

London Gateway: Inter-tidal zone archaeological walkover survey



Fieldwork report



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LONDON GATEWAY Inter-tidal Archaeological Survey

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Figure 1: The London Gateway inter-tidal survey

1 INTRODUCTION

1.1 Project planning background

- 1.1.1 London Gateway Port and Park received planning permission from Government on the 30th May 2007. The applications were in the form of Outline Planning Application for the Park (OPA) and a Harbour Empowerment Order (HEO) for the Port.
- 1.1.2 The proposed development area is extensive, including works on the gravel terrace, historic marshland, and the inter-tidal and sub-tidal zones, which are likely to encompass a diverse archaeological resource. Desk-based studies and non-intrusive surveys undertaken to support the London Gateway Environmental Statement suggest that the development has the potential to impact on important archaeological remains.
- 1.1.3 In recognition of this, a condition of both permissions is the implementation of the London Gateway Archaeological Mitigation Framework (AMF). Originally included as a Technical Report to the Environmental Statement, the purpose of this document was to establish a strategic framework, applicable to the entirety of the archaeological resource, within which the London Gateway archaeological programme would operate. Following consultation with Thurrock Council, an updated version of the AMF was included as Appendix 2 of the 'Statement of Common Ground' agreed between P&O (now DP World) and Thurrock Council in July 2003.
- 1.1.4 In accordance with the guidance contained within the AMF this document represents the results of the Inter-tidal Archaeological Survey.

1.2 Scope of the inter-tidal survey

- 1.2.1 The development of the container port at London Gateway involves extensive reclamation in front of the existing sea wall, using material dredged from the Thames channel to in-fill an area of current inter-tidal zone. A series of containment bunds will be created, and then in-filled to the level required for the port construction. The existing sea wall will be left in place, and a new quay retaining wall constructed along the seaward edge of the reclamation. The reclamation will involve very limited excavation impacts to the Holocene deposit sequence, these being confined to construction of the quay wall. However, surface finds and structures exposed along the foreshore will be covered and could potentially be disturbed in the course of reclamation. A previous inter-tidal survey was carried out by Wessex Archaeology in 2001 to inform the Environmental Statement (WA March 2002). The present survey was intended as an up-date, to check for new geoarchaeological resources that may have been exposed by coastal erosion since 2001. Examination of deposits exposed by erosion in the area of Mucking Flats and Stanford-le-Hope marshes may provide useful insights into the deposit sequence.

1.3 Site location and topography

- 1.3.1 The London Gateway development is located within the parishes of Stanford-le-Hope and Corringham, Essex (570300, 183700; Figure 1). The inter-tidal zone is a relatively small area of mudflat deposit south of the current sea wall, located within an estuarine zone between the sub-tidal Thames channel and

a series of smaller tributaries flowing north to south off the mainland.

- 1.3.2 The original expanse of the inter-tidal zone was much greater during the early and mid-Holocene, but during the historic period a series of sea walls was built, stopping the marine influence into much of the former inter-tidal floodplain. The exact date of formation of the sea wall is currently uncertain. There is no evidence for reclamation in the Roman period at present. In the medieval period, in Essex, There are documentary references to the granting of commissions for the review and repair of the marsh defences in the County of Essex as early as the 13th century, when the responsibility for sea defences would have lain with the tenants. By the 14th century, a rise in sea level led to the construction of sea walls along sections of the coastal marshes of Essex (VCH Essex vii 185).
- 1.3.3 A 17th century date is perhaps more likely for systematic reclamation of the Shell Haven site: In 1622 the marshland of Canvey Island to the east was embanked and reclaimed under direction of the Dutchman Vermuyden, and it is possible that the marshes around Stanford-le-Hope, Corringham and Fobbing were enclosed in the same period (Sparkes 1965, 37 and Hunter 1999, 18). Sparkes, in his history of Corringham marshes, refers to maps at the Essex Record Office dated to 1621 and 1675 which show the marshes around Fobbing enclosed by the 'Dutch Wall' (ibid., 37).
- 1.3.4 To the north of the sea wall the cessation of saline influence permitted land reclamation, and this area was subsequently used for a variety of agricultural and industrial activities. To the south of the sea wall the deposits remained within the inter-tidal region of the larger Thames estuary. This project design only deals with potential archaeological sites to the south of the sea wall within the current Thames inter-tidal region.
- 1.3.5 The inter-tidal zone within the context of the AMF requires definition, as there is an inherent ambiguity in using the term, caused through human environmental interaction and subsequent land reclamation. The inter-tidal zone, as referred to in this document, is the area between the low tide boundary of the Thames estuary to the south and the current sea wall to the north. It is acknowledged that other areas of floodplain were inter-tidal before the construction of the sea wall. However, the inter-tidal zone here refers to that area wholly to the south of the seawall that has not been subject to reclamation.
- 1.3.6 The inter-tidal zone suitable for the archaeological survey can be summarised as Mucking Creek, the Mucking flats, the beach and tidal flat deposits south of Stanford-le-Hope marshes and Shell Haven (Figure 2). The survey coverage was restricted to safely accessible areas of the foreshore, which inevitably meant the immediate vicinity of the shoreline.

