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Crossrail Archaeology Framework

C254 – Archaeology West

Archaeological Watching Brief - Sea Wall Breaching Wallasea Island Essex_ CNWA13_ Fieldwork Report

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SUMMARY

An Archaeological Watching Brief was undertaken by Oxford Archaeology/Ramboll UK (OAR) on the Cell 1 tidal lagoon, Wallasea Island, Essex on the 15th July 2015. The Watching Brief took place on two machine cut breaches (Breach 1 and 3) excavated through the present earthen bank sea walls. The breaches were part of the C828 works carried out by BAM Nuttall on behalf of Crossrail and were part of the Royal Society Protection of Birds' (RSPB) Wallasea Island "Wild Coast Project".

The recorded archaeological evidence appears to correspond with cartographic and documentary records, which show a bank and ditch in the area of Breach 1 and a "Breakwater" in the area of Breach 3.

At Breach 1 the remains of a possible ditch and bank were seen in the southern edge of the breach. The date and origin of this feature is unknown although it could be the remains of a ditch and bank shown on Chapman and Andre's 1777 map of Essex.

Parts of a crude, dry stone structure were revealed on the western side of Breach 3. Partly covered by the present sea wall, the date and origins of this linear structure was not obvious. The fact that it did not follow the line of the present sea wall would suggest that it pre-dates the sea wall, which appears to have been originally built at the end of the 18th century and repaired and partly rebuilt in the later half of the 20th century. Ordnance Survey maps of the island from the second half of the 19th century show a short structure marked as "Breakwater" within the intertidal zone to the south of the present seawall in the area of Breach 3. This appears to be one of the wharves, ferry stages and landings which are known to have stood along the edge of the island. These were added to enable the landing of heavy equipment on to the southern part of island after the North Sea Floods of 1953. The dry stone structure has been tentatively identified as part of this "Breakwater".

No artefacts or ecofacts and, aside from the dry stone wall at Breach 3, no structures were observed during the watching brief.

1. INTRODUCTION

1.1 Scope of Work

- 1.1.1 Oxford Archaeology/Ramboll UK (OAR), who were previously known as Oxford Archaeology/Gifford (OAG), were commissioned by Crossrail Ltd to undertake an Archaeological Watching Brief at Wallasea Island, Essex (hereafter the Site). Centred on TQ 965 935. (See Figure 1).
- 1.1.2 The Crossrail works at Wallasea Island involve the distribution of spoil generated during Crossrail tunnelling activities in London across areas of former low lying farmland. To create a wetland area as part of the Royal Society for the Protection of Birds' (RSPB) Wallasea Island "Wild Coast Project". Crossrail is constructing the Cell 1 tidal lagoon of the scheme by constructing new bunds, embankment and river channels.
- 1.1.3 The creation of the Cell 1 tidal lagoon requires the connection of the new landform with the local river system which would allow it to flood with each high tide. This was achieved by breaching the existing sea wall embankment adjacent to the River Roach at three locations (Breach 1, 2 and 3, Figure. 2).
- 1.1.4 The final breaching of the sea wall had to be undertaken during a neap tide. To ensure that the excavation of the final sections of embankment needed to be completed within a single six-hour period between the ebb tide and low water. The pre-breach and breaching works were undertaken in eight phases (Phases 1 to 5), which are described in C807's Construction Method Statement (C807-BNV-W-GMS-CRT00_ES001-50108) and set out in outline below.
- 1.1.5 Phase 1 works included the establishment of access. The excavation of a channel profile through the existing tidal saltings up to 8m seawards from the toe of the sea wall.
- 1.1.6 Other Phase 1 works involved the construction of a temporary access ramp onto the sea wall using material excavated from the breach deposition areas. Works required the construction of a working platform for the 40 tonne, 22m long reach excavator at the seaward toe of each side of the wall.
- 1.1.7 The second phase comprised the excavation of the tidal saltings between the existing sea wall and the River Roach to create a seaward channel. These works were undertaken by a team of amphibious long reach excavators to first create a 10m wide central deep channel.
- 1.1.8 During Phase 3 the upper shallow seaward channel section was excavated to either side of the deeper channel using the same excavated method as Phase 2. The total width of the upper shallow channel was 100m at each breach location.
- 1.1.9 Following completion of the pre-breach works, the excavation of the existing sea wall to create each breach was undertaken in two phases.

