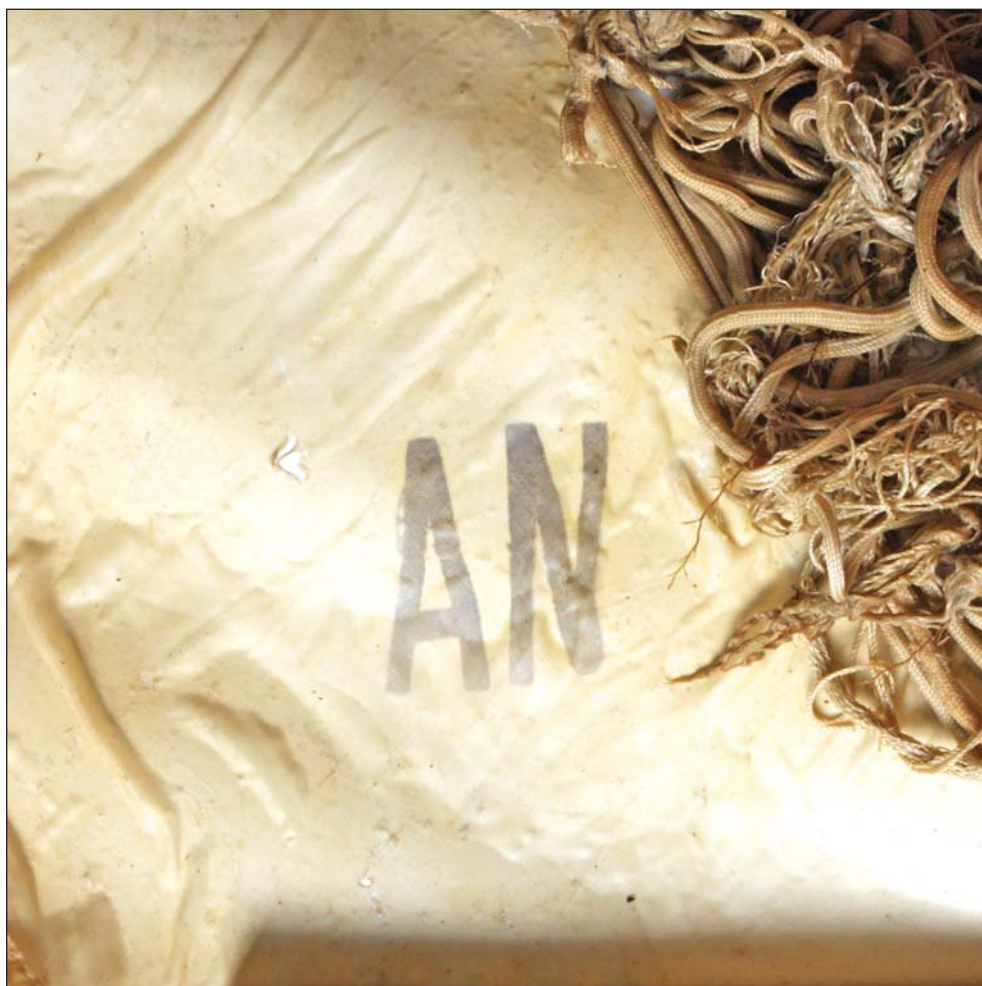




making sense of heritage

London Gateway Port: Strike and Track-plot Report

Preliminary Interpretation of Finds: Second Tranche



Ref: 88631.01
October 2014



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Preliminary Interpretation of Finds: Second Tranche

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Summary

Wessex Archaeology has been commissioned by London Gateway Port Ltd to provide archaeological services in respect of marine works in the course of developing the London Gateway Port and its associated infrastructure.

The purpose of this document is as follows:

- To describe and identify objects of archaeological interest (finds) recovered during LGP dredging operations and not previously reported upon in detail;
- To assess available evidence for where and what these finds were dredged from;
- To assess the available evidence for obstructions of possible archaeological interest encountered during dredging;
- To provide advice upon the archaeological significance of these finds and obstructions;

This report follows the first Strike and Track-plot Report compiled in November 2011 (ref. 72436.01).

A total of 9 strikes (finds and obstructions) have been recorded during the period September 2011 to May 2014. The retained finds have been recovered from the drag head of the dredgers that have undertaken the work. Most were retained during onboard watching brief by Wessex Archaeology and others were retained by the dredger crew. All of the retained finds have subsequently been examined by specialist archaeologists.

The most important discovery has been the wreck of a 19th century paddle steamer in Zone 38. Encountered as an obstruction, it has since been cleared and is reported upon separately.

Other notable finds include: ship or boat timbers that are likely to derive from one or more wrecks; a Second World War parachute; two cast iron cannon fragments, including part of what was probably an English Falcon of the second half of the 16th century; and a 13-15th century pottery cooking vessel recovered during an epibenthic trawl. Taken as a whole, the date range of the finds reported is 13-20th century.

With the exception of Strike 8028, which is part of the Second World War anti-submarine boom, the method of recovery means that all it is possible to say about where the finds have come from with certainty is that they are from Zones 30-40, with most coming from Zones 35-39. None have been positively identified as coming from previously identified sites or anomalies, although the parachute could be associated with the fuselage of an unknown aircraft, snagged by a trawler in 1992 but not subsequently located.

If ship wrecks associated with Strike 8029, part of a late 16th century cannon, or Strike 8034, the base of a medieval jar, were to be found, then these could represent important archaeological



discoveries of national or international importance. If the aircraft wreck possibly associated with Strike 8031 were to be found, then it will also be an important discovery.

Significantly fewer finds were reported in 2013 than in previous years. This suggests that the archaeological resource within the dredging zones is now diminished, at least to the depth of dredging. The extent to which the unknown maritime and aircraft sites within the dredging zones, suggested by the finds reported upon in this and the previous reports, have been removed during the dredging process is unclear.



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Wessex Archaeology would also like to thank the following:

- Ordnance expert Charles Trollope, who provided advice on the identification of Strikes 8029 and 8030, based upon measurements and photographs of the finds provided to him;
- The crew of the dredgers *Congo River*, *Breughel*, *Marieke*, *Charlemagne*, and *Lange Wapper*.

On-board archaeological watching brief was carried out by Paolo Croce, Andrew Roberts, Patrick Dresch and Graham Scott. Paolo Croce carried out the recording of Strikes 8027 and 8032 with the assistance of Gemma Ingason. The report was compiled by Graham Scott and Paolo Croce, with contributions by Gemma Ingason. Kitty Foster prepared the illustrations. Quality control and editing was carried out by Toby Gane, who also managed the project for Wessex Archaeology.



London Gateway Port: Strike and Track-plot Report

Preliminary Interpretation of Finds: Second Tranche

1 BACKGROUND

- 1.1.1 Wessex Archaeology (WA) has been commissioned by London Gateway Port Ltd to provide archaeological services in respect of marine works carried out during the development of the London Gateway Port (LGP) and its associated infrastructure.
- 1.1.2 The Protocol for Archaeological Discoveries (LORDI 2011) was initiated in March 2009 and updated in March 2011. The protocol provides for the reporting and recording of objects of archaeological interest (finds) recovered during dredging operations associated with LGP. It also provides for the reporting of obstructions with possible archaeological potential encountered during dredging, regardless of whether or not archaeological material was recovered. The protocol is in operation between Zone 1 and 50 and Zones 102 to 109.
- 1.1.3 The purpose of this document is as follows:
- To describe and identify finds recovered during LGP dredging operations and not previously reported upon in detail;
 - To assess available evidence for where and what these finds were dredged from;
 - To assess the available evidence for obstructions of possible archaeological interest encountered during dredging;
 - To provide advice upon the archaeological significance of these finds and obstructions;
- 1.1.4 This report follows the first Strike and Track-plot Report compiled in November 2011 (ref. 72436.01).

