

Area 521 Archaeological and Historical Record, July 2017.

This record is based on data drawn from the following sources:

- Royal Haskoning DHV (RHDHV) : Archaeology Desk Based Assessment 2016, Appendix 14.1 to Dover Harbour Board Aggregate Dredging Application MLA/2016/00227.
- EGS International Ltd : Goodwin Sands Geophysical Survey 2015, Appendix 8.2 to Dover Harbour Board Aggregate Dredging Application MLA/2016/00227.
- Wessex Archaeology : Archaeological review of Geophysical Data 2016, Appendix 14.2 to Dover Harbour Board Aggregate Dredging Application MLA/2016/00227.

Technical Glossary:

- United Kingdom Hydrographic Office (UKHO) – records the presence of “anomalies” (objects) on the seabed which may be a hazard to shipping. If UKHO classifies an anomaly as “dead” this is for navigational purposes only (e.g. it is no longer on the surface, but buried [ref. Wessex Archaeology 2016: Summary]) and does not refer to its archaeological status.
- National Record for the Historic Environment (NRHE) – provides an official national listing of recorded historical/archaeological sites.
- Kent Historic Environment Record (HER) - provides an official listing of recorded historical/archaeological sites in Kent.

Geophysical data collection equipment/methods – sonar and echosounders [ref. GES Intl. Ltd.]:

- Sidescan sonar system (SSS)
- High-frequency multibeam system (MBES)
- Sub-bottom profiler (SBP)
- Ultra Short Baseline (USB) sub-surface positioning system.

Archaeological Classification:

- A1 : Anthropogenic origin of archaeological interest.
- A2 : Uncertain origin of possible archaeological interest.
- A3 : Historic record of possible archaeological interest with no corresponding geophysical anomaly.

Note: “A total of 28 sites of potential archaeological interest within the exploration area and the proposed dredge area” have been identified as of maritime status in the EIA reports [ref. Wessex Archaeology 2016] using geophysical methodology – see reservations about this methodology below. No sites of potential aviation archaeological importance have been identified in the EIA reports using geophysical methodology – see similar reservations about this methodology below.

Historical Background:

- “ A single, distinct palaeochannel has been identified within sub-bottom profiler data trending approximately east to west across the entire survey area . . . and potentially contains deposits dating from a range of periods from the Cromerian to the Early Holocene . . . there is potential for archaeological

material from the Middle Palaeolithic to the Early Mesolithic to be present in the sediments . . . In the east, this channel is protected by the significant thickness of sand of the Goodwin Sand, although in the west, and within the proposed dredge area, this sediment cover is negligible and the deposits are at direct risk from dredging activities.” [ref. Wessex Archaeology 2016: Summary].

- “As an area of shallow, rapidly shifting sediment the Goodwin Sands have historically proven to be a major hazard to marine navigation. Because of this, they have perhaps the highest density of wrecks, and therefore marine heritage assets, in the UK.” [ref. Wessex Archaeology 2014 and 2016].
- “Due to the nature of this region and the shifting sands that form the banks, there is high potential for the identification of previously undiscovered wrecks within the survey area, whilst those previously recorded wrecks have the potential to become buried or uncovered periodically.” [ref. Wessex Archaeology 2016].
- “A total of 28 sites of potential archaeological interest within the exploration area and the proposed dredge area” have been identified as of maritime status in the EIA reports [ref. Wessex Archaeology 2016]
 - Two sites within the exploration/dredge areas have been classified as A1 – Anthropogenic origin of archaeological interest.
 - Four sites have been classified as A3 – Historic record of possible archaeological interest with no corresponding geophysical anomaly.
 - Twenty-two sites have been classified as A2 - Uncertain origin of possible archaeological interest.
 - **Note:** No sites of aviation archaeological importance in the exploration/dredge area are recorded in the applicant’s EIA, except for the following statement [ref. RHDHV 2016]:

Aviation

6.3.1 Known

There are no known aircraft crash sites or findspots within the proposed dredge area.

6.3.2 Potential

There is high potential for the remains of crashed aircraft on Goodwin Sands.

For example, an intact, Dornier 17 German bomber was found on Goodwin Sands by a local diver in 2008, subsequently revealed to be the world’s only surviving example of this type of aircraft. Shot down during the Battle of Britain in 1940, the remains of the Dornier were raised and are currently undergoing conservation at the RAF museum in Cosford.