2 THE INTER-TIDAL ARCHAEOLOGICAL SURVEY IN RELATION TO THE UPDATED AMF

- 2.1.1 As set out in the AMF, the London Gateway Development includes four principal geomorphic zones which demand different methodological approaches. These are: the gravel terrace, the alluvial floodplain, the inter-tidal zone, and the Thames channel. In accordance with the guidance given in PPG16, the AMF envisages that, wherever possible, any archaeological remains will be preserved *in-situ* and that where this cannot be achieved any remains will be investigated and recorded. When geoarchaeological

resources will be adversely affected by the development, the AMF sets out procedures for their investigation.

- 2.1.2 The inter-tidal survey will contribute to the wider aims of the AMF through providing information on sediment units in the inter-tidal zone and adding data to the Historic Environment Record (HER) for development area.

3 PREVIOUS DISCOVERIES IN THE INTER-TIDAL ZONE

- 3.1.1 The desk-based assessment has identified a small number of surviving historic landscape features in the inter-tidal zone, through the Sites and Monuments Record (SMR), National Monuments Record (NMR), aerial photography and ground based survey. This is partially a product of the limited accessibility to these areas and hence recovery of chance artefacts from the surface.
- 3.1.2 The existing gazetteer and survey data lists the following known components of the Historic Environment Record (HER) within the boundaries of inter-tidal zone (Figure 2):
- OAU 45, NGR: 570891, 181457: Roman pottery has been found on the foreshore at this general location over 'many years'. NMR 417014, SMR records SMR 7138 and 7139.
 - OAU 10, NGR: 569784, 180769: Findspot of Roman and medieval pottery found by chance in 1970. Finds were from the beach, from sea erosion outside the sea wall. SMR records 5186 and 5187
- 3.1.3 The preliminary inter-tidal survey conducted by Wessex Archaeology in 2002 recorded thirty one modern and post-medieval find locations and one isolated findspot of Romano-British pottery (Wessex Archaeology 2002, Catalogue number 7002, NGR: 570418, 181320). This location for the Romano-British pottery does not correlate with any known locations in the HER record for the inter-tidal zone and warrants further investigation.
- 3.1.4 Other geoarchaeological resources that may require further investigation in the inter-tidal zone are the identification of sediment units that have a high potential for the preservation of palaeo-environmental materials, such as peat deposits.
- 3.1.5 The sloping gradient of the inter-tidal zone, combined with localised erosion from water discharge at the Creeks, may have exposed geoarchaeological resources since 2001, which require recording.

4 SITE HISTORY AND PREVIOUS IMPACT ASSESSMENT

- 4.1.1 The geomorphic evolution of the development area is complex. At the end of the Devensian and during the early Holocene the floodplain is liable to have been an extensive gravel braidplain. At some point during the early Holocene the floodplain began to accumulate sediments, from both marine and riverine influences, with the channel network probably becoming more constrained and less braided. The process of sedimentation continued throughout the Holocene, producing the current depth of alluvium now witnessed at the site. During the historic period (although the exact date is uncertain) a sea wall halted marine influence into the alluvial floodplain and the vertical accretion of

the sediment body stopped. The top of the alluvial sequence has subsequently undergone soil maturation and stabilisation, coupled with draining and agricultural improvement.