2 METHODOLOGY

- 2.1.1 The methodology applied is consistent with LORDI 2011.
- 2.1.2 LGP dredging has been carried out by trailing hopper suction dredgers (THSDs). Finds are therefore only made when the drag head is recovered to the surface, either when the drag head becomes partially blocked by an obstruction or when the dredger concerned has a full load. Any objects sucked into the drag head and that have become lodged in its screen rather than passing through are then removed by hand. These objects are then inspected and any considered to be of potential archaeological interest are retained.
- 2.1.3 The drag head screen is designed to prevent large objects passing into the hopper pipe. The capacity of the screen to catch and retain small or fragile finds is very limited. Furthermore, this method of recovery is in no sense archaeologically sensitive and many

finds suffer serious or catastrophic damage as a result of the huge water pressure and physical impacts brought to bear upon them. As a result it is likely that only a small proportion of finds encountered by the drag head are actually recovered.

- 2.1.4 The process of inspecting and retaining finds is carried out by an on-board WA archaeologist as a 'watching brief' when the vessel is dredging in certain dredging zones identified by previous work as being archaeologically sensitive. In other zones it is normally carried out by the vessel crew. Notifications of discoveries are then sent to WA on a LORDI 2011 protocol proforma accompanied by photographs.
- 2.1.5 Significant obstructions encountered by the drag head are also notifiable under the protocol because there is potential for them to be archaeologically important. Although the obstruction is not seen, its presence is generally felt either through a drop in hopper pipe pressure or a small deviation in the track of the vessel. An obstruction is less likely to be detected by larger and more powerful dredgers.
- 2.1.6 Subsequent to the receipt of a protocol proforma, WA has prepared a protocol report/s for the finds. WA has then determined whether further investigation and reporting is required under LORDI 2011. If so, the relevant finds or obstructions have been assigned a 'Strike Number'.
- 2.1.7 The designation of 'strike' to a find/s or obstruction has generally been considered appropriate where:
- a noticeable obstruction was encountered by the dredging vessel;
 - a find whose cultural importance or potential importance is considered to be high has been recovered;
 - a find that may be associated with a known site has been recovered; or
 - a find that may lead to the discovery of unknown site has been recovered.
- 2.1.8 For each Strike Number, the relevant vessel 'trip' is identified. Each trip is a single dredging operation. Timed dGPS positions for the dredging part of each trip, from the start of dredging to recovery of the drag head when fully loaded, are then obtained. These show the position of the dredging vessel at five minute intervals.
- 2.1.9 A shapefile called a 'trackplot' is then created. This reconstructs the track of the dredger by joining the positions using straight lines. To take into account potential variations between the trackplot and the path over the ground of the dredger and the fact that the GPS receiver is remote from the drag head, a 10m buffer is applied. As bed level has generally been reduced gradually and the same area of seabed therefore dredged on multiple occasions, any previously identified anomalies and sites coinciding with this trackplot and from where the finds may originate are then identified.
- 2.1.10 An archaeological description and interpretation is given for each find in the strike, following transfer and examination at WA (this process begins onboard if there was an onboard archaeologist). The potential of each anomaly or site - identified during previous geophysical survey data assessments for archaeological purposes in 2001/2 (sidescan sonar) and 2005/6 (multi-beam echo sounder) and partially updated in 2011 (Wessex Archaeology 2011a) - within the trackplot buffer to be associated with the Strike is then considered. This analysis has also taken into account Strikes reported on previously (WA 2011b).

- 2.1.11 In addition to those Strikes made during dredging, an additional Strike (8034) was made during an epibenthic trawl survey. Track-plot data for the trawl has been used to isolate the likely recovery area. Although not part of the Archaeological Mitigation Framework (AMF), it was good practice on the part of the marine ecological contractor (Richard Newell Associates) to report the finding of potential archaeology to WA.

3 STRIKES

- 3.1.1 The strikes have been numbered in date order.
- 3.1.2 With one exception each strike listed below concerns finds that have been retained following a drag head recovery. The exception is Strike 8033, which resulted from the drag head hitting a very substantial obstruction on the seabed.
- 3.1.3 Where more than one object has been recovered together and there is potential for them to be associated in some way, they have been described in the same strike. The exception to this is Strike 8027, which is a group of twelve objects from multiple trips conducted without an on-board archaeological watching brief and reported together by a member of the vessel crew.
- 3.1.4 Anomalies/known sites that have the potential to be associated are shown in tables under the relevant Strike. They are shown graphically with the relevant vessel trackplot in the relevant figure.

3.2 Strike 8027 – worked timbers

Circumstances of recovery

- 3.2.1 Twelve worked pieces of timber (WA 1140-51; **Plates 1a-l**) were recovered from the drag head of THDS *Breughel* between 24th October and 23rd November 2012 in Zones 34-40 (**Figure 1**). These finds were reported together and it has not proved possible to establish which trip they are each from. However, it appears from the manner in which they were reported that they were recovered during more than one trip and are therefore unlikely to be from a single site.

Description

- 3.2.2 Some of the objects are damaged and it appears likely that this damage is mainly recovery related. In addition the objects were allowed to dry out before they reached WA, with the result that there has been considerable distortion and cracking. This makes interpretation more difficult.
- 3.2.3 WA 1140 (**Plate 1a**) has only been examined in photographs taken on board the *Breughel*. It appears to be a plank that has been bent in half by post-depositional or recovery damage.
- 3.2.4 WA 1141 (**Plate 1b**) measures approximately 1240mm long by 120mm wide by 110mm thick, is broadly square in cross-section and is of uncertain function. There are traces of a ferrous plate or fitting on two sides of the timber with ferrous staining along about 450mm of its length. Five ferrous through fastenings are visible: two holes adjacent to each other at one end; one centrally located; and a further two adjacent to each other at the other end) and two further holes are visible outside of the stained area on the timber.
- 3.2.5 WA 1142 (**Plate 1c**) is a plank, approximately 1200mm long by 160mm wide by 52mm thick. Three treenails are present, arranged in a single fastening fashion. Both ends have been damaged. One of the flat surfaces also has damage in the form of historic pitting and abrasions, although it is not clear whether these are pre- or post-depositional in nature.

