East Anglia
Offshore Wind

VATTENFALL

SCOTTISHPOWER RENEWABLES

East Anglia THREE

Appendix 17.1

Potential Archaeological Receptors

Environmental Statement
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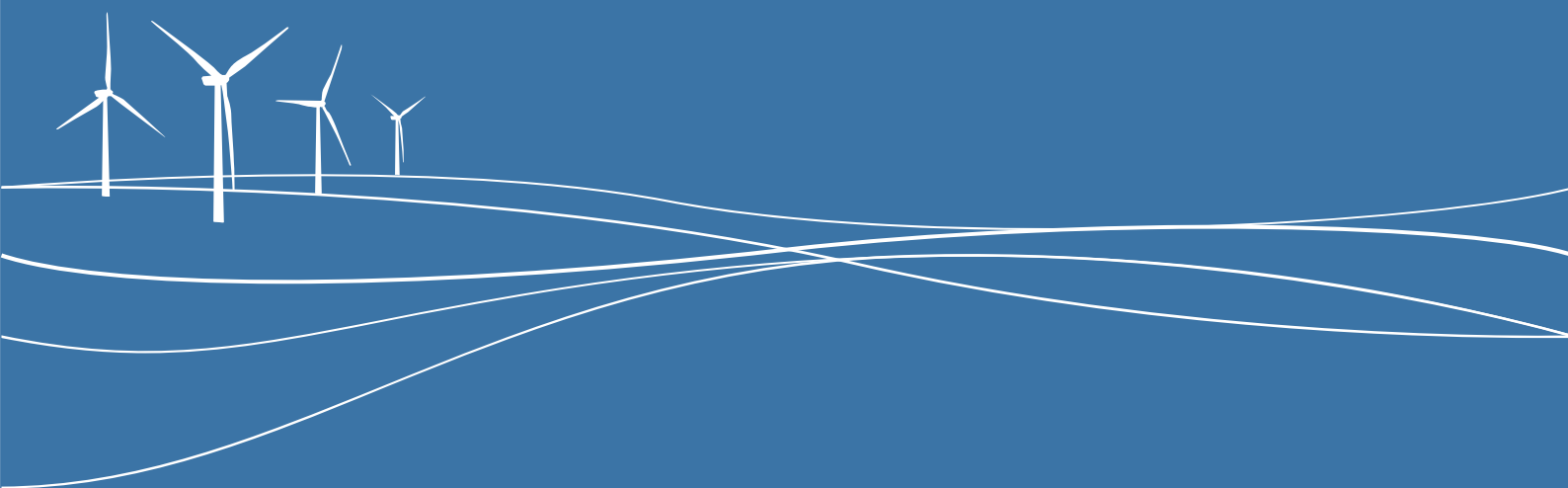

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17.1 POTENTIAL ARCHAEOLOGICAL RECEPTORS

17.1.1 Introduction

1. In addition to known sites and finds, there is also potential for the presence of as yet undiscovered archaeological receptors within the East Anglia THREE site and the offshore cable corridor (hereafter referred to as the 'Study Area'). This potential is summarised within Chapter 17 of the ES. The full potential is included below and subdivided by:

- Prehistory;
- Maritime; and
- Aviation.

17.1.2 Prehistory

17.1.2.1 Introduction

2. The archaeological baseline for the major phases of hominin activity is described below. Due to the fluctuations of Quaternary glaciations, the corresponding rises and falls in eustatic sae-level and major reconfigurations of the landscape during the last million years the archaeological record is phased between long periods of hiatus when environmental conditions or high-sea levels constrained access to Britain (Hijma *et al*. 2012, Pettitt and White 2012). Reported finds from offshore activity has to date produced a range of early prehistoric lithic artefacts indicating early prehistoric activity in submerged palaeolandscapes from Lower Middle and Upper Palaeolithic periods (Wessex Archaeology 2013), with notable collections of more recent Mesolithic artefacts from submerged palaeolandscape contexts (Momber *et al*. 2011, Wessex Archaeology 2013).

17.1.2.2 Lower Palaeolithic (c. 970,000 to 300,000 BP; > MIS 9)

3. The oldest prehistoric, Lower Palaeolithic, evidence north of the Iberian peninsula in Europe has been found on the East Anglian coast with key sites at Pakefield (c. 700 kBP) (Parfitt *et al*. 2005) and Happisburgh 3 (c. 970 k BP) (Parfitt *et al*. 2010). These sites represent activity near the northern shores of a huge North Sea basin estuarine landscape which drained many major European rivers including the Bytham / Ingham palaeo-river (Rose 2009, Westaway 2009), the palaeo-Thames-Medway system which drained northwards through Essex and East Anglia at this time (Bridgland 1994) as well as the Rhine (Hijma *et al.* 2012). The palaeogeography of the Middle Pleistocene was enduringly Britain being part of a huge peninsula of northwestern Europe; the now-submerged regions were of extensive low-lying estuaries, major

river systems, plains and rolling hills. It was a rich, diverse and productive landscape like any contemporary example and should not be considered as a temporary land-bridge or intermittent linkage to continental Europe (Coles 1998).

4. Whilst the archaeology at Pakefield was created during a more Mediterranean climate around Marine Isotope Stage (MIS) 17, the remains at Happisburgh 3 are indicative of colder than now conditions at the edge the boreal zone (Candy *et al*. 2011), highlighting that earlier hominins were capable of surviving in conditions previously thought too harsh (Parfitt *et al*. 2010).

5. The importance of these sites is international as they are currently unique at this latitude for this early date (Wessex Archaeology 2013). Cohen *et al*. (2012) have highlighted the North Sea basin as a key region for understanding Pleistocene hominins within a northerly, coastal environment. The east of England, particularly East Anglia but also the south-east of England are important regions for Lower Palaeolithic archaeology in the last 500,000 years during MIS 13 and 11 (Hoxnian inter-glacial) (Wymer 1999, Pettitt and White 2012).

6. Around 400k BP (MIS11, Hoxnian inter-glacial), within the palaeo-Thames-Medway system at Clacton, Essex artefactual evidence suggests two phases of lithic technology; earlier “Clactonian” pebble tools in the earlier warming phase of MIS 11, and Acheulean-type tools in the later cooling phase of the Hoxnian suggesting that at the same site, two different groups of hominins were producing tools (Pettitt and White 2012).

17.1.2.3 Early Middle Palaeolithic (MIS 9 – 6; c. 350 – 180 kBP)

7. During the Saalian glaciation (MIS 10) there was a hiatus in hominin activity in Britain (Pettitt and White 2012). When hominins returned, *H. neanderthalensis*, they brought a new lithic technology, the Levallois prepared core technique developing from MIS 9, c. 300k BP (Scott and Ashton 2011). They were hunters adapted to ‘mammoth steppe’ environment (Ashton and Lewis 2002).