There are two records of aircraft located c. 700m to the north of the proposed dredge area. The first is recorded by the NRHE (831719) and the UKHO (15048) as a wreck thought to be the remains of a Second World War American bomber, located in the Gull Stream among the Goodwin Sands. The second is an NRHE record (1398705) of a B26 Marauder (an American bomber) reported by divers lying on top of an old shipwreck in Kellett Gut. Given that these two records are c. 250m apart it is likely that they represent the same wreck.

There are no further losses of aircraft recorded within the area searched. This is unlikely, however, to be a realistic reflection of the potential for aircraft to be present.

Additional Note: The Goodwin Sands is the known and recorded crash site of at least 60 downed military aircraft and their 83 crew during the Battle of Britain, World War II. [ref. Kent Battle of Britain Museum, 2017 – evidence submitted to the Marine Management Organisation and the Ministry of Defence 2017]. The location of such crash sites are automatically protected from unauthorised interference by the Protection of Military Remains Act 1986.

- “There are 55 documented losses recorded by the NRHE and/or Kent HER within 2km of the exploration area. The year of loss varies from 1616 to 1980 with the highest density of losses in the 19th century (Table 6) . . .The majority of the losses were cargo vessels lost during the later 19th century . . . most of the vessels represented in the data are wooden sailing vessels” [ref. RHDHV, 2016 s. 6.2.2].

Historical Background (continued).

“ The NRHE also records the location of a major naval battle c. 1km to the north west of the proposed dredge area . . . The Battle of The Downs took place in The Downs anchorage in 1639 as a part of the Eighty Years War” fought between Spanish and Dutch vessels, with German merchant vessels inadvertently involved, and with consequential loss of vessels of all nationalities in the vicinity of the Goodwin Sands”. [ref. RHDVH 2016, s. 6.2.2]

“ A study assessing pre-1730 shipping activity in England showed that many of the maritime battles that occurred around the UK were concentrated in the English Channel and along the East coast (Wessex Archaeology 2004) . . . Several battles are recorded around The Downs and off the coast of Kent, including some major engagements of the Anglo-Dutch wars. This suggests that there is high potential for the presence of naval, as well as commercial, wrecks within the study area, as well as isolated finds such as cannonballs, indicative of these battle locations . . . A recent study of Goodwin Sands wrecks reports that most of the wrecks present are wooden ships that have not remained intact, battered to pieces by the gales that stranded them and now lying in dispersed debris fields (Wessex Archaeology 2014) . . . The potential for wooden wrecks, or parts of them, which account for the majority of documented losses is considered to be high.” [ref. RHDHV 2016 s. 6.2.2.]

- Assessment of “Direct Impacts to Heritage Assets” [ref. RHDHV 2016, s. 7.3.1]

“ Direct impacts to potential archaeological material may occur if previously undiscovered heritage assets are buried with the target aggregate and if they are impacted by the drag head during dredging . . . the archaeological material is considered to be **high** (Note: bold in the original) . . . The sensitivity of *in situ* maritime or aviation material to impacts from the dredger’s drag head should also be considered to be **high**. All damage to archaeological receptors will be permanent and cannot be reversed. It will not be possible to assess the capacity of an impacted receptor to accommodate change until impacts have been incurred and the receptor has been identified. A precautionary (worst case) approach is recommended which assumes that impacted receptors will have no capacity to accommodate change . . . Similarly, the magnitude of the effect cannot be fully assessed until an impact to *in situ* maritime or aviation material has occurred. It is possible that the impact may result in the total loss of an archaeological receptor, or partial loss of, or damage to, key characteristics, features or elements. If present within the path of the dredger’s drag head, damage is likely to occur and this change will be permanent. The potential magnitude of effect is, therefore, also judged to be **high** . . . In accordance with the matrix in Table 4.6 [ref. Marine Policy Statement] direct impacts to potential *in situ* maritime and aviation heritage assets are assessed as being of possible **major adverse significance**.”

- H.M. Government Marine Policy Statement, 2001 : Heritage Assets:

2.6.6.5: Many heritage assets with archaeological interest in these areas are not currently designated as scheduled monuments or protected wreck sites but are demonstrably of equivalent significance. The absence of designation for such assets does not necessarily indicate lower significance and the marine plan authority should consider them subject to the same policy principles as designated heritage assets (including those outlined) based on information and advice from the relevant regulator and advisors.

2.6.6.7: In considering the significance of heritage assets and their setting, the marine plan authority should take into account the particular nature of the interest in the assets and the value they hold for this and future generations. This understanding should be applied to avoid or minimise conflict between conservation of that significance and any proposals for development.