- 3.2.6 WA 1143 (**Plate 1d**) has only been examined in photographs taken on board THSD *Breughel*. It appears to be a fragment of a broken dead-eye.
- 3.2.7 WA 1144 (**Plate 1e**) measures approximately 1.2m long by 120mm wide by 90mm thick. It has a square cross-section and is in fair condition, apart from being damaged at one end. The opposing end has an unsymmetrical taper at the head of the timber forming a 'v-shape' which aided the abutment of the timber to another on a vessel. This timber is potentially a deadwood, although this cannot be confirmed, and the lack of a substantial fastening may suggest otherwise. It has three 30mm diameter treenails set in an alternating or diagonal pattern and one hole for an iron fastening. A curving 'cut' seen on the side of the object is interpreted as post-deposition or recovery damage.
- 3.2.8 WA 1145 (**Plate 1f**) is possibly a futtock or half frame. It measures 600 by 100 by 90mm and has a broadly square cross-section. It has four *in situ* treenails in an alternating pattern and extending through one axis of the timber, whilst the other axis has two ferrous through fastenings. Although damage makes further interpretation difficult, one end was probably cut to abut a reciprocal timber with a plain scarf joint.
- 3.2.9 WA 1146 (**Plate 1g**) measures 890 by 160 by 130mm and is possibly a futtock or half frame. It is square in cross-section and has four *in situ* treenails as well as one ferrous through fastening. Whilst some of the original worked surface can be seen no tool marks are apparent. The futtock is in fair condition apart from a post-recovery longitudinal split and damage to one end. The damaged end is cut to abut a reciprocal timber with what appears to have been a plain scarf joint and has a single empty treenail hole.
- 3.2.10 WA 1147 (**Plate 1h**) is probably a fragment of heavily abraded plank with one *in situ* treenail and one treenail hole. It is lighter in both colour and weight than other wooden objects in Strike 8027 and has been affected by bio-infestation. It is a tropical hardwood of as yet unknown species (pers. comm. R. Bale, 08/09/2015).
- 3.2.11 WA 1148 (**Plate 1i**) is a knee. It has been badly damaged during recovery. Three 'grazes' on the surface of the wood may be tool marks. It has a single empty treenail hole which measures 20mm diameter.
- 3.2.12 WA 1149 (**Plate 1j**) measures 700 by 100 by 60mm. It is a very worn and has suffered damage. Damage to all of its faces makes identification difficult. It has a single treenail hole of 35mm diameter with a broken cylindrical treenail.
- 3.2.13 WA 1150 (**Plate 1k**) is in particularly poor condition. It is grossly deformed, very worn and has sustained heavy damage post-deposition or during recovery. It has a single treenail hole and one hole with iron staining. It is likely to have originally been a thin plank.
- 3.2.14 WA 1151 (**Plate 1l**) measures 1060 by 150 by 30mm and is unidentified. It has two partial treenail holes. Damage to the object, probably during recovery, makes interpretation very difficult, although it is probably a plank.

Location of recovery

- 3.2.15 The relevant trackplot has not been identified, although the finds are reported to have been recovered during dredging of Zones 34-40. In the absence of a trackplot no attempt has been made to identify anomalies that may be associated with the finds. It has not proved possible to identify associations with previously recovered finds on the basis of similarity.

Discussion

3.2.16 All of the finds are likely to be from a vessel or vessels, with the possible exception of WA 1141, which may be debris from a damaged structure. WA 1143 may be an isolated loss. An association with the ship's timbers of Strike 8032 (Zones 36-40) is possible, although the timbers found in both strikes are not sufficiently similar to make a positive connection.

3.3 Strike 8028 – anti-submarine boom fitting

Circumstances of recovery

3.3.1 WA 1096 was reported with Strike 8027 (see above).

Description

3.3.2 WA 1096 (**Plate 2**) is a large ferrous fitting with a square base from which two curved horn-shaped projections on opposite sides. It resembles a bitt, used for securing rope or cable, although it is clearly of non-standard design and probably unsuitable for use with rope.

Location of recovery

3.3.3 The relevant trackplot has not been identified. However, it is reported to have been recovered from Zones 34-40. A Second World War anti-submarine defence boom constructed between Shoeburyness and Minster on the Isle of Sheppey formerly crossed Zone 35 and a UKHO record (WA 5195; **Figure 1**) and a number of geophysical anomalies have previously been associated with this structure (Table 1; WA 2008 and Firth *et al.* 2012: 63-4).

Mitigation Group ¹	Zone 35
2.1.1	
2.1.2	
2.1.3	5195; 7476; 7477; 7478; 7544;7546; 7547; 7586
2.1.4a	
2.1.4b	
2.1.4c	
2.1.4d	
2.2.4d	

Table 1: Strike 8028 anomalies and sites

Discussion

3.3.4 Part of the anti-submarine boom hung from surface floats. A number of contemporary photographs of the boom show that the floats had bitts for securing the net and that these resemble WA 1096. It therefore appears likely that the find is one of these bitts and that its location prior to recovery was within Zone 35 at one of the above locations.

¹ For a list of mitigation group descriptions see **Appendix 3**.

3.4 Strike 8029 – 16th century cannon fragment

Circumstances of recovery

- 3.4.1 Part of a cast iron smooth bore cannon barrel (WA 5001; **Plate 3**) was recovered from the drag head of THDS *Brueghel* at 23:25 on 30th July 2013 during Trip 0566.

Description

- 3.4.2 The find is a broken fragment of just under one half of the circumference of the breech end of the barrel. It includes part of the first and second reinforces and the first reinforce ring. Total length is 450mm. The fragment is very worn and corroded and there is some concretion of the bore. The diameter of the reinforce ring is 165mm, although as very slightly less than half of the barrel survives, the true diameter will have been slightly greater. Barrel diameter forward of that is 148mm and behind it (First Reinforce) 172mm. Measurement of the bore is complicated by the fact that the edges are worn and slightly irregular, but appears to have been 70-76mm (2.75-3.0 inches).
- 3.4.3 The fragment is probably part of a cannon manufactured in the period 1550-75 (Charles Trollope, email). Barrel thickness and bore suggest that it may be a Falcon, a gun of the culverin type that fired a shot of up to 2.5 pounds. It is likely to have been of North European origin. Given that many of the cast iron guns in circulation at the time were English and given the geographical location of the find, it is quite likely to have been manufactured in England. Early cast iron guns are rare and therefore even fragments are archaeologically significant.
- 3.4.4 It is not impossible that the gun burst onboard and was dumped over the side. However, it is more likely that the fragment was part of a worn out or damaged gun that was being carried as ballast or cargo. Whilst both ballast and cargo can be jettisoned from a ship at sea in certain circumstances, it is more probable that its presence on the seabed results from the loss of a vessel and that therefore the find comes from a wooden wreck. In those circumstances the date of loss is uncertain, as the gun could have been very old at the time. However, a date of loss in the second half of the 16th century or during the first half of the 17th century is plausible.

Location of recovery

- 3.4.5 The track-plot for Trip 0566 shows dredging activity along the northern edge of Zones 30-35 and along the southern edge of Zones 30-31 (**Figure 2**). No recorded wreck of this period that could account for the presence of the find in the area dredged during Trip 0566 has been identified and no obstruction was recorded during dredging prior to the recovery of the drag head. Table 2 shows previously located anomalies within the trackplot buffer. None have any obvious characteristics of a wooden shipwreck and all are derived from pre-dredge sidescan sonar data dated 2001-2.

Mitigation Group	Zone 30	Zone 31	Zone 32	Zone 33	Zone 34	Zone 35
2.1.1						
2.1.2						
2.1.3						
2.1.4a		7380				
2.1.4b						
2.1.4c		7583				
2.1.4d		7381				
2.2.4d						

Table 2: Strike 8029 anomalies and sites

Discussion

- 3.4.6 WA 5001 is archaeologically significant because it is part of a rare object and because it is likely to have come from a late 16th or early 17th century wreck impacted by the dredge. The location, size and character of the wreck are currently unknown.

3.5 Strike 8030 – 17th century cannon fragment

Circumstances of recovery

- 3.5.1 Part of a cast iron smooth bore cannon muzzle (WA 5004; **Plate 4**) was recovered from the drag head of THDS *Brueghel* at 08:20 on 1st August 2013 during Trip 0569.