8. The international importance of Early Middle Palaeolithic archaeology in the southern North Sea is highlighted by the numerous sites preserved within the Thames river terraces (White *et al*. 2006, Scott *et al*. 2011) and in particular by the submerged prehistoric Levallois lithic assemblage from marine aggregates licence area 240 in the palaeo-Yare catchment; over 120 artefacts have now been recovered from the locale, many recovered from in situ or near in situ contexts (Wessex Archaeology 2013a, 2013b).

9. The substantial, mixed assemblage of handaxes also recovered from Area 240 may be of older Lower Palaeolithic origin (e.g. >MIS 9) or may date to the Later Middle Palaeolithic when technologically similar artefacts were made (c. MIS 3) (Boismier *et al*. 2012).

10. During, MIS 6 the Weald-Artois ridge was finally breached creating the Dover Strait (Toucanne *et al*. 2009), occurring within a trend towards increasingly restricted access to Britain (Ashton *et al*. 2011, Scott and Ashton 2011). Palaeogeographically, Area 240 is one of the most northerly Neanderthal sites in northwest Europe and of primary archaeological importance for defining Middle Palaeolithic potential and the contemporary palaeogeography across the southern North Sea basin (Tizzard *et al*. 2014).

11. Currently there is no definitive evidence of a hominin presence in Britain during MIS 5 (Lewis *et al*. 2011). Within the context of early prehistory and submerged palaeogeography however, substantial areas of the southern North Sea basin would have been dry land during the warming and cooling limbs of the various sub-stages (MIS 5a-e), therefore potential exists for human activity to have occurred in Doggerland. Offshore locations may be the only source for testing this hypothesis (Wessex Archaeology 2013b); the western European archaeological record is rich in comparison for MIS 5 (Lewis *et al*. 2011, Pettitt and White 2012).

17.1.2.4 Late Middle Palaeolithic (MIS 3; c. 60 kBP)

12. Again, East Anglia provides early evidence for Neanderthal recolonisation of Britain after the hiatus between MIS 6-4, around 60 kBP. The Lynford Quarry material highlights a new lithic technology visually similar to Lower Palaeolithic Acheulean lithics, so-called Mousterian of Acheulean Tradition (MTA) handaxes and tools (Boismier *et al*. 2012). Climatically MIS 3 was significantly colder than now but did not attain the glacial conditions of later or earlier glacials (e.g. MIS 6 or 2) (Pettitt and White 2012), For the Neanderthals that may occupied the region at this time, surviving in Doggerland during this period may have been subject to a variety of technological and cultural adaptations (White 2006).

13. Recent analysis suggests Neanderthals died out in Britain around 42,000 years ago, with modern Humans arriving around 34,000 years ago (Jacobi and Higham 2011).

17.1.2.5 Upper Palaeolithic (MIS 3 – 2; 34,000 – 10,500 BP)

14. The Upper Palaeolithic straddles the Devensian glaciation with a hiatus in human activity in Britain between 24 – 15 k BP (Pettitt and White 2012, Jacobi and Higham 2011). Recent analysis has suggested that eight relatively brief phases of human

activity are represented by the existing Upper Palaeolithic archaeological record (Jacobi and Higham 2011); with six occurring before the Devensian glacial maximum.

15. The onshore archaeological record of Upper Palaeolithic activity is relatively sparse, and offshore locations may provide unique and important context for coastal and lowland human activity during this period (Wessex Archaeology 2013b). For example, a Maglemosian harpoon artefact from trawled peat in the early 20th century was subsequently radiocarbon dated to around 12,000 years ago (Housely 1991), and archaeological and palaeoenvironmental material has been reported from North Sea contexts for over a century (Reid 1913, Godwin and Godwin 1933).

17.1.2.6 Mesolithic (10,500 – 6,000 BP)

16. Considerable attention has been paid to Mesolithic Doggerland in the last decade (Gaffney *et al*. 2007, Tappin *et al*. 2011) and the geoarchaeology (Boomer *et al*. 2007), submerged forests (Hazell 2008) and palaeo-river systems around the current North Sea coast (Wessex Archaeology 2013a, Limpenny *et al*. 2011, EMU 2009). Increasingly, a maritime perspective has developed for understanding the early prehistoric archaeological record, where coasts, estuaries and wetlands are key landscape elements (Ransley *et al*. 2013). It is clear from numerous research and development-led investigations that post-glacial marine transgression has not destroyed Pleistocene and Holocene palaeogeography by default (Wessex Archaeology 2013b) and that detailed palaeoenvironments and palaeogeography can be reconstructed for large parts of the North Sea basin (Tappin *et al*. 2011, Limpenny 2011, Dix and Sturt 2011). By the early Holocene, Mesolithic hunter-fisher-gatherers in Doggerland were active in a familiar ecosystem of mixed deciduous woodland with oak, elm, alder and lime populated by deer and a wide variety of other mammals (Tappin *et al*. 2011).

17.1.3 Maritime

17.1.3.1 Introduction

17. Subsequent to the inundation of the Study Area by post Devensian rising sea levels any human activity can be expected to be of a maritime nature, relating to seafaring and the human exploitation of the sea. As an island nation, the UK has a long maritime history and, as such, there is potential for the presence of archaeological material spanning from the Mesolithic period to the present day within the Study Area.

18. There are many known and accurately charted wreck sites in UK waters. However, the known wreck resource is inherently biased, with a greater number of wrecks dating to the 19th and 20th centuries in comparison to sparse records from earlier

periods. By way of illustrating this bias, the ALSF funded *Marine Class Description and Principles of Selection for Aggregate Producing Areas* project revealed that of the total number of known and dated wreck sites, a notable 96% are recorded to have been lost in the period between 1860 and 1950 (Wessex Archaeology 2008a).

19. There are a number of factors which can be considered as contributing to this bias. Firstly, prior to the establishment of the Lloyds of London list of shipping casualties in 1741, there was no central record of shipping losses. Moreover, the 19th century shipbuilding industry also witnessed the increasing use of iron and steel in construction. The use of metal components in vessel construction meant that not only were the submerged remains of wrecks more likely to survive, they were also considered to pose greater navigational hazards to existing shipping than their wooden-hulled counterparts, and were charted more scrupulously as a result (Bournemouth University 2007:13).

20. Through understanding of this bias it becomes apparent that there is the potential for wreck sites and wreck-related debris to exist within the SAs that is not currently represented by the known resource. As such, the "potential" maritime resource must be given due consideration. The "potential" maritime resource includes the consideration of vessels known to have been lost but whose remains have yet to be located. Source material of relevance here comprises vessels recorded in the Lloyds of London list of shipping casualties, in newspaper accounts and in historic records of eye witness accounts. These records are commonly referred to as documented losses. Documented losses are not currently associated with tangible remains on the seabed. As new data becomes available, these records may be linked to charted wrecks of unknown identity or recently identified wrecks whose remains have yet to be charted. The NRHE groups documented losses at arbitrary points on the seabed called Named Locations (NLOs). Named locations represent general loss locations (e.g. "off the coast of Suffolk) and do not (except by chance) relate to actual seabed remains.