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- 1.1.10 Prior to breach day and during the days preceding the breaching, the height of the existing sea wall was reduced by mechanical excavator in pre-determined layers. Excavation was timed to coincide with the most favourable tide levels and prevailing weather conditions. The sequence of excavation is set out in Appendix E of the C807 Construction Method Statement (C807-BNV-WGMS- CRT00_ES001-50108). The extent of the sea wall lowering (Phase 8) was determined by the tide levels +500mm to avoid overtopping of the sea wall. Excavation of the sea wall was undertaken at all three breach locations in parallel.
- 1.1.11 The final breaching was undertaken over the course of a single day and in a controlled sequence with all three sea wall breaches occurring at the same time. Two excavators were employed at each breach site.
- 1.1.12 Following completion of the final breach the exposed ends of the remaining sea wall will be graded by mechanical excavator to form a level lower plateau at the toe of the sea wall and battered face. These works will minimise erosion of the remaining sections of sea wall.
- 1.1.13 An archaeological assessment prepared for the RSPB and presented as part of the Wallasea Island Wild Coast Project Environmental Impact Assessment ((CR/HB/EMR/0001) identified the archaeological potential for the survival of archaeological remains associated with medieval or earlier sea walls.
- 1.1.14 To mitigate the impact of the breaching works on these potential archaeological resource an archaeological general watching brief was undertaken immediately after the breaching to identify and record any evidence for medieval or earlier sea walls.

1.2 Planning Background

- 1.2.1 The overall framework within which archaeological work was undertaken is set out in the Environmental Minimum Requirements (EMR) for Crossrail (3rd draft November 2007) and confirmed in the Crossrail Act 2008.
<http://www.legislation.gov.uk/ukpga/2008/18/schedule/7>
- 1.2.2 The requirements being progressed follow the principles of Planning Policy Guidance Note 16 on archaeology and planning (1990), superseded by PPS5 as of 23 March 2010 and subsequently National Planning Policy Framework (NPPF) in March 2012. Accordingly the nominated undertaker or any contractors will be required to implement certain control measures in relation to archaeology before construction work begins.
- 1.2.3 The strategy for archaeological works was set out in the Crossrail Generic Written Scheme of Investigation (WSI) (CR-XRL-T1-GSTCR001-00003). It presented the strategy for archaeological design, evaluation, mitigation, analysis, dissemination and archive deposition adopted during the design stage and construction of the Crossrail project. The Generic WSI also provided a general statement of objectives, standards and structure for the planning and implementation of archaeological works during the project.

- 1.2.4 Initial consultation was undertaken with the Essex County Council Historic Environment Management Team (ECC HEM) regarding the works at Wallasea Island in October 2011 and March 2012. The ECC HEM agreed with the recommendation for a general watching brief and recording of any exposed sections of the sea wall which might indicate remains of earlier, particularly medieval, sea wall construction. In June 2014 the RSPB also consulted with ECC Place Services (formerly the HEM) this consultation confirmed that the only element of Crossrail's works within Cell 1 that required archaeological monitoring were the sea wall breaches. Consultation undertaken by Crossrail with ECC Place Services has been ongoing since 2012 as changes to the scheme design have become apparent.
- 1.2.5 Crossrail produced a Site Specific Written Scheme of Investigation (SSWSI) for the Site (C807-XRL-T1-XWI-CRT00_ES001-50001 Rev.1.0). The practical methods of realising the requirements of the SSWSI were set out in OAR's Archaeological Method Statement (AMS) (C254-OXF-T1-GMS-CRG04-50001 Rev. 2) which was approved in advance of works by the Crossrail Project Archaeologist.