Description

- 3.5.2 The find is a broken fragment of just under one half of the circumference of the barrel and includes the muzzle, five concentric muzzle mouldings, the muzzle astragal and fillets and a section of the chase. It is 380mm long and the bore is estimated from the segment that survives to have been approximately 92mm (3.63 inches). Barrel wall thickness is approximately 55mm. The muzzle has a pronounced flare which commences just forward of the muzzle astragal.
- 3.5.3 The shape of the muzzle swell and the diameter of the bore suggest that it is from an English saker of the English Civil War era. It is likely to have been manufactured within the period 1640 to 1670 (Charles Trollope, email).
- 3.5.4 Although there is a small gouge mark from damage that occurred during recovery, the broken edges of the find are highly worn, which suggests that the damage is historic and not caused by impact with the drag head. It could therefore have resulted from accidental damage caused during firing, or from the deliberate breaking up of a worn out or damaged gun.
- 3.5.5 Early iron sea service guns were prone to losing part of their muzzle if they accidentally struck the side of the gun port during recoil. This is the most likely explanation for the presence of this find on the seabed. In those circumstances the muzzle might fall into the sea, resulting in an isolated find. However, naval vessels and possibly merchant ships also carried old iron guns as ballast and these have been discovered on the nearby wreck site of the English warship *London*, lost in 1665 (WA 2012: 8-9). If the muzzle was carried inside a vessel as ballast, then it is likely to have come from the wreck of a wooden ship.
- 3.5.6 In the second half of the 17th century the bulk of the English navy was based in the ports of the Medway and Thames Estuary due to the threat posed by the Dutch. Furthermore, the find was made seaward of the important naval anchorage of the Nore, where the fleet was accustomed to muster. However, we cannot be sure that the gun was in the possession of the English fleet and it could also have been part of the armament of a sizeable merchant ship. Furthermore, captured English guns were frequently used on-board Dutch ships.

Location of recovery

- 3.5.7 The track-plot for Trip 0569 shows dredging activity in the southern part of Zones 35 to 40 (**Figure 3**). No recorded wreck of this period that could account for the presence of the find in the area dredged during Trip 0569 has been identified and no obstruction was recorded during dredging prior to the recovery of the drag head. Table 3 shows previously located anomalies within the trackplot buffer. Like 8029, none have any obvious characteristics of a wooden shipwreck and all are derived from pre-dredge sidescan sonar data dated 2001-2.

Mitigation Group	Zone 36	Zone 37	Zone 38	Zone 40
2.1.1				
2.1.2	7139			
2.1.3				
2.1.4a				
2.1.4b				
2.1.4c	7137	7141, 7145	7146,	
2.1.4d		7549	7552, 7147, 7553	
2.2.4d			7554	7157

Table 3: Strike 8030 anomalies and sites

Discussion

- 3.5.8 Comparison of the relevant trackplots appears to rule out an association with Strike 8029. Find WA 5032, the base of a late 16th or 17th century stoneware jug manufactured on the Rhine was recovered from Zones 38-39 during Trip 0585 and could possibly be associated. However, in the absence of evidence of a 17th century shipwreck, WA 5004 is probably an isolated find. Its presence on the seabed probably resulted from an accident that occurred whilst firing part of the armament of an English naval vessel in the mid to late 17th century.

3.6 Strike 8031 – Second World War Allied parachute

Circumstances of recovery

- 3.6.1 Part of a parachute (WA 5007; **Plate 5**) and two small fragments of what is probably riveted aircraft aluminium (WA 5008-9) were recovered from the drag head of THDS *Brueghel* at 01:00 on 6th August 2013 during Trip 0575. The parachute was untangled and opened at WA Salisbury in March 2014.

Description

- 3.6.2 The parachute is a substantial fragment with the canopy and some suspension lines. It is not attached to a harness and it was found unpacked. No data panel or printed serial number was found. However, printed markings on the canopy read 'AN' (interpreted as standing for 'Army Navy') and the number '24'. This is likely to indicate that this was a 24ft canopy constructed of 24 individual panels. Each panel should have been marked along the edge of the parachute though the incomplete nature of the find means that only the 24th panel has a remaining mark.
- 3.6.3 The parachute is a standard US pattern manufactured by various companies and widely used during WWII by pilots. It is likely to have been in use on an American plane overflying the Thames Estuary.
- 3.6.4 The aluminium pieces are fragments and have been crushed. There is evidence of small rivets characteristic of aluminium aircraft parts and evidence of a dark paintcoat. There are no serial numbers or other markings and their function is unknown. They are likely to be debris associated with an aircraft that has crashed into the sea and are therefore likely to be from a military aircraft of the Second World War.

Location of recovery

- 3.6.5 The track-plot for Trip 0575 shows dredging activity in the centre and southern half of Zones 35-40 (**Figure 4**). A 12m section of the fuselage of an unknown aircraft is reported to have been fouled by a fishing vessel in 1992 approximately 120m south-west of the trackplot in

Zone 39, but it was not subsequently located (WA 5041; WA 2007). It is conceivable that the parachute is related to this aircraft. Otherwise no recorded wreck of this period that could account for the presence of the finds in the area dredged during Trip 0575 has been identified and no obstruction was recorded during dredging prior to the recovery of the drag head. Table 4 shows previously located anomalies within the trackplot buffer. None have any obvious characteristics of an aircraft wreck and all are derived from pre-dredge sidescan sonar data dated 2001-2.

Mitigation Group	Zone 36	Zone 37	Zone 38	Zone 39	Zone 40
2.1.1					
2.1.2	7139				
2.1.4b	7480				
2.1.4d			7550		7567
2.2.4b			7564,7702		
2.1.4c	7225	7149			
2.2.4d			7152, 7361		

Table 4: Strike 8031 anomalies and sites

Discussion

- 3.6.6 The circumstances in which the parachute came to be present on the seabed are unknown. Although it was found unpacked, it is possible that this is the result of the recovery rather than deployment. Similarly the fact that it was not attached to a harness could mean that it was not attached in the first place, became detached during recovery or the user successfully detached it after landing in the water after bailing out. An association with the aircraft WA 5041 in Zone 39 is possible.
- 3.6.7 Although the probable aluminium aircraft fragments are unidentified, the possible presence of an aircraft wreck in the near vicinity is unlikely to be coincidental. The possibility that dispersed debris existed prior to dredging or that since 1992 the aircraft has lain buried and further to the north or north-east than previously recorded cannot be discounted. At the present time evidence exists that a crashed military aircraft exists or existed until recently within Zone 36. However, if any of the wreck survives, then its current location is unknown.

3.7 Strike 8032 – worked timbers

Circumstances of recovery

- 3.7.1 Nine fragments of worked timbers (WA 5017-25; **Plates 6a-i**) were recovered from the drag head of THDS *Brueghel* at 01:55 on 7th August 2013 during Trip 0576.

Description

- 3.7.2 WA 5017 (**Plate 6a**) measures approximately 420 by 130mm and has a square profile. It has suffered recent mechanical damage, probably during recovery and it has also suffered damage due to infestation by marine borers. Concretion on one surface suggests that a metal nail is preserved within the wood and a small section of one side appears to have been protected from weathering by the attachment of a rectangular object.
- 3.7.3 WA 5018 (**Plate 6b**) measures approximately 100 by 150mm and is interpreted as a plank. There is a single empty treenail hole. There is evidence of infestation by marine boring organisms. One end appears angled; the other has been damaged, possibly during recovery.