21. The "potential" maritime resource also includes consideration for vessels for which there is no account of their loss (e.g. prehistoric or early historic losses, loss of smaller local craft). This assessment is further underpinned by the characterisation of known maritime activity (e.g. shipping routes, fishing grounds, maritime battles) alongside a consideration of findspots within the SA (e.g. artefacts discovered and since raised from their location of find).

22. Alongside a consideration of records which signify the potential for maritime losses to have occurred, an assessment of the "potential" maritime resource also depends on an understanding of the variable survivability and visibility of wrecks on the

seabed. This is dictated by a combination of factors, including the age of the vessel, the construction material, the seabed sediment type where the vessel remains lie, the prevailing hydrodynamic and sedimentary regimes of the area and the occurrence of any seabed activities in that location. In general terms, it is considered that wreck material incorporated into seabed sediments will deteriorate much more slowly than that exposed on the seafloor. Sediment types which afford the greatest level of preservation are often considered to comprise finer grained sediment types.

23. The surface of the sea bed within the offshore East Anglian region is characterised by a series of sandbanks; elevated, elongated, round or irregular topographic features which are present as layers overlying hard substrata. Sandbanks are not only comprised of finer grained sediments (more suited to the preservation of archaeological material than coarser grained deposits such as gravels), but also often present navigational hazards to vessels passing through the area. In general, therefore, areas in which sandbanks are present have a greater potential for wreck sites to exist. Within the region, these areas of sandbanks have previously been mapped as Areas of Marine Archaeological Potential (AMAP) by the ALSF Navigational Hazards project (Bournemouth University 2007) (*Volume 2, Figure 17.12*). None are present within the Study Area, although AMAPs with coastal proximity are mapped within the Offshore Cable Corridor.

24. This potential for, and the nature of, maritime receptors that may be present within the Study Area is discussed below. Alongside other sources, where relevant, the following environmental baseline has been informed by two strategic desk-based assessments undertaken by Wessex Archaeology; the Early Ships and Boats project (Wessex Archaeology 2013) and the Aggregates Levy Sustainability Fund (ALSF) funded Assessing Boats and Ships: 1860-1950 (Wessex Archaeology 2011a-d). The Early Ships and Boats project comprised a strategic desk-based assessment of known and dated vessels from the Prehistoric period up to 1840 within England's wreck resource (including both onshore and English inshore waters up to the 12nm limit) in order to evaluate potential records for selective investigation. Assessing Boats and Ships: 1860-1950 comprised a national stock-take of wrecks dating between 1860 and 1950, providing supplementary guidance on key themes and interests represented by the known resource with the ultimate aim of enabling better informed decision-making to be undertaken in respect of the wrecks of vessels lost during this period. In each case, the results of these projects enable the special interest of potential wreck sites within the Study Area to be understood against the existing baseline of currently known and recorded wrecks in England's territorial waters.

17.1.3.2 Documented Losses

25. Records of documented losses (historical accounts of vessels lost at sea) provide an indication on the type and number of wrecks that may be present within an area.

26. The remit of the NRHE only extends to the 12 nautical mile limit of UK territorial waters. Consequently, there are no NLOs within or near the Study Area. This does not mean that loss events did not occur within the Study Area; only that NRHE records for this area are not available.

27. Within the offshore cable corridor there are 88 records at four NLOs represented by GIS polygons at arbitrary points on the seabed. *Table 1.1* shows the distribution of losses according to date.

Table 1.1 Documented Losses by Date of Loss

Documented Losses by Date of Loss	
Date	**Number of Losses**
1700 to 1749	1
1750 to 1799	17
1800 to 1849	41
1850 to 1899	21
1900 to 1913	4
1914 to 1918	4
Total	**88**

28. The distribution by date of loss demonstrates a rise in the number of records from the 19th century. This is consistent with more accurate reporting and the increased visibility of remains on hydrographic surveys due to the rise in the number of metal-hulled vessels operating during this period. Conversely, the reduction in records from 1900 is reflected in a corresponding increase in charted wrecks for this period. Of all charted wrecks within the Study Area, none are recorded to predate 1900 although a number are currently undated.

17.1.3.3 Pre-1508

29. Maritime discoveries of pre-1508 date are rare. Little is known about Prehistoric maritime activities or types of craft while the data available for the Romano-British and Medieval periods is limited in comparison to subsequent periods. On this basis, all material from this period will be of special interest solely due to the rarity of any discoveries.

30. There are no known or charted wrecks and no documented losses from this period within the Study Area.

31. There is no evidence for Palaeolithic maritime activities in the archaeological record for the UK, although archaeological material from elsewhere suggests that early modern humans did undertake maritime activities (e.g. Johnstone 1980; Lourandos 1997). The resources required to construct simple watercraft, such as hide-covered log or boat rafts, would have been available during this period and it has been postulated that late Upper Palaeolithic communities utilised such craft for coastal journeying and fishing (McGrail 1987, 2004).

32. During the Mesolithic, patterns of human settlement associated with rivers and coastal environments suggest the likely use of watercraft for fishing and transport although, as for the Palaeolithic, the lack of available evidence means that the nature of these maritime activities remain unclear. Archaeological discoveries of Mesolithic logboats (e.g. McGrail 2004:174) attests to the ability of Mesolithic communities to construct watercraft and it is likely that rafts and hide boats would also have been used. Unfortunately, their light construction makes it less likely that they would survive in the archaeological record.

33. By the Mesolithic it is probable that the Study Area was already submerged although areas that were coastal or nearshore at this time, particularly those associated with river inlets, are a likely context for the discovery of the remains of early maritime activities. The extensive deposition of Holocene alluvium associated with the fairly rapid post-Devensian rise in sea level may have concealed the remains of the early prehistoric watercraft that are currently missing from the archaeological record.

34. The Early Ships and Boats project (Wessex Archaeology 2013) states that within England's wreck resource, just 19 records exist with a date range that falls within the Early Prehistoric Period (Palaeolithic to Mesolithic). These records comprise 18 logobats and one findspot; none have been scientifically dated or identified as surviving in archaeological contexts (Wessex Archaeology 2013:33). This highlights the potential importance and historical value of remains of watercraft dating to this period should they be discovered within the Study Area.

35. During the Neolithic and early Bronze Age (4,000 to 700 BC) the coastline in the East Coast region would have attained a form similar to that of today. The movement of goods across the sea is demonstrated by the introduction into the UK of non-native species of livestock and cereals (May 1976) and the discovery of porcellanite stone axes from Ireland, on the UK mainland, and the Western Isles of Scotland (Breen and Forsythe 2004:32). The discovery of deep water fish in shell middens at Neolithic

sites demonstrates that marine fishing was being carried out at this time (Ellmers 1996).