1.3 Location, Topography and Geology

- 1.3.1 Wallasea Island lies approximately 12 km northeast of Southend-on-Sea and 850m to the south of Burnham on Crouch which lies on opposite (northern bank) of the River Crouch from the island (Figure 1).
- 1.3.2 It is one of six islands, along with Potton, Rushley, Foulness, New England and Havengore, which form the so called "Essex Archipelago" located on the southeast coast of the county of Essex.
- 1.3.3 Wallasea Island, which lies on the northern side of the Thames Estuary, is defined by the River Crouch to the north and to the south and east by the River Roach, which flows into the Crouch at the island's northwest corner. The western side of the island is defined by the Lion Creek, Paglesham Creek and Paglesham Pool. Wallasea Island is connected to mainland by a single road/causeway parts of which are occasionally covered by water at high water.
- 1.3.4 Wallasea is a large flat low-lying island that is entirely within the coastal floodplain. Surrounded by the Roach and Crouch estuaries which are themselves part of the Thames Estuary. It is surrounded by earthen sea walls which are up to 4.8m high at 104.8m above Tunnel Datum (ATD) where the Tunnel Datum is calculated as being 100m above Ordnance Datum e.g. 1m aOD = 101m ATD. The sea walls are fronted by tidal mudflats and salt marsh.
- 1.3.5 Much of the island is lower in elevation than the surrounding intertidal habitats, at ca. 98 to 100m ATD (-2m to 0m aOD), a consequence of historical reclamation and subsequent ground settlement. On the north side of the island the RSPB Wallasea Wetland Reserve has been created by constructing a new sea defence and breaching the former sea wall. The Crossrail works described in this report are confined to the area known as Cell 1 situated on the eastern side of the island.
- 1.3.6 The British Geology Society Drift edition map of the area (BGS 1976). Describes the island deposits as comprising undifferentiated or clay, marine or estuarine alluvium, with river terrace deposits located at the western end of the island near Grapnell's Farm.

- 1.3.7 An assessment of various historic borehole data provides the following stratigraphic profile of the islands geology (EMR 2008:226):
- Made Ground (the sea walls);
 - Soft marine clays;
 - Marine alluvial silts (generally under the embankments);
 - Alluvial sand (north side of the island only)
- and
- Desiccated marine alluvial clays.
- 1.3.8 The EMR notes that prior to and during the Neolithic period (4000-2000BC) this area would have comprised tidal silt flats and ridges of gravel and shell, with no evidence of prehistoric activity recorded during previous surveys and research on the island. The island developed into a marshland island by the Later Bronze Age (1000-700BC) (2008:226) as the inter-tidal flats and ridges slowly built up due to the fluvial action of silt deposition over a period of time.
- 1.3.9 Subsequent flooding events in the 20th century followed by remediation and levelling works have significantly altered the character of the island.

1.4 Archaeological and Historical Background

- 1.4.1 The following outline is mostly taken from the Wallasea Wild Coast Project Environmental Statement (EMR 2008).

Prehistoric (700,000 BP to A.D. 43) and Roman (A.D. 43 to 410)

- 1.4.2 Despite a potential for prehistoric land surfaces to exist on the Site there is no archaeological evidence in the Essex Historic Environment Record (EHER) for activity on the site before the Iron Age. The importance of the Essex coast for Late Iron Age and Roman (100 BC- A.D.410) salt production is well known and the MER ES records the location of three characteristic 'red hills', or salt production sites on Wallasea. One of these red hill sites (EHER No. 11308) was located within Cell 1 (see Figure 3 in Crossrail 2015). A site walkover survey and review of historic aerial photographs and Lidar data for the MER ES revealed no evidence for the red hill deposits.