- 3.7.4 WA 5019 (**Plate 6c**) measures approximately 640 by 200mm wide and 140mm deep and is interpreted as a plank. It has three treenails and three empty 28mm diameter treenail holes set in an alternating, regularly spaced pattern at 250. Each hole measures approximately 28mm. Both ends of this find have been recently broken by mechanical force, probably during recovery.
- 3.7.5 WA 5020 (**Plate 6d**) measures approximately 850 by 250mm wide by 220mm deep and is possibly a futtock fragment. It has two worked sides. There is a single 20mm diameter treenail. One end is angled and there is concretion on one surface which suggests the presence of a ferrous fastening. In addition to recent mechanical damage, the find has evidence of infestation by marine borers.
- 3.7.6 WA 5021 (**Plate 6e**) measures approximately 840 long by 240mm wide and 100mm deep. It has a rectangular cross-section and is broken at both ends due to recent mechanical damage. One end is angled. Concretion on one surface suggests that a ferrous fastening is present.
- 3.7.7 WA 5022 (**Plate 6f**) measures approximately 900mm long by 200mm wide and is interpreted as a probable plank. It has three treenails and an empty treenail hole. It has suffered mechanical damage, at least some of which appears recent.
- 3.7.8 WA 5023 (**Plate 6g**) measures approximately 440mm long by 140mm wide by 90mm deep and is interpreted as being a small plank. Three of its surfaces have been worked and are smooth, whilst the fourth has sustained damage. It is angled for part of its length and has one small treenail. Both ends are broken and the damage appears recent.
- 3.7.9 WA 5024 (**Plate 6h**) is a rectangular plank with four worked sides and broken ends. It measures approximately 1050mm long by 240mm wide by 100mm deep. It has three 30mm diameter treenails and a treenail hole. One of the face surfaces has damage and abrasion that is probably historic, possibly incurred prior to loss. Lightly incised diagonal lines along the edge faces are probably saw marks.
- 3.7.10 WA_5025 (**Plate 6i**) is possible plank measuring 1370mm long by 120mm wide by 30mm deep. It has very heavy damage along its whole length, probably sustained during recovery, and this makes making interpretation difficult.

Location of recovery

- 3.7.11 The trackplot for Trip 0576 shows dredging activity in the southern part of Zones 36 to 38 and the northern part of Zones 38 to 40 (**Figure 5**). No recorded wreck that could account for the presence of these finds in the area dredged during the Trip has been identified. The trackplot does cross the obstruction previously recorded at Strike 8004, but it is not clear whether this position is for the drag head and no finds are reported to have been made when it was recovered following the strike. **Table 5** shows previously located anomalies within the trackplot buffer. None have any obvious characteristics of a wooden shipwreck and all are derived from pre-dredge sidescan sonar data dated 2001-2. 7138 was dived by WA in February 2012 and no archaeological material was found (WA 2012, CMS Datasheet 7).

Mitigation Group	Zone 36	Zone 37	Zone 38	Zone 39	Zone 40
2.1.1					
2.1.2	7139				
2.1.4b					

Mitigation Group	Zone 36	Zone 37	Zone 38	Zone 39	Zone 40
2.1.4d		7549	7550; 7147; 7552		
2.2.4b			7702	7566	
2.1.4c	7137; 7138	7141; 7145	7146		
2.2.4d			7151; 7152; 7504; 7505; 7508	5009	

Table 5: Strike 8032 anomalies and sites

Discussion

- 3.7.12 These finds are likely to be ship timbers and are therefore likely to come from one or more wrecks in the vicinity of the trackplot for Trip 0576.
- 3.7.13 It has not proved possible to identify a clear association between these finds and any of the worked timbers recovered in January and February 2011 in Zones 30-37 (Strike 8004 and 8009-18; WA 2011). Nevertheless, it is possible that an association exists. Similarly it is not possible to demonstrate a clear association between these timbers and those of Strike 8027, recovered from Zones 34-40.

3.8 Strike 8033 – 19th century wreck

Circumstances of recovery

- 3.8.1 On 9th December 2013 the TSHD *Victor Horta* encountered an obstruction in Zone 38 (**Figure 6**). A PLA dive team subsequently inspected the obstruction and reported it to be a large wreck.
- 3.8.2 The unidentified wreck was cleared between 31st March and 5th April 2014 by the salvage barge *Atlantis* using a grab. An archaeological watching brief was undertaken and this has been separately reported (WA 2014). As the site has been cleared, no further on-site archaeological mitigation has been recommended. The wreck appears to have been that of a 19th century iron paddle steamer, possibly a tug (WA 2014). The find is of considerable archaeological significance.

3.9 Strike 8034 – medieval cooking vessel

Circumstances of recovery

- 3.9.1 A medieval jar base (WA 5092; **Plate 7**) was recovered during an epibenthic trawl survey for LGP during Spring 2014. Although not falling within the strict remit of the AMF, the benthic ecology contractor showed good stewardship practice by reporting the find via the protocol.

Description

- 3.9.2 The find is a jar base, probably of a cooking vessel. It is a sandy fabric with a convex base and unusually straight sides. Date of manufacture was 13-15th century.
- 3.9.3 When found it had two clusters of whelk eggs, some hydroids and a few barnacles adhering to its surface. This suggests that it was probably buried until fairly recently and that it is unlikely to have been exposed on the seabed for longer than a year.

Location of recovery

- 3.9.4 The trawl track was 500m long and approximately 500m north of Zone 40 (**Figure 7**). This coincides with no known sites or anomalies.

Discussion

- 3.9.5 Although the presence of this find on the seabed may represent the deliberate jettisoning of a broken cooking vessel or an accidental loss, it could also indicate the presence of a 13-15th century ship or boat wreck along the trawl track. Medieval wrecks are extremely rare and it would undoubtedly be of national importance.

4 DENDROCHRONOLOGICAL ANALYSIS

- 4.1.1 In June 2015, dendrochronological analysis was carried out on samples from fifteen oak timbers recovered during dredging operations as part of the London Gateway project, by the University of Wales, Trinity Saint David.
- 4.1.2 None of the ring-width series from these samples could be absolutely dated against British or European chronologies. However, three tangentially sawn timbers (WA5021, WA5023 and WA5024) (Strike 8023) cross dated against each other allowing construction of a 67-year sequence and analysis suggests they were part of the same structure and may have been sourced from the same tree. Examination of two further timbers (WA2003 (not examined in this report) and WA1147) (Strike 8027) indicates that they are sourced from tropical hardwood species and would require further specialist microscopic examination to identify them to species level (Bale and Nayling 2015).