36. As with the Mesolithic, the evidence for Neolithic watercraft is limited to discoveries of log boats and the precise nature of maritime activities remains unclear. The discovery of a prehistoric logboat has been reported from the River Orwell (Suffolk HER FRT 004) although this date is unproven and it may be of later date. Further logboats of unknown date have also been reported from the River Stour (Suffolk HER - HRK Misc) and on the River Orwell opposite Pond Ouze Point (Suffolk HER - IPS Misc).

37. The scale of seafaring activities is considered to have grown through the Bronze Age (2,400 – 700 BC) and Iron Age (700 BC – AD 43) with evidence of significant advances in technology and vessel size. Logboats and hide boats remained in use alongside new vessel types such as the flat-bottomed sewn plank boats suited to a wider variety of uses in a wider range of environments (McGrail 2004). These are the earliest known form of plank construction with planks lashed together and made watertight.

38. Some 97 records with a date range that falls within the Late Prehistoric period (Neolithic to Iron Age) were identified as part of the Early Ships and Boats project (Wessex Archaeology 2013:33) within England's wreck resource, comprising two boat burials, three designated wrecks, 84 logboats and eight findspots. Of the 84 logboats, only two were identified as surviving in an archaeological context. This rarity once again highlights the potential importance and historical value of remains of watercraft dating to this period. The potential for the discovery of further examples of early craft within stratified contexts is well demonstrated by the discovery of six logboats in a clay-pit at Must Farm near Peterborough in 2011, variously dating between the Middle Bronze Age and the Early Iron Age (Cambridge Archaeological Unit: 2012; English Heritage 2012:5). Although discovered onshore, these logboats are testament to the high level of preservation afforded by waterlogged environments and signify the potential similar finds to exist within comparable environments both offshore and onshore. Artefacts discovered at Must Farm are also indicative of extensive and complex sea and riverine trade routes within the Bronze Age and Iron Age, potential relics of which cannot be discounted within the Study Area, particularly within Holocene alluvium sediments.

39. A closer unity between Britain and the southern North Sea margin was established during the Romano-British period (AD 43 to 410) with an expansion and diversification of trade with the Continent. The later Iron Age saw the emergence of a distinct tradition of "Romano-Celtic" shipbuilding representing both Roman and

northern European methods, capable of coastal and oceanic voyages and reflecting substantial, sea-going trade.

40. A significant number of the vessels involved in these movements are likely to have passed through the Study Area. Trading ports were active on the Suffolk and Norfolk coast and the Roman military establishment made extensive use of the East Anglian coastal waters, transporting goods from garrison to garrison (Rippon 2008:86). Caister-on-Sea, for example, provided a clear entry port to the rich farmlands of East Anglia and offered the shortest sea crossing to the mouth of the Rhine.

41. The recorded remains of vessels from this period continue to be rare despite the growth of seafaring activity and the wide range of ocean-going vessels indicated to have been in use in contemporary accounts. The Early Ships and Boats project revealed a total of 34 records within England's wreck resource with a date range that falls within the Roman period, comprising two designated wrecks, 23 logboats, five findspots and four undesignated wrecks (Wessex Archaeology 2013:34). None of the 23 logboats were identified as surviving in an archaeological context.

42. The 'Dark Ages' which succeeded the Roman occupation of Britain saw the migration of Saxon, and later Norse and Danish, settlers into Britain which brought both renewed expansion of trade routes and new shipbuilding traditions. A network of Saxon trade and migration routes existed in the southern North Sea, with a number of important ports or landing places along the East Anglian coast. According to the Anglo-Saxon Chronicle, the Saxon leader Cerdic landed at the shore close to Great Yarmouth in AD 495 (Online Medieval and Classical Library) and Dunwich (Dumnoc) is listed as a port in the Anglo-Saxon Chronicle for 636 (Comfort 1994:5).

43. There are several archaeological examples of Saxon boats in Suffolk including the clinker built Ashby Dell (Suffolk HER - HRF 012) and Sutton Hoo (Suffolk HER – SUT 004, 005, 038) boat burials. The clinker technique, fastening overlapping planks together to form the hull, was a specifically north European technique which found its best known expression in the Viking ship traditions of the later 8th and 9th centuries.

44. The potential for discoveries of this date from offshore contexts is demonstrated by a 16ft logboat "landed" while fishing off Covehithe in 1998 by a Dunwich fisherman (Suffolk HER – COV Misc). The boat was radiocarbon date to 775 to 892 AD. It has been suggested that this may have been eroded from Benacre, Covehithe or Easton Bavents Broad (Good and Plouviez 2007).

45. Viking raids on the eastern British coast began in the 8th century and during the subsequent period of Viking settlement the North Sea continued to act as a communication, trade and migration route to the Scandinavian home countries with England's existing trade routes across the North Sea functioning into the 9th century, although a lower volume of trade passed along them (Friel 2003:44). The first evidence of a purpose-built English royal naval force comes from this period at the time of Alfred (King of Wessex 871-99), when a fleet of large, oared ships was built to help fight the invading Danes (English Heritage 2012:5). Following the Danish raid in Kent in 885, Alfred's fleet is recorded to have travelled up the River Stour where a battle with the Danes took place (Asser 1983:87). Although the Anglo-Saxon fleet emerged as victorious, they were caught unaware when attempting to leave the Stour and were attacked and defeated by a Danish force at the mouth of the river (Huntingdon 1969:81).

46. Direct evidence for seafaring activity of this period within the offshore East Anglian region includes the timbers of a clinker vessel (c. AD 890 to AD 970) at Buss Creek and two oaken rudders (c. AD 850 to AD 950) found close to Southwold in the 1980s (Bacon 1996:18-22). The first rudder was trawled up in a fishing net in 1981 while the larger was washed up on the beach at Easton and found by a fisherman after a storm in 1986. To highlight the rarity of vessel remains dating to this period, the Early Ships and Boats project revealed that just 40 records within England's wreck resource have a date range that falls within the post-Roman to Norman Conquest (410 to 1066 AD) period, comprising four boat burials (including the early 7th century Sutton Hoo near Woodbridge, Suffolk), 28 logboats (none of which were identified as surviving in an archaeological context), six findspots and one undesignated wreck (Wessex Archaeology 2013:34).

47. By the time of the Norman Conquest in 1066 many East Anglian ports had developed into busy trading centres, with Norfolk and Suffolk establishing larger fleets than any other region of England at this time (Williams 1988:257). This expansion continued throughout the medieval period with the southern North Sea acting as the artery for increasing trade between the UK and Europe.