Anglo-Saxon (AD 410 to 1066) and Medieval (1066 to 1540)

- 1.4.3 By the late Saxon period the low lying marshes across Wallasea has become valuable as pasture for grazing livestock. The marshland pasture was divided between numerous parishes, as recorded in the Domesday Survey of A.D. 1086.
- 1.4.4 By the medieval period the valuable agricultural land required protection from flooding. Documentary evidence suggests the island reclaimed being originally embanked in the 13th or 14th centuries (Heppel 2004). The interior of the island would have been subdivided into a number of smaller areas of marsh. The lines of these embankments are visible on historic mapping. However, no surface evidence was visible during the Site walkover survey conducted in 2008 and it is likely that the former embankments were removed by modern levelling of the island's interior (EMR 2008:227).
- 1.4.5 Archaeological investigations during the 1970s on the island of Foulness, to the east of Wallasea Island, revealed the remains of medieval sea walls surviving beneath the existing sea walls. These earlier sea walls comprised timber and ragstone revetments and earthen banks.

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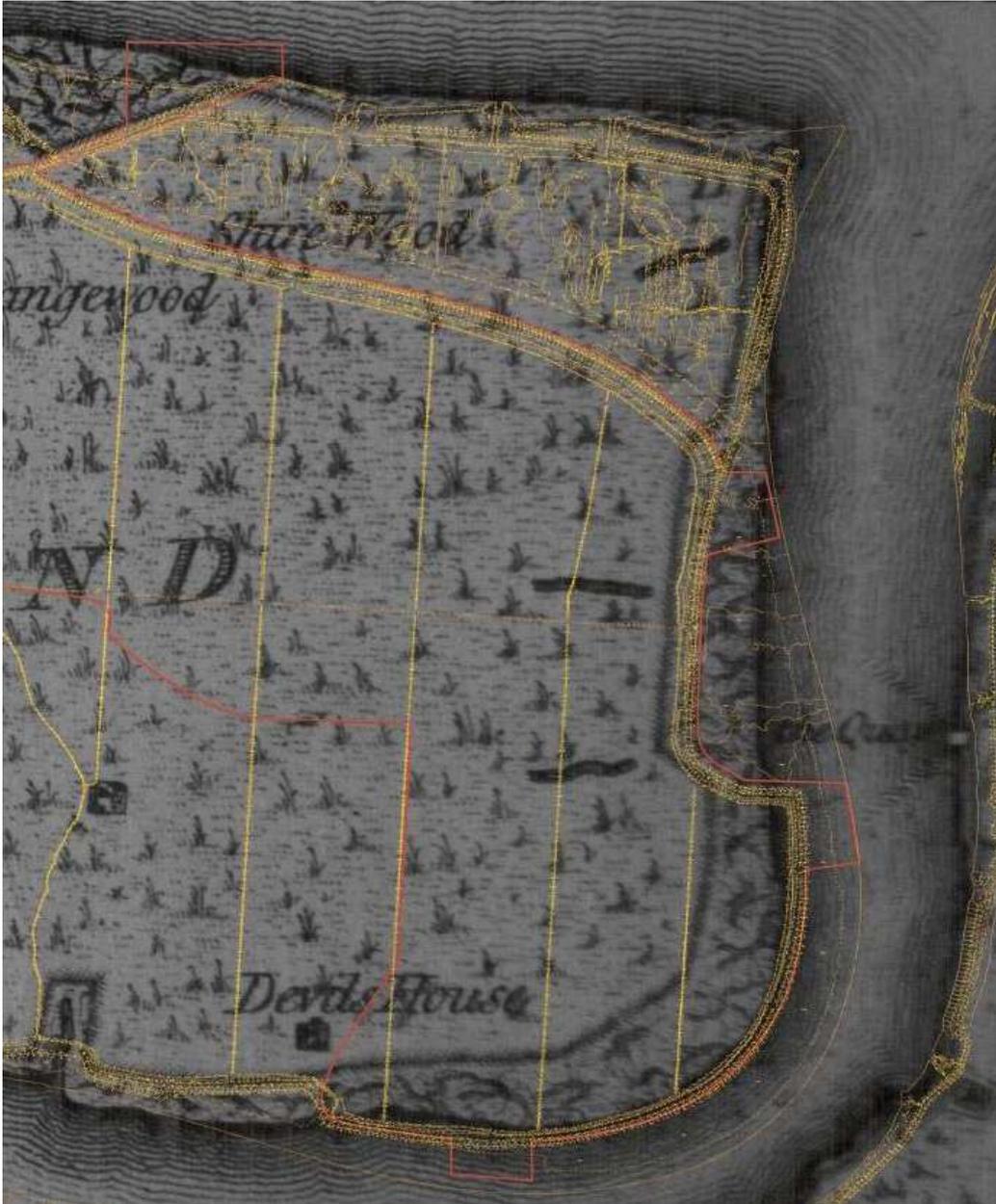
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- 1.4.6 The post-Roman settlement on the island is noted to have been initially transitory, perhaps seasonal occupation by fishermen and shepherds. No occupation sites are known prior to the early post-medieval period, although documentary sources identify permanent settlement on the island by the Tudor period (1487-1603).