5 CONCLUSIONS

- 5.1.1 With the exception of Strike 8028, which is almost certainly part of the Second World War anti-submarine boom between Shoeburyness and Sheppey, the method of recovery means that all it is possible to say about where the finds have come from with certainty is that they are from Zones 30-40, with most coming from Zones 35-39. None have been positively identified as coming from previously identified sites or anomalies, although the parachute could be associated with the fuselage of an unknown aircraft, snagged by a trawler in 1992 but not subsequently located.
- 5.1.2 Significantly fewer finds were reported in 2013 than in previous years. This suggests that the archaeological resource within the dredging zones is now diminished, at least to the depth of dredging. The extent to which the unknown ship and aircraft sites within the dredging zones suggested by the finds reported upon in this and the previous report have been removed by the dredging process is unclear.
- 5.1.3 Strike 8029 (16th century cannon fragment) is suggestive of the presence of a late 16th or early 17th century wreck along the route of Trip 0566 in Zones 30-35. Wrecks of this period have been found before in the Thames and its estuary but are nevertheless very rare. However, limited analysis of known anomalies and sites for the purposes of this report has not indicated any obvious candidate site.
- 5.1.4 Strike 8034 (medieval pot base) is another discovery of potential importance, but only if it has been recovered from a wreck. The trackplot for this is unusual as it lies outside of the dredged channel and therefore any remains associated with the pottery vessel would not have been subject to impacts from the dredging. If present, the site should be lying well within the footprint of the epibenthic trawl and straightforward to assess. Medieval wrecks are exceptionally rare in the UK. The area from which this find was recovered is well defined and small, but no existing geophysical survey data has been identified for it.
- 5.1.5 The balance of evidence currently suggests that Strike 8031, the Second World War Allied parachute, is likely to be associated with the wreck of an aircraft in Zone 39, fouled by a fishing vessel in 1992 but not found since. The extent to which this wreck survives is



unknown. If located the wreck will be automatically protected under the Protection of Military Remains Act.

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7 APPENDIX 1 – STRIKES BY ZONE

Strike	Type of find	Potential	Zone										
			30	31	32	33	34	35	36	37	38	39	40
8027	Worked timbers, including probable ship timbers	Probable wreck											
8028	Anti-submarine boom fitting	Debris from former Second World War anti-submarine boom in Zone 35											
8029	16th century cannon fragment	Probable wreck											
8030	17th century cannon fragment	Probable isolated find											
8031	Second World War parachute	Isolated find or aircraft wreck (may be associated with unconfirmed aircraft wreck record WA 5041)											
8032	Worked timbers, including probable ship timbers	Probable wreck											
8033	19th century iron shipwreck	Wreck											
8034	Medieval cooking vessel	Isolated find or wreck											



8 APPENDIX 2 – ANOMALIES AND SITES WITHIN TRACKPLOT BUFFERS

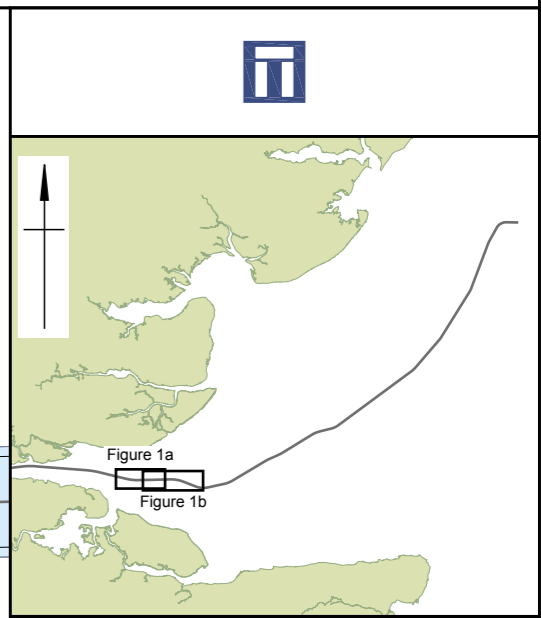
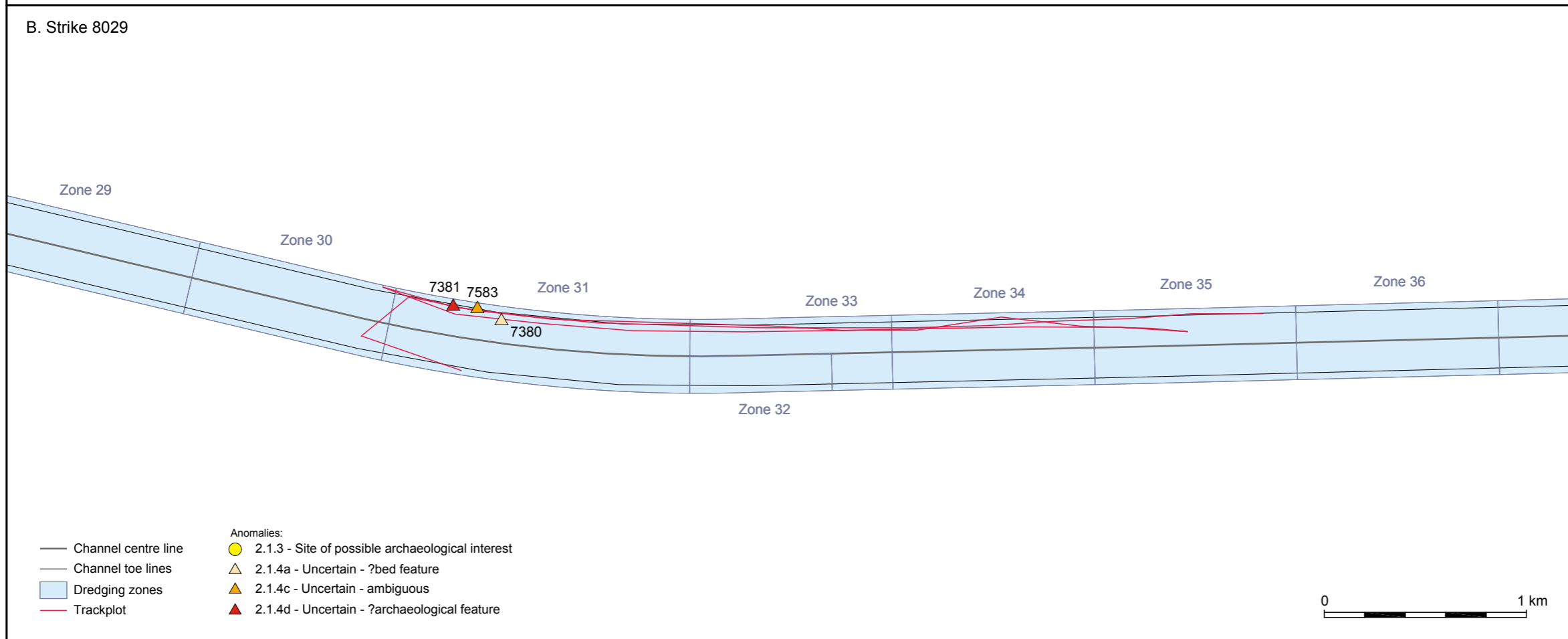
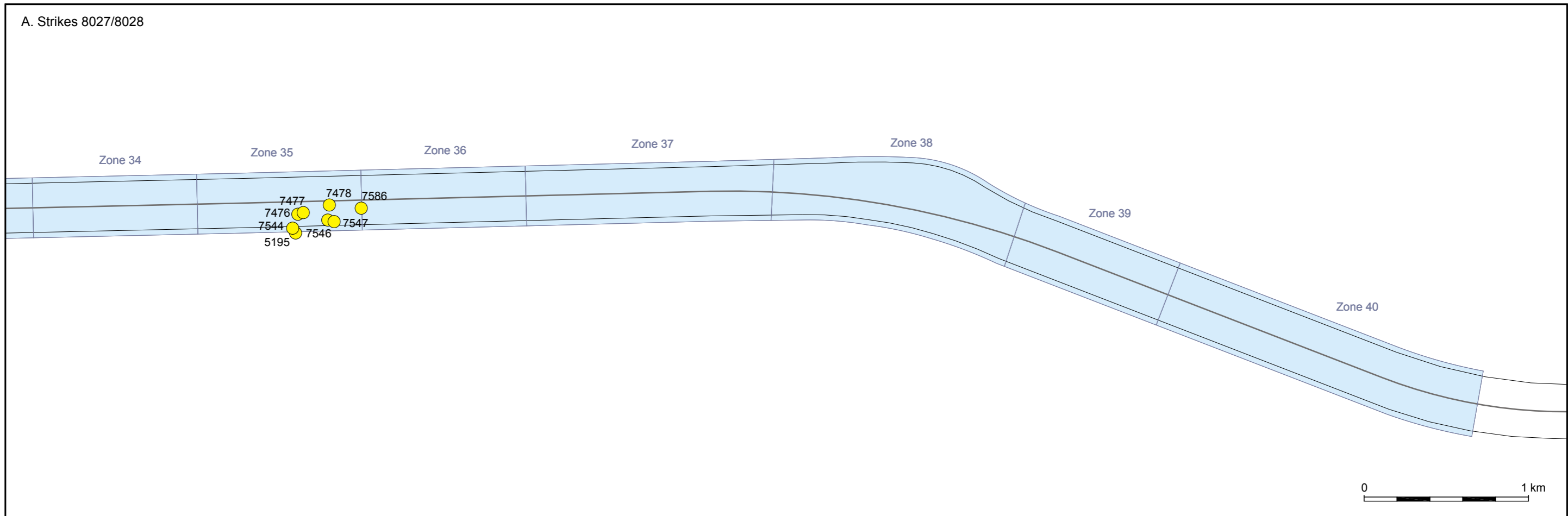
Strike	31	35	36	37	38	39	40
8028		5195; 7476; 7477; 7478; 7544; 7546; 7547; 7586					
8029	7380; 7583; 7381						
8030			7139; 7137	7141; 7145; 7549	7146; 7552; 7147; 7553; 7554		7157
8031			7139; 7480; 7225	7149	7550; 7564; 7702; 7152; 7361		7567
8032			7139; 7137; 7138	7549; 7141; 7145	7550; 7147; 7553; 7702; 7146; 7151; 7152; 7504; 7505; 7506	7566; 5009	