48. Fishing was also important and during the 13th, 14th and 15th centuries the most notable market in Norfolk and Suffolk was that of preserved fish (Hutchinson 1994: 129). Great Yarmouth, in particular, became one of the major herring markets in Europe. English 'Doggers' of 30 to 40 tonnes, with crew of 20 to 30, began fishing in Icelandic waters from the 14th century onwards (Hutchinson 1994: 57). These fleets acted in convoy throughout the 15th century, reaching a peak in the early 16th century (Marcus 1954: 296).

49. The available archaeological and historical evidence indicates the development of a wide range of vessel types during the medieval period associated with the increasing need for inexpensive and spacious cargo transporters and the need to defend these merchant vessels against piracy. This increasing need and the development of ordnance precipitated the development of purpose built warships and a standing navy by the 14th century (Kemp 2002: 71).

50. By the end of the medieval period the use of flush laid strakes in construction, further developments in propulsion (single masts replaced by more complicated three or four mast rigs), increasing tonnages and the development of reliable navigation techniques and aids facilitated an even greater expansion of the trade routes. This period saw the advent of maritime exploration on a global scale as vessels from Europe reached the New World and, subsequently, mapped the spice routes to the Far East.

51. However, while the design and construction of larger ships was becoming increasingly formal and standardised, the range and types of smaller, vernacular craft are likely to have remained extensive with the use of simple rafts and skin or hide covered boats as well as wooden vessels associated with recreation, transport and fishing, for example. The wide range of historical influences upon the design of such vessels, coupled with the specific requirements of the local environment, suggest that the different types of vessels operating in the seas and rivers around Britain would have been numerous and diverse. Boats and ships from the Medieval and Early Tudor period are sufficiently rare that all examples are likely to be considered of special interest. The Early Ships and Boats project identified just 51 records with a date range that falls within the Medieval and Early Tudor period (1066 to 1540), comprising seven designated wrecks, 20 logboats (none of which were identified as surviving in an archaeological context), ten findspots, one historic vessel and 13 undesignated wrecks; a number of which are likely to post-date 1509 (Wessex Archaeology 2013:34).

17.1.3.4 1509 – 1815 AD

52. Post-medieval shipwreck remains are better represented in the archaeological record than earlier periods although those subject to archaeological investigation are only a fraction of the numbers likely to have been lost. There are no known wrecks from this period within the Study Area although there are 34 documented losses, only one of which predates the advent of Lloyds List in 1741 (*Volume 2, Figure 17.12* and *Volume 3, Appendix 17.3, Section 1.1*).

53. Technological advances in the construction, fitting and arming of ships, and in navigation, sailing and steering techniques, continued into the post-medieval period.

Traditions of shipbuilding for larger vessels continued to develop around the utilisation of the flush-laid strake technique while the form and construction of local craft remained diverse, continuing to incorporate traditions of earlier periods such as the clinker construction technique.

54. The great innovations in ship design during this period were stimulated by the development and growth of new trans-oceanic communication networks which saw the opening up of the New World. The late 15th and early 16th century voyages of exploration precipitated global mercantile trade and expansion and the emergence of the "Golden Age" in northern Europe (Glete 1999) with the establishment of the East India Company in 1599.

55. By the beginning of the 17th century the volume of trade, and the numbers of vessels involved in such trade, increased dramatically. The length of voyages, the hazards of trans-oceanic journeys and the requirements of trade saw the development of even larger vessels with round-bellied, capacious holds to accommodate both stores and cargo.

56. The East Coast played a key role in this "Golden Age" with established overseas trade connections ranging from the Baltic Sea to the Iberian peninsular and beyond (Williams 1988: 70). By the late 18th century, statistics from the Lloyds Register of the English and Welsh regions (1776) attributed 10% of the total of shipbuilding tonnage to East Anglia (Goldenberg 1973:424; Stammer 1999:254). It is notable that at least ten of the 18 documented shipping losses dating to the 18th century within the Offshore Cable Corridor were cargo vessels, a testament of the growth in trade during this period.

57. Alongside this global growth of trade and prosperity came an increasing need to protect financial interests and from the 16th to mid 19th centuries the separation of merchant ships and ships built for fighting also became more marked. Fighting ships were designed to fight broadside to broadside with heavy ordnance. Battles at sea became larger and more destructive and a standing Royal Navy, established during the Tudor period, grew to become an established and organised force. The expansion of the Navy in the Tudor period also saw the opening of a network of royal dockyards.

58. The East Coast region was subject to three major battles during the 17th century (Wessex Archaeology 2003) (*Volume 2, Figure 17.12*). The Battle of Gabbard Shoal (1653), The Battle of Lowestoft (1665) and the Battle of Sole Bay (1672) formed part of the Anglo-Dutch wars, a series of wars fought for control of the seas and trade routes rather than territory and marking a new era in the history of naval warfare.

Twenty Dutch ships and two English vessels were lost during the Battle of Lowestoft with three Dutch ships and four ships from the combined English and French fleet lost at the Battle of Sole Bay.

59. These lost warships are yet to be confidently located and it is possible that their remains may lie within the Study Area. There is an NRHE record of a documented loss within the wider area (arbitrarily located at the mouth of the Rivers Stour and Orwell), described as the wreck of an English storeship captured in 1653 from the Dutch during the First Anglo-Dutch War (NRHE 902051). As further testament to this potential, between 2005 and 2013, 16 cannonballs were reported from the East coast dredging region through the Marine Aggregates Protocol for Reporting Finds of Archaeological Interest.

60. In addition to this global explosion in trade and naval warfare, the East Coast economy was still underpinned by local trade and marine exploitation. The fishing industry continued to thrive with the developed quays of Southwold and Lowestoft and the established ports of Great Yarmouth and King's Lynn prospering following their expansion with the Icelandic cod fishing fleets during the mid 17th and 18th centuries (Gould 1997), particularly with the development of deep sea fishing in the 19th century (Rasmussen 1985:217). There are two NRHE records of whaling ships lost in the area (NRHE 1300333, 1340044), each of which are assigned to a named location within the Offshore Cable Corridor.

61. In the 18th century, East Anglia was at the forefront of the 'Agricultural Revolution' whereby communications were developed to serve the farming economy and to facilitate the diverse trade of Norfolk and Suffolk of which grain was the principal export (Gilman 1997:67).

62. Although there is significantly more historical data for maritime activities in this period, particularly with regard to East India Company shipping and Naval warfare, the number of known wrecks from the 16th to early 19th centuries remains low, although a larger number of records relating to known sites exists in comparison to earlier periods. For example, the Early Ships and Boats project (Wessex Archaeology 2013) identified 34 and 68 records with a date range that falls between the Mid to Late Tudor period (1540 to 1603) and the Stuart period (1603 to 1714) respectively, as well as an additional 145 with a date range falling within the Hanoverian period (1714-1837) (although a number of these will post-date 1815). Despite this, known examples of wrecks dating to this period are still rare in comparison to those post-dating 1840. Additionally, the smaller vessels and local craft employed in the day to day activities of coastal communities, and deployed as auxiliary vessels to the Royal Navy, are still comparatively absent from both the historical and archaeological

record and discoveries are rare. Any wrecks from this period, therefore, will be of special interest.