- 4.1.2 In contrast the inter-tidal zone has remained within the influence of the tidal Thames. Sediments have continued to be deposited from both riverine and marine sources. There has been no stabilisation and subsequent soil profile development.
- 4.1.3 Although the inter-tidal zone should primarily be seen as a depositional environment, with extremely deep alluvial sequences, there will be areas of localised erosion and scour where the discovery of geoarchaeological resources has a higher potential. The two areas of highest potential are the Vange and Mucking Creeks (Figure 2). Both of these Creek areas have recorded HER entries, although the provenance of these materials is currently unclear, i.e. primary *in-situ* or alluvially re-worked and re-deposited material.
- 4.1.4 The inter-tidal zone is outside the existing sea wall, which was constructed for the purpose of land reclamation. Some previous disturbance will have occurred to the geoarchaeological deposits in the inter-tidal zone, through the construction of the present sea wall, and dredging of the Shell refinery approach channel and shipping berths.

5 POTENTIAL DEVELOPMENT IMPACTS

- 5.1.1 Construction of the London Gateway container port will produce limited new impacts to geoarchaeological resources in the inter-tidal zone, including potential for disturbance of exposed archaeological, as the reclamation takes place.
- 5.1.2 Past impacts on buried archaeology have been assessed from air photographs, cartographic sources, site visits and the investigation of the SMR and NMR. The inter-tidal zone has seen limited archaeological fieldwork through a preliminary walkover survey conducted by Wessex Archaeology in 2002 (WA, March 2002). It is probable that the present distribution of known archaeological sites and finds, as recorded by the SMR and NMR, does not accurately reflect the true distribution of archaeological resources.
- 5.1.3 In broad terms, the site has the potential to contain archaeological remains dating from the prehistoric to post-medieval periods, buried at various depths in the floodplain alluvium. Economic utilisation of the marshland is unlikely to have involved permanent settlement, but may include salt-workings, trackways, evidence for fishing and hunting, and for maritime transport. There is considerable potential for wrecks and wharf structures of prehistoric or later date that may be preserved in and around the creeks, in what may once have been navigable natural channels.
- 5.1.4 The archaeological potential of the inter-tidal zone has been assessed using a predictive model of geoarchaeological resources within the Shell Haven development. This predictive model has been constructed using multiple data sources, such as the Historic Environment Record (HER), borehole data and resistivity survey. The potential for recovering geoarchaeological resources within the upper alluvium of the inter-tidal zone is considered low. This is due to the depth of the alluvial sequence, coupled with continued sedimentation up until the present day. Localised exceptions may occur, where limited erosion through water scour reveals deposits of geoarchaeological significance.

6 AIMS OF THE ARCHAEOLOGICAL INTER-TIDAL SURVEY

6.1.1 The aim of the archaeological inter-tidal survey was to:

- identify and record areas of high geoarchaeological potential,
- investigate for possible locations of geomorphological features such as palaeochannels,
- look for exposures of peat deposits that provide a high potential for organic preservation
- search for any cultural remains such as pottery sherds, timber structures, etc.

7 METHODS

7.1 Equipment

7.1.1 The survey was undertaken using a Leica RX 1250 SmartRover DGPS. Although the survey only required accuracy of 0.5 metres this equipment is capable of accurate of between 1 and 2 centimetres. Such accuracy was undertaken and maintained where it did not inhibit the progress of the survey.

7.1.2 A Ricoh Caplio 500G wide digital camera was used to undertake a photographic record of the survey.

7.2 Method

7.2.1 A two-person team consisting of Mark Littlewood and Sarah Lane spent two days walking over the survey area at low tide with a GPS surveying unit, supported by Project Manager Stuart Foreman from areas of the shore accessible by Public Footpath, and by a safety boat supplied by Livett's Launches. Representative small finds were bagged and labelled and significant deposits surveyed. Photographic recording was undertaken throughout the survey area, including general record photographs of the foreshore at low tide. The inter-tidal survey was conducted from 30th-31st of March 2009.