9 APPENDIX 3 – KEY TO MITIGATION GROUPS

Mitigation Group ²	Summary Description
2.n.1	Site of certain archaeological interest
2.n.2	Site of probable archaeological interest archaeological interest
2.n.3	Site of possible archaeological interest
2.n.4	Site of uncertain archaeological interest
2.n.4a	Uncertain - ?bed feature
2.n.4b	Uncertain - ?debris
2.n.4c	Uncertain - ambiguous
2.n.4d	Uncertain - ?archaeological feature

² Where n = 1, this refers to sites above (upstream of) Sea Reach 1; where n = 2, this refers to sites seaward of Sea Reach 1.



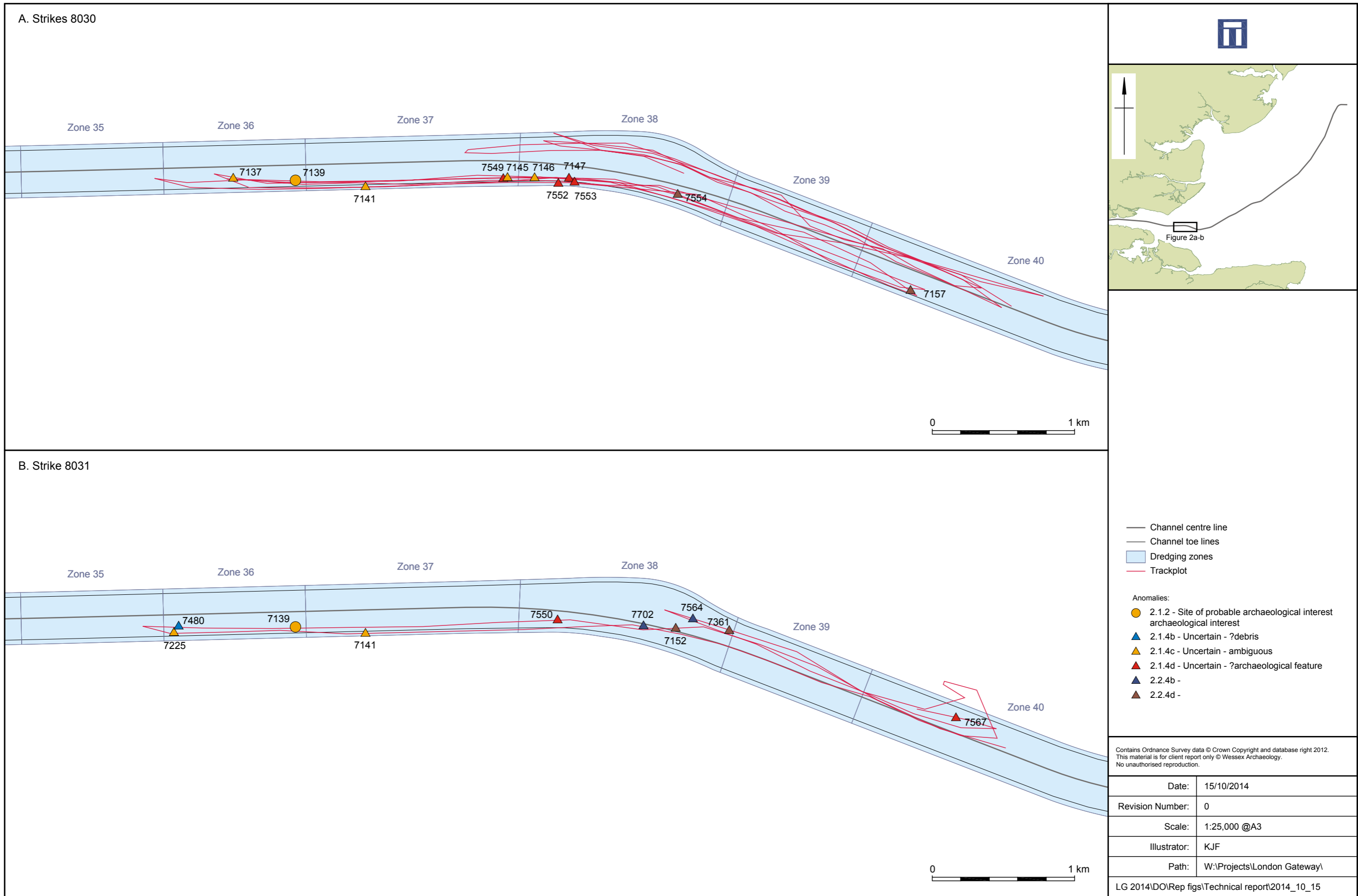
- Channel centre line
 Channel toe lines
 Dredging zones
 Trackplot
- Anomalies:
 ● 2.1.3 - Site of possible archaeological interest
 ▲ 2.1.4a - Uncertain - ?bed feature
 ▲ 2.1.4c - Uncertain - ambiguous
 ▲ 2.1.4d - Uncertain - ?archaeological feature