2.6.6.8: The marine plan authority, working with the relevant regulator and advisors, should take account of the desirability of sustaining and enhancing the significance of heritage assets and should adopt a

general presumption in favour of the conservation of designated heritage assets within an appropriate setting. The more significant the asset, the greater should be the presumption in favour of its conservation. Substantial loss or harm to designated assets should be exceptional, and should not be permitted unless it can be demonstrated that the harm or loss is necessary in order to deliver social, economic or environmental benefits that outweigh the harm or loss.

- The Protection of Military Remains Act 1986: Legal obligation:

“ Potential discoveries of material associated with military aviation . . . automatically protected under the Protection of Military Remains Act 1986”. [ref. RHDVH 2016, Table 6.1].

Key Features from the Geophysical Data.

- “ The form, size and/or extent of an anomaly [detection of an “object”] is a guide to its potential to be an anthropogenic feature and therefore of archaeological interest. A single small but prominent anomaly may be part of a much more extensive feature that is largely buried. Similarly, a scatter of minor anomalies may define the edge of a buried but intact feature, or it may be all that remains as a result of past impacts from, for example, dredging or fishing.” [ref. Wessex Archaeology 2016, s. 2.4].

- Seismic Data: Buried Targets in Palaeochannel [EGS International Ltd Geophysical Survey 2015].

“A number of sub-surface hyperbolae (anomalies) were identified within the seismic records. These are caused in seismic data by the point diffractors, which could potentially represent buried objects such as boulders or debris. . . Depths of hyperbolae range from 4m to 10 m below the seabed. The cluster towards the middle of Figure 22 appears to be associated to the extents of the palaeochannel . . . It is to be noted no hyperbolae were observed in the shallow sections of the site [the proposed dredge area]. However, this could be due to the presence of a number of seabed multiples in the records caused by the repeated reflection of the seabed masking the signature of these features.” [ref. EGS 2015, s. 4.10.1].

- Significant Maritime Wrecks in the Dredge and Exploration Areas [RHDHV 2016, Appendix A].

WA ID *	Classification	Archaeo-logical listing	Description	External Reference
7006	Recorded wreck	A2	Recorded in UKHO position as an unidentified wreck. Not observed in the sidescan sonar or echosound data. Previously seen as a small contact in 1996. Not observed since; presumed buried. Has been amended to “Dead” †.	UKHO 15170
7014	Recorded wreck	A3	Recorded position of British sailing vessel <i>Admiral Gardner</i> which sank in 24/01/1809. Last seen in 1997 30mx10mx2m. Noted as intact and almost entirely buried. Given protected designation and 300m exclusion zone. Not observed in sidescan sonar or echosound data.	UKHO 14868 NRHE 1082122 HER MKE17338
7018	Wreck	A1	Two distinct areas identified in the sidescan sonar and echosounder data, approximately 34m apart on NW - SE alignment. Centre of the two areas used for location position. The area to south east is observed as a distinct elliptical mound with a depression in the centre, appearing partially buried in the sediment and measuring 18.9m x 6.5m x 4.7m. Section to north west appears as a large but regular scatter of objects measuring 37m x 28m x 3.5m. Associated with UKHO recorded position of the US steam ship <i>North Eastern Victory</i> , which is recorded as being in two pieces with the middle section buried. Sunk 24/12/1946. The north west section appears as a distinct array of straight objects with structure in the CHP data, which implies area is being slowly buried.	UKHO 1379 NRHE1523927 HER MKE76172

WA ID	Classification	Archaeological listing	Description	External Reference
7023	Recorded wreck	A3	Recorded UKHO foul ground position. Not observed in sidescan sonar or echosound data. Last observed in 1981 by sonar as an area of rocks or wreck 25mx20m. Has been amended as “Dead” †.	UKHO 14780 NRHE 831709 HER MKE9771
7024	Wreck	A1	Recorded in UKHO position of an unidentified wreck, recorded as possible debris or vessel stern. Not observed in the current data set but observed in the 2009 CHP data as a small but distinct irregular object within a depression, with some structure and surrounding scar.	UKHO 75211
7027	Recorded wreck	A3	Recorded UKHO foul ground position. Not observed in sidescan sonar or echosound data. Recorded as a magnetometer anomaly only; presumed buried. Has been amended as “Dead” †.	UKHO 14749 NRHE 831712 HER MKE9774

* WA ID = Wessex Archaeology Identification Number (Wessex Archaeology, 2016)

† United Kingdom Hydrographic Office (UKHO) – records the presence of “anomalies” (objects) on the seabed which may be a hazard to shipping. If UKHO classifies an anomaly as “Dead” this is for navigational purposes only e.g. it is no longer on the surface, but buried [ref. Wessex Archaeology, 2016 : Summary] and does not refer to its archaeological status.