17.1.3.5 1816-1913 AD

63. By the start of the 19th century, coastal and international trade were dominated by wooden sailing vessels and the 'wooden walls' of the naval fleets during the French Revolutionary Wars represented the zenith of the naval sailing vessel (Lavery 1991). Of the 16 shipping losses documented within the Offshore Cable Corridor dating between 1800 and 1815, at least 12 represent wooden sailing vessels. However, during the course of the 19th century the technological innovations of the Industrial Revolution brought fundamental changes in maritime technology, which amongst other advances in naval engineering, enabled the development of steam propulsion, oil engines and iron and steel construction.

64. The use of iron in shipbuilding began during the 18th century but it wasn't until the first half of the 19th century that the technology came into widespread use. Initially, iron was used to supplement structural elements in shipbuilding although it was later used for angular joints or knees and the framing of vessels and ultimately replacing wood as the covering for the hull. Steel was used periodically for ship construction from the late 1850s but did not supersede iron until the later 19th century (Greenhill 1993:89; Ville 1993:52).

65. The first Atlantic crossing by a paddle steamer took place in May 1819 and by the 1820s steamboat transport formed an extensive network around the British Isles (Pearsall 1985:195). The high cost in coal consumption, however, limited their range and value to the trade economy and, as such, they were largely confined to the passenger trade where reliable quick passages were more important than cost (MacRae and Waine 1990:11). The introduction of the screw propeller began in the 1830s but it wasn't until the development of the compound engine in 1854 that vessels equipped with screw propulsion could truly compete with the sail.

66. The first steam powered naval vessel *HMS Agamemnon* was ordered by the Royal Navy in 1849 with the first iron naval ship *HMS Warrior* built in 1861 (www.royalnavy.mod.uk). Following a period of experimentation, designs were standardised by the 1890s with new steel "battleships" and the large armoured cruisers built to defend trade routes. The development of the torpedo, or mine, from early experiments in the 1860s saw the introduction of small and fast torpedo boats and, in response, heavily armed torpedo boat destroyers and led to the development of the submarine and ultimately the all-big-gun dreadnought battleships in the early 20th century.

67. The use of metal in shipbuilding increased both durability and capacity while the use of steam propulsion allowed for greater speed, thus facilitating the further growth of long distance trade. However, the transition was gradual with wooden sailing vessels such as schooners, brigs, brigantines and snows continuing to dominate until the second half of the 19th century and continuing in use well into the 20th century (Ville 1993:52). It is notable that of the 50 documented shipping losses dating between 1816 and 1913, a significant 39 represent sailing vessels. The use of wood in the construction of local craft also continued with new technologies contributing but rarely supplanting local maritime traditions and cultural values. At least 18 of the 50 documented shipping losses within the Offshore Cable Corridor are recorded as being constructed of wood.

68. By the late 19th century a global network had been established linking the major cities of the world into an integrated global transport system. Coastal traffic also continued to grow during this period. The transport of coal was a major contributor to coastal trade with c. 22 million tons carried coastwise (Jackson 1983:117). At least 10 of the shipping losses dating between 1816 and 1913 documented within the Offshore Cable Corridor were laden with coal at their time of loss, with a further two detailed as colliers (NRHE 1301629 and 1301600). The East Coast coal trade formed a large proportion of this, from the northern coalfields to the London market. Norfolk and Suffolk's principal export however was agricultural goods such as grain across the North Sea with the import of timber coming from Scandinavia and the Baltic.

69. The dominance of Great Yarmouth as a fishing port in the region continued into the 19th century, with the well-established herring stock exported on mass to the Mediterranean and Northern Europe. In the late 19th and early 20th century, the Yarmouth/Lowestoft autumn herring fishery was by far the biggest fishery on the East Coast.

70. The recording of shipping losses became more centralised in the late post-medieval period, and as such from this period onwards the available record of shipping casualties is both more complete and accurate. There are 50 documented losses dating to this period (*Volume 3, Appendix 17.3, section 1.1*). Wrecks dating to latter part of this period are also more likely to be visible in hydrographic surveys. With the use of metal in boat and ship construction becoming more common for wrecks of this period, their remains are often more evident on the sea bed than their predecessors as their upstanding components are more clearly apparent to bathymetric and geophysical survey, and they generate strong magnetic anomalies. It is notable that only one documented shipping loss (NRHE 1488658) in the Offshore Cable Corridor is recorded to have been constructed of steel. Metal wrecks were also

considered to represent worse navigational hazards to shipping than their wooden counterparts and were recorded more scrupulously as a result. Despite this, of the known and dated charted wreck sites within the Study Area, none have been assigned to the date range 1816-1913. However, with further data acquisition, it is possible that any one of the currently unidentified and undated charted wrecks or obstructions represent the remains of the 50 documented losses yet to be located.

71. Nonetheless, known wrecks identified as dating between 1816 and 1913 are more plentiful in the archaeological resource in comparison to those dating to earlier periods. This is particularly the case for wrecks dating from the mid 19th century onwards. While the Early Ships and Boats project identified 384 records in England's wreck resource from the prehistoric period to 1840 (Wessex Archaeology 2013), the Assessing Boats and Ships 1860-1913 project (Wessex Archaeology 2011b) identified 518 wrecks in England's wreck resource dating to a 53 year period alone, spanning 1860 to 1913. Due to the number of records, for a wreck of this period to be of special interest, it is likely to have to make a distinctive contribution in respect of a number of integral factors. It must also be considered to have relative merit in comparison to other wrecks or surviving vessels of the period. The special interest of boats and ships of this period is likely to be multi-faceted. Consequently, any wrecks from this period that may be discovered within the Study Area may only be of special interest if the remains can make a specific contribution to current knowledge and understanding.

17.1.3.6 1914 to 1945 AD

72. The East Coast was subject to a high level of hostility throughout both World Wars, with the East Anglian region providing a focus for military activity. The 11 known wrecks within the Study Area lost during periods of hostility are testament to this (one within EA3 and 10 within the Offshore Cable Corridor). There are an additional four documented shipping losses dating to this period (*Volume 3, Appendix 17.3, section 1.1*). The rapid technological advances of the preceding century facilitated the development of more homogenous naval fleets of larger, faster and more durable vessels, heavily armed and incorporating the widespread use of submersibles.