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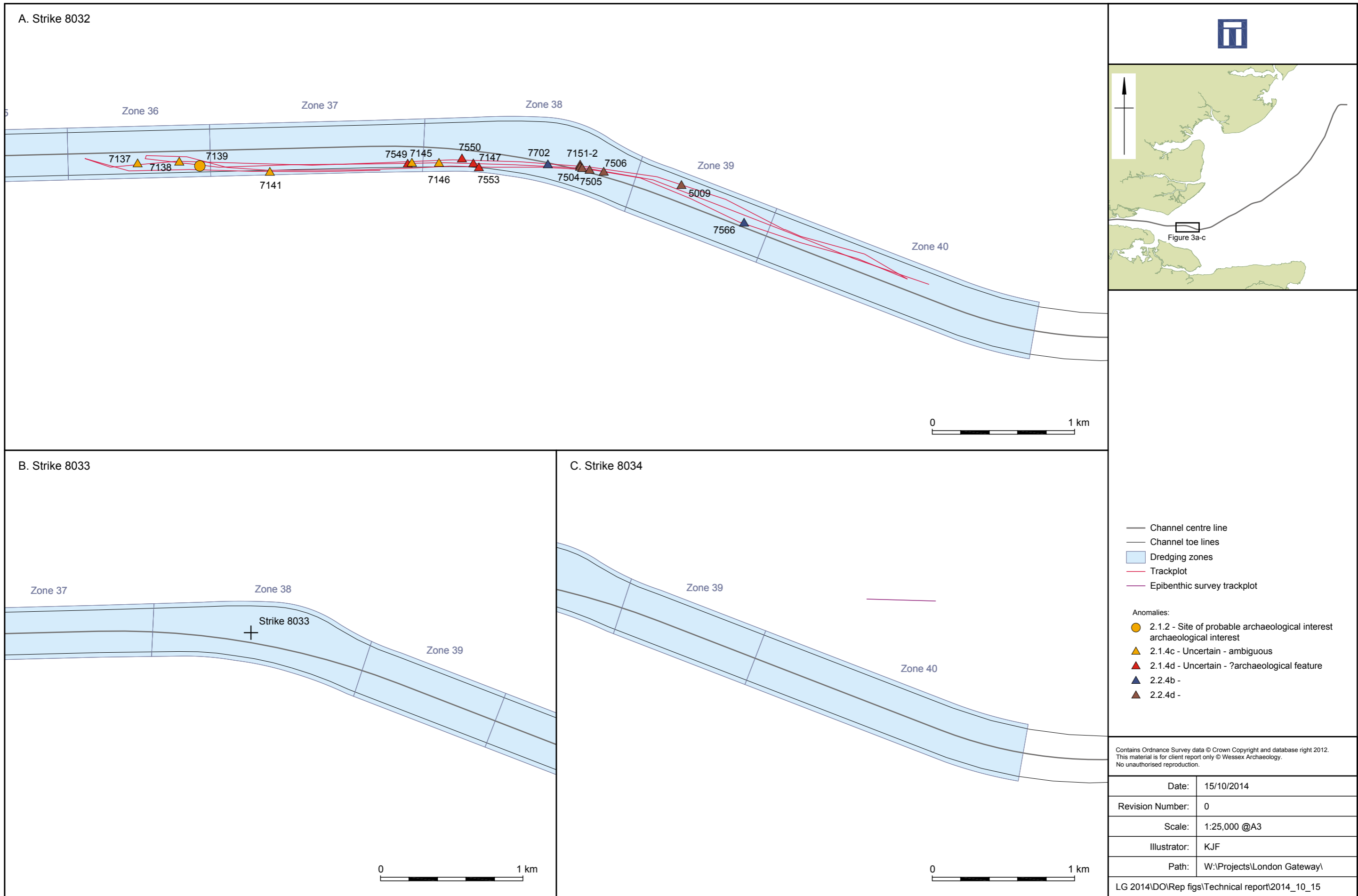
Strikes 8027/8028 (A) and 8029 (B)

Figure 1



Strikes 8030 (A) and 8031 (B)

Figure 2



Strikes 8032 (A) and 8033 (B)

Figure 3



Plate 1a: WA 1040



Plate 1b: WA 1041



Plate 1c: WA 1042



Plate 1d: WA 1043



Plate 1e: WA 1044



Plate 1f: WA 1045



Plate 1g: WA 1046



Plate 1h: WA 1047



Plate 1i: WA 1048



Plate 1j: WA 1049



Plate 1k: WA 1050



Plate 1l: WA 1051



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Plate 2: Strike 8028 – Anti-submarine boom fitting



Plate 3a: Strike 8029 - Breech exterior of a probable iron Falcon, manufactured 1550-75


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Plate 3b: Strike 8029 - Breech interior of a probable iron Falcon, manufactured 1550-75



Plate 4a: Strike 8030 - Muzzle Exterior of an English saker, 1640-70


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Plate 4b: Strike 8030 – Muzzle interior of an English saker, 1640-70

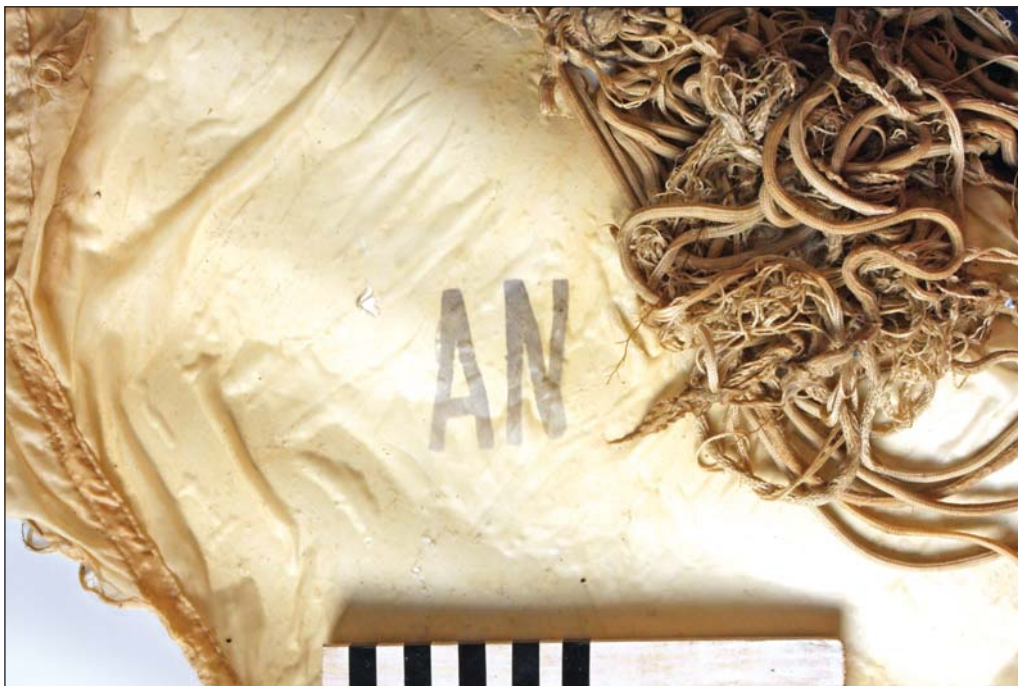


Plate 5: Strike 8031 – Second World War Allied parachute


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Plate 6a: WA 5017



Plate 6b: WA 5018



Plate 6c: WA 5019



Plate 6d: WA 5020



Plate 6e: WA 5021



Plate 6f: WA 5022



Plate 6g: WA 5023



Plate 6h: WA 5024



Plate 6i: WA 5025




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Plate 7: Strike 8034 – 13-15th century jar base

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