Additional Notes : Significant Maritime Wrecks in the Dredge and Exploration Areas (recorded above).

- Of the above officially recorded wrecks, one lies in the proposed dredge area (7006) and five lie in the exploration area (7014, 7018, 7023, 7024 and 7027).
- “ The *Admiral Gardner* [7014], an English East Indiaman, built in 1797, which stranded in Trinity Bay during a gale in 1809. The wreck was discovered in 1976 after East India Company tokens appeared in sand dredged from the Goodwin Sands for use as fill for construction in Dover Harbour . . . the wreck was subject to salvage work between 1980 and 1985 . . . the site of the *Admiral Gardner* is subject to a cycle of exposure and burial. Geophysical survey in 2012 showed that the site was buried . . . the site assessment for the wreck suggests the South Sand Head (the southern sandbank of the Goodwin Sands) has shifted to the west over the last decade, covering the wrecks on the western edge of the sandbank including that of the *Admiral Gardner*”. [ref. RHDHV 2016, s. 6.2.1].

Unresolved Issues in the Identification and Recording of Historical and Archaeological Assets.

The foregoing (RHDVH 2016, GES Intl. Ltd 2015 and Wessex Archaeology 2016) is a comprehensive account of the known assets (those which have been discovered). However, equally central, is the issue of what is not known (has not been discovered) and whether there is a methodology capable of enabling it to be known.

This is important because, without doubt, the significance of this historical heritage is clear:

- The Goodwin Sands have perhaps the highest density of wrecks, and therefore marine heritage assets, in the UK [ref. Wessex Archaeology 2014 and 2016].
- There are potential significant Palaeolithic and Mesolithic archaeological assets located in the dredge site that would be at risk from dredging [ref. Wessex Archaeology 2016].
- It is known that at least 60 aircraft and 83 crew crashed in the Goodwin Sands during WWII Battle of Britain [ref. Kent Battle of Britain Museum 2017] and that these remains and the ‘final resting places’ of the crew are automatically protected from disturbance under the Protection of Military Remains Act 1986.

If we accept that there are c. 1000 shipwrecks in the Goodwin Sands [ref. 700 wrecks since 1600, Richard and Bridget Larn, *Shipwrecks of the Goodwin Sands*, published by Meresborough Book, 1995,

and 300 from the centuries prior to 1600] along with 60 documented military WWII aircraft [Kent Battle of Britain Museum] we can reasonably expect the dredge site – which is one-sixteenth of the area of the entire Goodwin Sands [RHDHV 2016] – to contain, simply on a statistical basis, the remains of 4 aircraft and the wrecks of 62 ships.

These aviation and maritime archaeological remains, along with the possible Paleolithic and Mesolithic remains, are significant historical assets. The HMG Marine Policy Statement has a presumption in law that they will be protected (MPS 2001, s.2.6.6.8), as also does The Protection of Military Remains Act 1986 in the case of WWII military aviation remains.

The key question therefore is whether the documented archaeological and historical record accompanying the Dover Harbour Board's marine aggregate dredging application (MLA/2016/00227) and the associated geophysical identification surveys have adequately recorded these heritage assets?

The significant issues are:

- Of the six known wrecks in the dredge/exploration area for dredging application MLA/2016/00227 (7006, 7014, 7017, 7023, 7024 and 7027) only one (7017) was detected by the EGS Intl. Ltd (2015) sidescan sonar and echosounder geophysical monitoring programme. The other five are known to be there, but were not detected by the survey. Why is this?

These survey techniques are only effective in any reliable way for the detection of maritime historical and archaeological assets when the asset is not buried i.e. is partially above the surface. If it is below the surface and buried, it is unlikely to be detected with any degree of reliability.

This being so, the overwhelming majority of maritime historical and archaeological assets will be buried (objects deposited on sand have a physical propensity to sink into the sand) and will so not be discovered by conventional survey methods (sidescan sonar and echosounder techniques).

The foregoing position is confirmed by the 2015/16 surveys for application MLA/2016/00227; and, the fact that one of the wrecks – 7014, *Admiral Gardner* which is now reburied - was not detected in 2015/16, and was originally only found as a result of aggregate dredging in 1976.