73. A great number of vessels were lost during the World Wars, including both warships and submarines, but a much greater number of merchant vessels were lost as the disruption and destruction of shipping became an established military tactic. Large numbers of mines were laid by the Germans off the East Coast while German U-boats were engaged in unrestricted attacks on the British merchant fleet from September 1915 onwards. At the height of the campaign, between February and

April 1917, U-boats sank 500 merchant ships (Hewitt 2008:17). At least five known wrecks in the SAs represent merchantmen lost due to an act of war during WWI. One documented loss (NRHE 914586) also represents a merchantman lost during WWI.

74. During the war years the numbers of ships passing through the Study Area intensified as a result of increased demand for shipping to fulfil military requirements and to supply the wartime demands. For example, the East Coast trade route from the 'Great North Coalfield' was still the main supply line to London, which accounted for the single largest consumption for fuel in England (Hewitt 2008:7). Of the 25 known wrecks lost as a result of hostilities in WWI, six were laden with coal at their time of loss. To protect the maritime trade merchant fleets started operating in convoys escorted by minesweepers (Steffen 2005: 802), and a great number of non-military vessels were requisitioned by the Royal Navy to support the war effort in this respect.

75. A total of two known wrecks dating to WWI were requisitioned by the Royal Navy at their time of loss, all of which are charted within the Offshore Cable Corridor. HMS *Ludlow* (WA 72999) was hired as a minesweeper and lost in 1916 and the *Tergestea* (WA 72437) was hired by the Admiralty and lost in 1916. An additional two documented shipping losses also represent vessels hired by the Admiralty for the war effort; the HMS *Vitality* (NRHE 1487719) and the HMS *Queen of the North* (NRHE 1488658) , both of which were lost in 1917 whilst on minesweeping duties.

76. Convoys were also utilised in the World War II in an attempt to transform the east coastal trade route into an indestructible highway (Hewitt 2008:17, 23). The main convoy route during WWII passed to the west of the Study Area, between Methil, Fife and Southend-on-Sea in the Thames from 1939 onwards. During the war the seaside resort of Southend-on-Sea would witness over 2,000 convoy vessels arrive and depart.

77. As in WWI, large numbers of steam trawlers and drifters were bought or hired by the Admiralty to supplement the Royal Navy's dwindling resources in WWII.

78. The advent of flight brought another dimension to 20th century warfare and the deployment of aircraft to destroy both merchant and military ships became a key strategy during WWII (Bowyer 2003:26). Alongside mines and submarines, aircraft posed a significant threat to shipping in WWII which was measurably enhanced as the accuracy and effectiveness of dive-bombing techniques increased (Whitley 2002:12).

79. Dozens of vessels such as these were lost due to enemy action, some sunk by torpedoes or gunfire from submarines, with the additional threat of German motor torpedo boats, known as E-Boats and fighter/bomber aircraft (Larn and Larn, 1997). The distance between the coast of Norfolk and Suffolk and the coasts of German-occupied France and Holland was relatively short and ships were lost off Norfolk almost daily from 1939 to 1941.

80. The high levels of losses between 1914 and 1945, combined with the increased likelihood of discovering wrecks from this period through geophysical survey or historical accounts, means that only remains contributing to an understanding of technological changes and to local and global activities during this period are likely to be of special interest. However, many vessels of little archaeological value may have additional significance with regard to loss of life or through identifiable connections with significant events.

17.1.3.7 Post-1946

81. Maritime activity within the Study Area in the post-war era is multi-faceted, with the southern North Sea providing an arena for military, commerce, fishing and leisure activities. Although ships and boats are less numerous than in preceding years, the overall volume of seafaring activity continues to be very high (Wessex Archaeology 2009:61). The numbers of vessels lost in the post war period are fewer in comparison to the preceding centuries as a result of increased safety coupled with the absence of any major hostile action. Only remains of this period with unusual or specific potential to further understanding are likely to be regarded of special interest.

17.1.4 Aviation

17.1.4.1 Introduction

82. A guidance note published by English Heritage (EH) entitled Military Aircraft Crash Sites (English Heritage 2002) outlined a case for recognising the importance of aircraft crash sites, specifically with regard to existing and planned development proposals which may have an impact on such sites. The guidance note argues that aircraft crash sites not only have significance for remembrance and commemoration, but they also have an implicit cultural value as historic artefacts, providing information on the aircraft itself and also the circumstances of its loss (English Heritage 2002:2). All aircraft that crashed while in military service are automatically protected under the Protection of Military Remains Act 1986.

83. Site survival is largely determined by the cause of loss. With a few exceptions, aircraft come to be on the sea bed as a result of an in-flight accident or enemy action

and remains are often highly fragmented and widely dispersed as a result of mid-air explosion or the high impact of hitting the water at speed. Aircraft which come to rest on the sea bed as a result of controlled ditching are more likely to be better preserved. The factors which determine the survival of an aircraft crash site are not yet fully understood although marine environments generally offer favourable conditions for the preservation of artefacts, enhancing the potential for the survival of aircraft crash sites on the sea bed.

84. This potential for, and the nature of, aviation receptors that may be present within the Study Area is discussed below.

17.1.4.2 Pre-1939

85. Fixed wing-aviation first began in the early 1900s in the UK, with the first flight across the English Channel in 1909. This early period was characterised by the intense and rapid development of a new technology, from the advent of powered flight to the outbreak of WWII. At least 119 different aircraft models were used by the military in the UK during this period but examples of only 24 survive today anywhere in the world. This, alongside the fragility of the airframes and the relative scarcity of flights over water mean that any aircraft remains dating to this period will be of special interest.

86. There are no known or charted aircraft or documented losses dating to this phase within the Study Area.

87. Early aircraft were constructed of canvas covered wooden frames and were extremely fragile, and it was not uncommon for such an aircraft to break up in flight. The regular use of aircraft over the battlefields of the Western Front by the end of WWI, however, prompted the mass-production of fixed wing aircraft in large numbers, spurring technological advances in aircraft design.

88. A total of 28 fixed wing aircraft and 15 airships were lost by the German Imperial Air Service and Navy during raids on the UK mainland during WWI (Wessex Archaeology 2009:65) and a further 34 aircraft from the British Home Defence Squadrons are also recorded to have been lost during this period (Holyoak 2002:659). It is possible that some of these losses occurred at sea, particularly within regions that attracted intense aircraft hostility such as the East Coast.

89. By the outbreak of WWII, low-powered wood and cloth biplanes had been replaced by high-powered monoplanes made of aluminium (Wessex Archaeology 2009:65). Civil aviation also increased significantly during the 1920s and 1930s, with over-seas services established to a number of European and worldwide destinations (Wessex

Archaeology 2009:16). The Department of Transport's Air Accident Investigation Branch (AAIB) records 20 civil aircraft losses at sea between 1920 and 1939, though this is not regarded as being a comprehensive record (Wessex Archaeology 2009:65).

90. Pre-1939 aircraft crash sites at sea are likely to be relatively rare, and the lightweight construction of the earlier airframes means that they are less likely to survive within the marine environment unless buried within sea bed sediments. Any early aircraft crash sites from this period are likely to be very important if discovered.