7.2.2 An initial walkover along the foreshore between Mucking Creek and Vange Creek was undertaken on 30th March to assess the visibility conditions and carry out a preliminary survey record and photography. The second day (31st March) comprised more detailed surface artefact collection in areas with good visibility, and a more detailed record of potentially significant exposed structures identified the previous day.

7.2.3 The survey was organised to make the best possible use of the spring tides within safety constraints. As a consequence areas such as Mucking Creek were investigated while the survey team waited for areas immediately facing onto the sea wall and the glaciis near the jetties at Thames Haven to become exposed by the lowest ebb of the spring tide.

8 SURVEY RESULTS

8.1 Survey conditions

- 8.1.1 Weather conditions were dry and sunny or overcast throughout the survey, with a light breeze.
- 8.1.2 Although limited access into mudflat areas was possible without danger of sinking in some areas (principally in front of the Stanford-le-Hope marshes) the visibility for surface artefact collection purposes was negligible. Consequently the survey coverage is effectively restricted to a strip along the immediate foreshore, and beaches and creek channels in the Stanford-le-Hope marshes.
- 8.1.3 It is clear from the concentration of finds in the Stanford-le-Hope marshes, where no sea wall exists, that the presence of sea walls in front of the Shell Haven site and Compensation Site A, effectively masks any archaeology that may once have been present on the foreshore.

8.2 Cultural features

- 8.2.1 A total of 36 monuments and find spots were recorded in the study area. These consisted mostly of post-line structures and isolated posts which have been identified as sea defence revetments, jetty structures and isolated boat tie-offs. Seven of the more substantial features were previously recorded during an inter-tidal survey undertaken by Wessex Archaeology in 2001.

8.3 Stanford-le-Hope Marshes

- 8.3.1 Thirty-one monuments and findspots were recorded within this stretch, all of which are shown on Figure 1. Wessex Archaeology find spots from the 2001 survey are also shown on Figure 1. Most of the recorded monuments or finds were identified in Stanford-le-Hope Marsh, from the saltmarsh foreshore, the inter-tidal creek channels, on beaches and from the edge of the mudflats.
- 8.3.2 OA Number 8001, was identified as a possible fishtrap also recorded by Wessex Archaeology in 2001 (7011).
- 8.3.3 OA Number 8003 was identified as a possible jetty during the survey and was also described as such by Wessex Archaeology (7003).
- 8.3.4 OA Number 8006 consists of two curved post-lines angled into the ground, which were recorded by Wessex Archaeology as 7010. No obvious fittings were observed on the post-lines but their shape indicates that these are the ribs of a hulked boat. Although the date is uncertain, this structure lies outside the development impact.
- 8.3.5 Twelve pottery find spots were recorded along the foreshore and in the small inter-tidal creeks in Stanford Le Hope Marshes (See ceramic specialist report below). This was mostly of Roman date, but with a single prehistoric sherd and one possible Anglo-Saxon sherd. Almost all the sherds showed an unusual combination of characteristics, being noticeably very hard but also very abraded, presumably as a result of abrasion in the inter-tidal environment. Fired clay and lumps of bituminous material were also present (possibly derived from red hill material). The 2002 Wessex Archaeology

survey found a single Romano-British pottery sherd along the same stretch of foreshore (7002). Roman pottery finds are also reported at this location in the County Heritage Environment Record. The presence of prehistoric and possible Anglo-Saxon material on the foreshore (albeit single sherds only) is interesting, as evaluation trenches through the adjacent red hill in Compensation Site A produced only Roman pottery.

