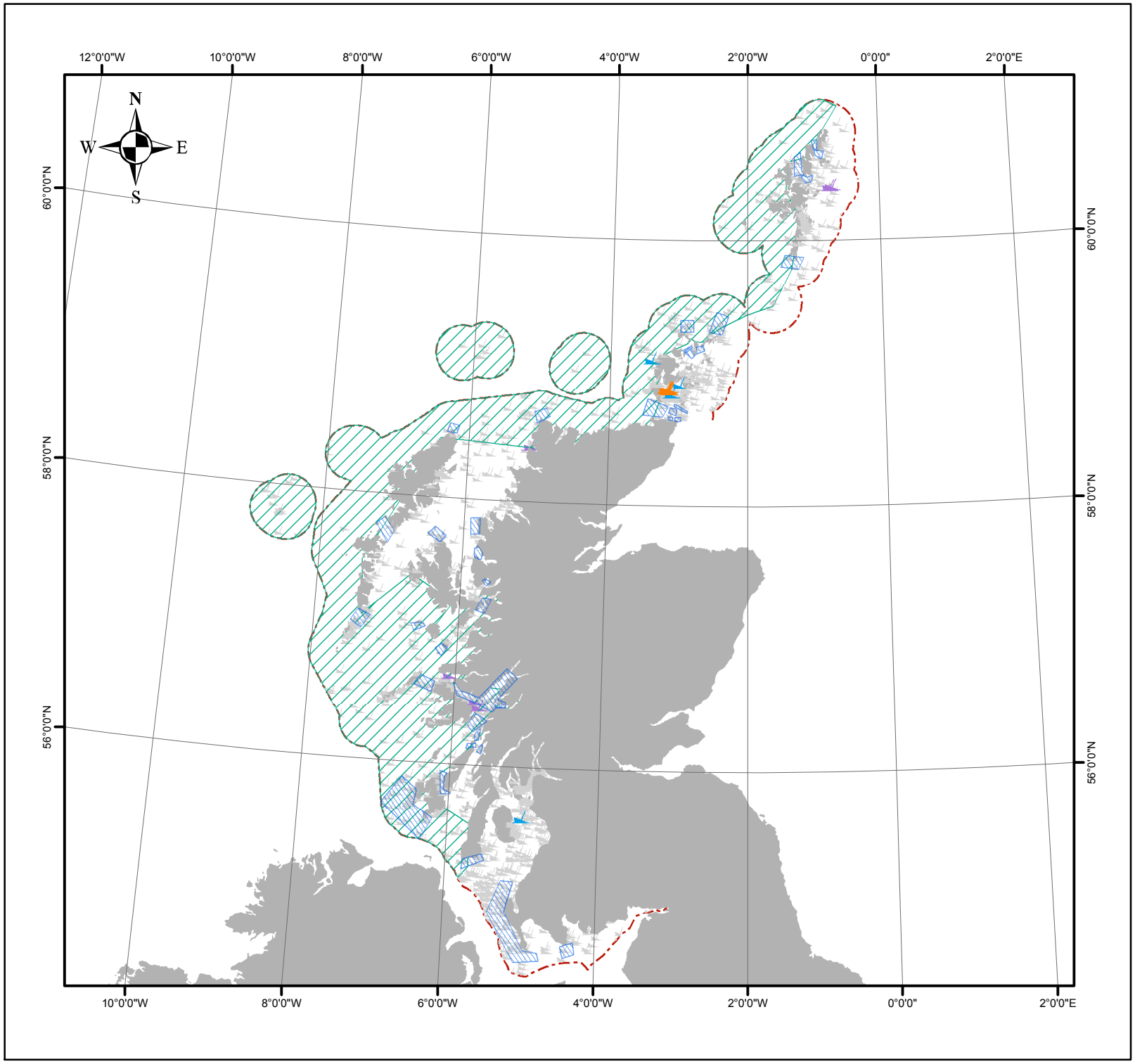

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Figure C11.1: Wreck sites

Legend

Potential development area

- Tidal resource
- Wave resource

Wrecks

- Marine Scheduled Ancient Monument
- Protected under Military Remains Act
- Protected under Protection of Wrecks Act
- Live wreck

- 12 Nautical mile limit (study area only)
- Land

Date	21 February 2007	
Projection	Transverse Mercator	
Spheroid	Airy	
Datum	OSGB36	
Data Source	SeaZone Solutions Ltd; Marico	
File Reference	P736\GIS\Mxd\Scoping report\	
Checked	RM	GIS Specialist
	FLB	Project Manager

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