17.1.4.3 1939-1945

91. This period is characterised by technological innovations which extended the reliability and range of aircraft and the deployment of aircraft as a key strategy during WWII. This period also saw the highest number of aircraft and associated human casualties in the history of aviation and, as such, has special significance.

92. During WWII airpower became increasingly important at a strategic and operational level. Forming the frontier between the Allies and Axis, the North Sea became a significant focus for a high volume of aviation activity in WWII with hostile aircraft activity particularly concentrated off the east and south coasts of England (Wessex Archaeology 2008b:16). During the Blitz Great Yarmouth suffered more bombing than any other coastal town in the country.

93. The loss of aircraft from both sides during the war was immense and it is estimated that an average of five aircraft crashed every day between 1939 and 1945 somewhere in the British Isles (Bédoyère 2001:8). Many of these casualties are likely to have occurred offshore.

94. The Aircraft Crash Sites at Sea project (ALSF 5223; Wessex Archaeology 2008b) considered a selection of sources which may be considered to indicate the potential for aircraft remains of this period to exist within the Study Area. One of the most complete sources of information was provided by published aviation researcher Ross McNeill, who identified 11,090 RAF aircraft losses in the North Atlantic, North Sea, English Channel, Irish Sea and Biscay areas between 1939 and 1990, the majority of which occurred in WWII (Wessex Archaeology 2008b:18). Of these, 73 are thought to have occurred off the coast of Suffolk and a further 217 off the coast of Norfolk. While WA cannot verify the accuracy of the data supplied by McNeill, it was collated through a systematic study based on both primary and secondary sources and suggests a high volume of potential aircraft crash sites within the Study Area.

95. A further survey of crash sites in England, carried out by EH in consultation with the Ministry of Defence (MoD) as part of the Monuments Protection Programme (MPP),

revealed that WWII losses tended to cluster along the southern and eastern margins of England. The study suggested that c. 1,000 British aircraft were lost off the coast of Suffolk (English Heritage 2000; English Heritage 2002:5). Located beneath flight paths of enemy bomber formations from the Continent to the East Coast, the skies above the Study Area are likely to have been a focus for air combat during WWII.

96. There are no known WWII aircraft within the Study Area although there are 12 documented losses recorded by the NRHE, comprising 11 British aircraft (two bombers, seven fighters and two fighter bombers) and one German bomber (*Volume 3, Appendix 17.3, section 1.1*). Three were lost due to an aircraft malfunction, one as a result of firing practice and six as a result of enemy action. One was described as lost after it spun into the sea without an explanation for the cause while one British fighter was hit by fire from an American plane.

97. A review of WWII Air/Sea Rescue Operations maps suggests that five recorded Air/Sea Rescue Operations took place within the Study Area, and a further 11 within the Offshore Cable Corridor (*Volume 2, Figure 17.12*). At least six of these rescue operations are mapped as unsuccessful. Although the mapped locations of these operations are not necessarily reliable, the locations provide a useful guide to the general distribution and potential density of aircraft crash sites within the Study Area.

98. Direct evidence for aircraft within the offshore East Anglian region is provided by a number of aircraft remains reported through the Marine Aggregates Protocol for Reporting Finds of Archaeological Interest including a large quantity of aluminium wreckage from WWII, some of which is identifiable with a particular make of aircraft.

99. In 2007 a number of aircraft fragments were discovered with a human arm bone at Ridham Wharf near Sittingbourne, Kent, and reported to WA through the Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest (formally the BMAPA Protocol) (Wessex Archaeology 2007). The discovery came from dredging area 430 which lies less the 1km to the north of the central extent of the Offshore Cable Corridor. Following specialist assessment, desk based research and analysis of the area through geophysical survey the remains were interpreted to be part of a single crash site, most likely of a Junkers Ju 88, a WWII German Luftwaffe twin-engine, multi-role aircraft. The aircraft is most likely to have crashed during the second half of August 1940 during the Battle of Britain. A temporary exclusion zone was established around the site and continues to prohibit dredging within the area of the discovery. A number of additional aircraft finds have also been found in the East Coast dredging region, c. 18km north-west of the Offshore Cable Corridor, including fragments of a fuselage from a Supermarine Spitfire, a possible

WWII hydraulic jack and an aircraft fuel gauge Manufactured by a company which developed fuses and aircraft instruments throughout both world wars, as well as a number of unidentified aluminium fragments thought to derive from aircraft.

100. This evidence demonstrates a very high potential for the presence of WWII aircraft remains to exist within the Study Area. As outlined above, all aircraft that crashed while in military service are automatically protected under the Protection of Military Remains Act 1986. All remains of aircraft from this date will be of high importance.

17.1.4.4 1945-Present

101. From the end of WWII until the early 1990s, military aviation activity was dominated by the Cold War. During this period, aircraft research, design and development further increased to the benefit of both the military and commercial sector. Developments in aerospace engineering, a term coined in 1958 to encompass aircraft and spacecraft technology, saw the refinement of the jet engine which in turn enabled the production of the jet aircraft. The jet aircraft was much faster than its propeller-powered predecessors and was able to attain a greater altitude, providing maximum efficiency over long distances (Jarrett 2000).

102. The growth of commercial aviation in the post-war years saw that flight soon became an available means of travel within and around the UK for most people and the volume of airliner activity across the Study Area is likely to have been considerable. However, despite the volume of aviation activity in the skies over the UK, there have been very few major losses. The Air Accidents Investigations Branch (AAIB) lists 120 civil aircraft losses at sea around the UK between 1946 and 1994, most of which comprise light aircraft or in more recent years, helicopters associated with the North Sea oil and gas industry (Wessex Archaeology 2009:68). Unlike in preceding years, the majority of military aircraft losses are due to training accidents rather than combat operations (Wessex Archaeology 2009:66).

103. There is one charted record thought to represent the possible location of aircraft remains dating to this period approximately 140m south of the East Anglia THREE offshore cable corridor; that of a piper Comanche aircraft (WA 73231) lost in 1971. This record is charted in the Offshore Cable Corridor (*Volume 2, Figure 17.24*) and is considered as 'dead' with the charted location representing the reported loss location of the aircraft. Nonetheless, the potential for the remains of this aircraft to exist within the Study Area cannot be discounted. The discovery of fragments of aircraft wreckage identified as that of a McDonnell-Douglas F-4 Phantom in dredging area 251 (c. 26km north-west of the Offshore Cable Corridor) further serves to signify this potential. This type of aircraft was flown from the mid-1960s and they are still used around the world today. There is no recorded loss for this type of plane in

the region. Therefore, the potential for the remains of aircraft not represented as recorded losses dating to this period cannot be discounted within the Study Area.

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Appendix 17.1 ends here