- 8.3.6 Peat was observed at OA Number 8029 within a small creek of the saltmarshes in Stanford-le-Hope Marshes. Although this exposure is in a different location from where Wessex Archaeology observed peat in 2001 (7009) stratigraphically it is in the same sequence, lying above bluish grey alluvial clay and in a location where it is regularly submerged by high tides. No associated finds were observed that would shed light on the date of the peat. As the exposure lies outside the development, in a ecologically sensitive zone, no further work is proposed at this location. (Peat is widespread within the Holocene deposit sequence at London Gateway and will be subject to analysis and radiocarbon dating of borehole samples, as part of the London Gateway palaeoenvironmental programme).
- 8.3.7 OA Number 8032 marks the hulk of a small boat, possibly a fishing boat. It consists of several collapsed strakes, an engine block with remnants of metal framing to attach it to the hull and the pump well from the bilge. It is difficult to ascertain the age of the boat, but the state of decay and the remnants of its engine suggest that it is possibly sixty years old.

8.4 Shell Haven Creek

- 8.4.1 This stretch of the study area consists of the foreshore, mudflats and marshes between the eastern end of Thames Haven and the eastern limit of the survey area near the Shell oil refinery. Access was via the sea wall from the Thames Haven survey and from Jetty H.
- 8.4.2 Two monuments were recorded in this stretch: OA Numbers 8017 and 8033. These are incoherent structures of post-lines and wooden plank fragments within the eroding foreshore, behind the rock armour of the modern sea defences. Due to their incoherence it is difficult to say what they are. They are most likely to be jetties, although 8033 could possibly be a hulked boat. Wessex Archaeology surveyed the northernmost of these monuments as 7013, and this probably equates to 8017.

8.5 Ceramic finds

- 8.5.1 Small amounts of pottery, mostly of Roman date, were recovered. Almost all the sherds showed an unusual combination of characteristics, being noticeably very hard but also very abraded. Fired clay and lumps of bituminous material were also present. The material is listed by ID number in the table below.

Table : Quantification of ceramic material by context

ID	Sherds	Wt (g)	Comments	Date
1004	2	19	grog and sand tempered reduced ware	early Roman?
1004	1	14	bituminous lump	modern
2001	1	15	sand and organic	?early Anglo-Saxon
2002	1	2	sand tempered reduced ware	Roman
2003	1	19	fired clay	?
2004	1	2	fine reduced ware	Roman

2004	1	29	fired clay	?
2005	1	24	bituminous lump	modern
2006	2	11	fine oxidised ware	Roman
2007	1	22	fine reduced ware base	Roman
2008	1	11	flint tempered	later prehistoric
2009	1	1	fine reduced ware	Roman
2010	3	22	reduced wares, 1 possible bead rim	early Roman

- 8.5.2 The condition of the material and the absence of diagnostic fragments preclude close dating. It is notable, however, that the one probable later prehistoric sherd (2008, survey ID 8026) was not abraded, in contrast with most of the Roman material and the single possible Anglo-Saxon sherd. The relative consistency of the Roman fabrics may suggest that all belong to the earlier Roman period (ie 1st-2nd centuries AD), but this is speculative.

9 CONCLUSIONS

9.1 Summary results

- 9.1.1 The survey has identified a number of significant archaeological findspots, including: 1 sherd of prehistoric pottery, 11 Romano-British pottery sherds, 1 possible Anglo-Saxon sherd. The location of these finds suggests strongly that they are eroding from an early Roman red hill site discovered during recent archaeological trenching within Compensation Site A (OA, May 2009). (This site will be subject to detailed investigation in advance of construction of new mud-flats). All of the potentially significant finds were located in an area of surviving saltmarsh, which will not be affected by construction of the London Gateway Port.
- 9.1.2 Of two boat fragments recorded in the same general area, one is definitely of mid-late 20th century, and the other of indeterminate date.