For marine licensing purposes, the presumption must therefore be that a substantial majority of maritime historical/archaeological assets in the Goodwin Sands are beyond detection by conventional geophysical surveying methods (sidescan sonar and echosounders), and will only become known (discovered) if subject to actual excavation.

Given that excavation of historical/archaeological assets on land is a meticulous and rigorously conducted procedure in order to ensure that the asset is not damaged, and given that excavation by marine aggregate dredging will inevitably be heavy-handed and lead to irreversible damage to the heritage asset (RHDHV 2016, s. 7.3.1 and Wessex Archaeology 2016, Summary), there clearly exist incontrovertible reasons to assert that aggregate dredging in Area 521 of Goodwin Sands (MLA/2016/00227) will be injurious to the maritime historical and archaeological assets, and possibly Paleolithic and Mesolithic remains too, that reside there but which are unknown and undiscovered. HMG Marine Policy Statement 2001 has a clear presumption in favour of their conservation and protection (ss. 2.6.6.3 forward).

Consequently to allow aggregate dredging on the basis of current sidescan sonar and echosounder techniques would be reckless, and thus irresponsible and arguably unlawful too.

- Given the foregoing documented evidence regarding the difficulty of detecting buried historical and archaeological assets, it is not surprising that geophysical surveys to date in connection with application MLA/2016/00227 have not detected WWII crashed aircraft from the Battle of Britain and their crews.

There are at least 60 aircraft from this Battle documented as having crashed in the Goodwin Sands, and this fact does not take account of other aircraft which may be in this locality from the extended period of WWII (1939-1945).

Unlike maritime historic assets (shipwrecks) which require detection before they can become legally protected, military aircraft from WWII are automatically protected if they are known to be in a specific locality, even though their remains have not yet become physically evident. There is a definitive legal protection for the remains of such aircraft against disturbance, without prior licence from the Secretary of State, Ministry of Defence, under the Protection of Military Remains Act 1986.

Accordingly, regardless of sidescan sonar and echosounder data, there is a legal presumption in favour of the protection of documented WWII aircraft and their crews in the Goodwin Sands.

- It has been proposed, and actioned (ref. Marine Management Organisation 2017), that the sidescan sonar and echosounder surveys be repeated and, in doing so, be accompanied by a magnetometer survey. This new survey is for the dredging site only (Area 521) and does not encompass the earlier wider exploration area (ref. RHDHV 2016) of the South Sand Head (the southern sandbank of the Goodwin Sands). The magnetometer survey will seek to detect ferrous material, but will not detect other metals.

In the case of WWII military aircraft their construction, in the vast majority of cases, was from wood, canvas and aluminium alloys including engine cylinder blocks, and only a limited number of components (e.g. propellers and some engine parts) will have been ferrous in composition [Kent Battle of Britain Museum]. In the case of maritime assets, the vast majority will have been of timber construction [RHDHV, 2016 s. 6.2.2], and only a small number of features (e.g. cannoballs) will have been ferrous.

Accordingly a magnetometer survey has inherent limitations, as recorded above, and its penetration of sediment is limited to around 2 metres in depth. Further, a buried object(s) detected by this means can only be interpreted (albeit professionally) rather than provide a definitive statement of fact as to its historical/archaeological status. Only physical excavation (professionally undertaken) can be definitive.

Consequently, it is unclear what the present objectives of the new geophysical surveys are; nor have these objectives have not been stated in any precise terms from an historical and archaeological standpoint [ref. Wessex Archaeology, Magnetometer Survey Specification, 2016, Report 111511.01].

- The shortcomings of the existing (2015 and earlier) sidescan sonar and echosounder surveys have been documented above. These geophysical surveys are now to be repeated (confirmed by the Marine Management Organisation as completed July 2017) along with an accompanying magnetometer survey. However as noted above, these new surveys are confined specifically to the proposed dredging area (Area 521), and do not encompass the wider exploration area as in 2015 (reported upon RHDHV 2016).

Consequently in terms of scientific procedure, there is no “control site” for these new findings.

Thus there is no means of being able to verify whether there new findings will be “significant” (i.e. normal/abnormal). For example, if the magnetometer survey draws a “blank” (nothing detected) how may this finding be evaluated if there is no comparable area with which to compare it, and if it does detect a level of “activity” how significant has the magnetometer tool been in detecting “activity” when there is no comparable area with which to compare it?

These are serious questions in the context the documented background reality where there are c. 1000 shipwrecks and 60 known crashed WWII aircraft in the Goodwin Sands.

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