APPENDIX A GAZETTEER OF MONUMENTS AND FINDSPOTS

OA Number	Description	Type	Easting	Northing
8000	Possible structure associated with seawall. Row of wooden posts in line along shore, parallel to sea wall unknown date (c. 20th?) Posts 0.10m x 0.02 x c. 0.15m high	Sea Defence	570440.652	181325.724
8001	Semi circular structure composed of wooden posts 0.10m x 0.03m x 0.10m-0.20m in height. Possible fish trap.	Posts	570634.192	181375.862
8002	Line of wooden posts approximately 0.15m x 0.03m x 0.20m high	Sea Defence	571753.747	181318.977
8003	Two lines of posts extending from the shore associated with a post-line parallel to the shore. Possible remains of a jetty	Hulk	570627.927	181401.692
8004	Two post-lines forming an L-shape parallel to the shoreline. Possible a revetment for sea defence	Sea Defence	570287.213	181069.202
8005	L-shaped revetment post-line	Fish Trap	570351.408	181194.928
8006	Two curved post-lines, also angled into the ground. Although fittings are not obvious due to the eroded state of the timbers, this could be the remains of a hulked boat.	Postline	570321.486	181217.175
8007	4 wooden posts. Position of posts up against foreshore indicate that these posts are from a probable sea defence	Jetty	570318.983	181220.247
8008	2 standing wooden posts 0.10m x 0.03m x 0.60m high. Probable boat tie off.	Sea Defence	570315.034	181228.158
8009	2 standing wooden posts 0.10m x 0.03m x 0.60m high. Probable boat tie off.	Sea Defence	570320.083	181229.279
8010	Row of 3 posts. Line is 1.5 m long. Position against shoreline indicates possible sea defence function. Probably associated with post 1022	Hulk	570324.672	181267.811
8011	Row of 3 posts. Line is 1.5 m long. Position against shoreline indicates possible sea defence function.	Post	570633.663	181376.991
8012	Wooden post 0.08m x 0.05m x 0.70m high. Probably associated with post 1023	Post	570591.506	181432.126
8013	Wooden Post-line. Aligned along eroding shoreline so possible early sea defence. Observed from foreshore. Location is approximate as access was dangerous due to soft mud deposits.	Sea Defence	570580.659	181443.035
8014	3 wooden posts formed a triangular shape, next to the foreshore. Position of posts up suggest possible sea defence function	Sea Defence	570572.571	181429.868
8015	Line of wooden posts. Position is parallel to the shoreline and therefore possibly part of a sea defence	Post	570617.698	181432.296
8016	Line of wooden stakes. Highest is 1m, lowest is 0.10m high., width 0.03m x 0.02m. Aligned with shoreline and located within a bank of laid stone, so probably a sea defence	Sea Defence	570736.291	181453.934

OA Number	Description	Type	Easting	Northing
8017	Incoherent structure consisting of 3 primary post-lines and plank fragments. Possible jetty structure	Sea Defence	570778.576	181476.716
8018	2 early Roman pot sherds and a bituminous lump	Sea Defence	570786.192	181482.853
8019	1 possible early Anglo-Saxon pot sherd	Sea Defence	571922.702	181335.290
8020	1 Roman pot sherd	Jetty	574848.106	181897.940
8021	An undated lump of fired clay	Find Spot	570324.914	181274.341
8022	A Roman pot sherd and an undated lump of fired clay	Find Spot	570363.606	181310.915
8023	1 bituminous lump	Find Spot	570364.922	181311.758
8024	2 Roman pot sherds	Find Spot	570364.934	181311.838
8025	1 Roman pot sherd	Find Spot	570366.068	181311.854
8026	1 later prehistoric pot sherd	Find Spot	570363.977	181313.879
8027	1 Roman pot sherd	Find Spot	570364.031	181312.793
8028	3 early Roman pot sherds	Find Spot	570417.105	181321.924
8029	Peat deposit observed in eroding foreshore	Find Spot	570481.836	181341.563
8030	Set of 12 wooden posts. Possible boat tie offs	Find Spot	570554.805	181359.207
8031	Wooden Post-line. Aligned along eroding shoreline so possibly a sea defence feature. Observed from foreshore. Location is approximate as access was dangerous due to soft mud deposits.	Find Spot	570557.442	181358.575
8032	Remains of hulked wooden boat consisting of a number of semi-collapsed timber elements, engine block and pump well. Date is unknown but judging by the few remains left this boat is possibly the remains of a fishing vessel hulked no more than c.60 years ago.	Find Spot	570570.254	181370.786
8033	Incoherent structure of wooden posts and wooden plank fragments. Possibly a jetty.	Jetty	574852.145	181894.128
8034	Isolated wooden post. Probably associated with OA 8008 and 8030	Post	570631.113	181378.439
8035	Boat plank fragment with mortice hole cut into it.	Boat Fragment	570722.734	181482.479

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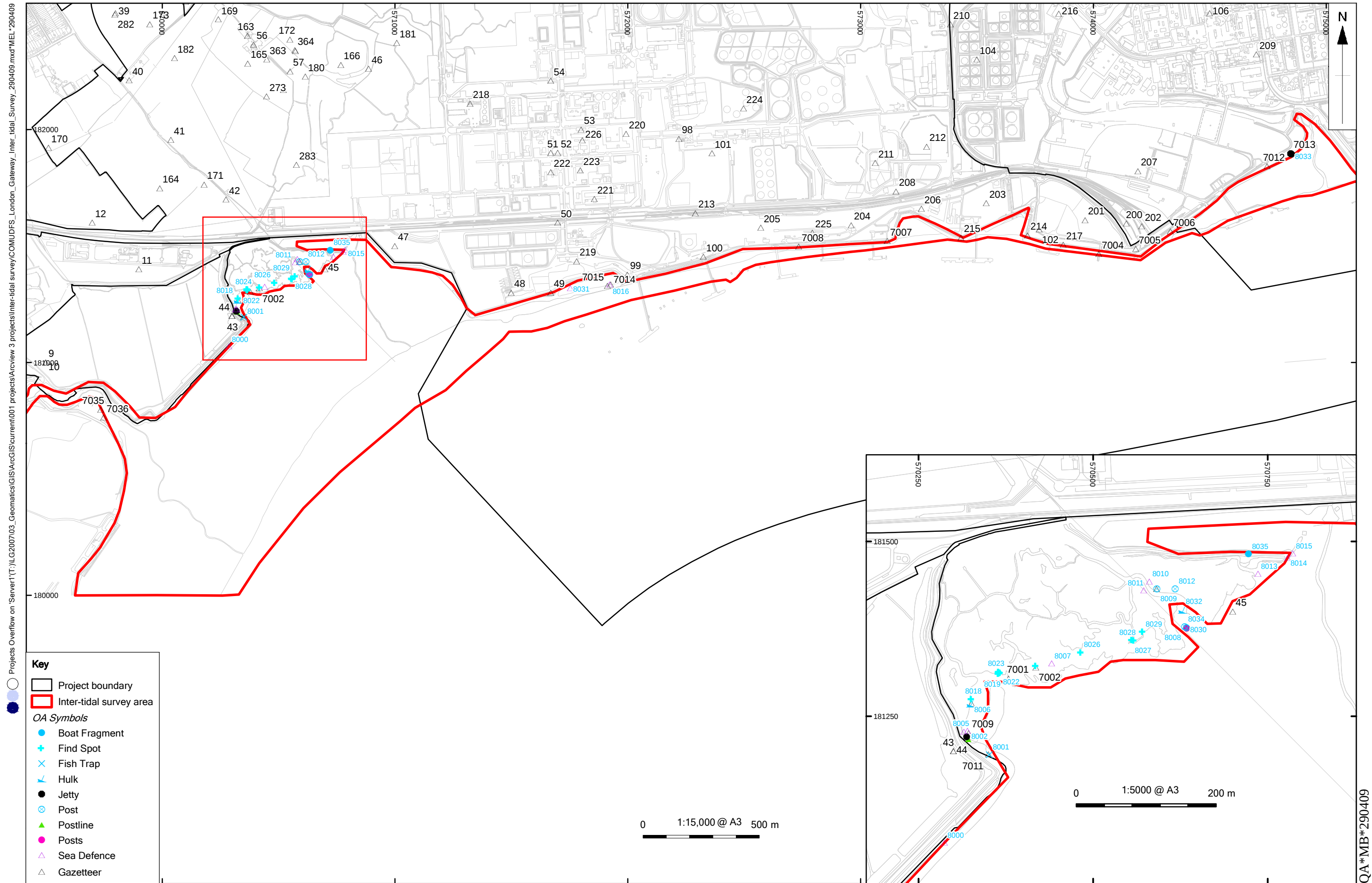


Figure 1: London Gateway inter-tidal survey



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