Post-medieval (1540 to 1901)

- 1.4.7 Chapman and Andre's map of 1777 (Figure 4 Crossrail 2015) records the location of 10 farmsteads spread across the island, along with the major creeks and sea walls. Only Devil's House farm (later Tile or Tyle Barn Farm) was located within Cell 1.
- 1.4.8 The 1777 map also indicates that the extent of the southern part of Cell 1, known as Tile Barn Marsh was smaller than it is today with what appears to be a sea wall or bank and ditch located further inland. The area immediately behind the modern sea wall appears to be tidal saltings at this time.
- 1.4.9 Modern aerial photos of the same area (see Figure 5) clearly show a buried linear feature visible on the same alignment corresponding to the bank and/or ditch shown on Chapman and Andre's map. This suggests that the land immediately behind the current southern sea wall was reclaimed from the saltings shown on Chapman and Andre's map of 1777. This is supported by documentary evidence cited in the MER ES which records that Tile Barn Marsh was 'inned' or embanked in 1790.



Excerpt of Chapman and Andre's map of 1777 – overlain with modern topography

- 1.4.10 In the area covered by Breach 1 the present sea defences appear to follow the line of the bank shown on the 1777. However in the area covered by Breach 3 they run to the south (sea ward) of the bank on the 1777 map. This embankment is first shown on the 1873 Ordnance Survey (OS) map (not illustrated) and on all of the successive OS maps.
- 1.4.11 The sea walls will have been repaired and in places rebuilt a number of times since their construction particularly after major floods which have hit the island three times since the 18th century.

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1.4.12 Ordnance Survey mapping from the late 19th century records that the number of farmsteads on the island had increased to 13 by 1875 by this time the population was large enough to support a school which operated on the island from 1879 until the outbreak of the Second World War.

Modern (1901 to Present)

1.4.13 Agricultural decline led to the gradual abandonment of the majority of farmsteads on the island, in the 20th century. The holdings were gradually consolidated so that by the outbreak of the Second World War only four farms; Grass Farm, Tile (Tyle) Barn /Devil's House, Old Pools, Lower Barn and Grapnell's Farm survived.

1.4.14 Most of Devil's House/Tile Barn (Tyle Barn) was destroyed in the North Sea Flood of 1953 after suffering bomb damage in the Second World War. So that on the 1958 Ordnance Survey (OS) map of the island (Not shown) only one out building survived to the south of the farm's former core. This building, which is called Tyle Barn on the 1958 map, was itself levelled in the 1960s. Almost all of the other farms on the island suffered the same fate as the farm at Tyle Barn, so that now there are no extant farms to the east of the existing Grapnell's Farm.

1.4.15 On the edges of the island there would have been a number of post-medieval landings such as wharves and jetties which would have served the farms and as ferry points linking Wallasea to the mainland and neighbouring islands. On the 1777 map a small inlet and wharf are shown to the west of Devils House (Figure 4 Crossrail 2015). We know that this wharf was used by a ferry which linked Wallasea to Foulness until the outbreak of the Second World War. No remains of these jetties were visible during the 2008 walkover. On the northern side of the island a ferry still crosses the River Crouch between Burnham and the Wallasea Marina.

1.4.16 Wallasea Island has flooded a number of times in the recorded past, including 1551, 1736, 1897, 1928, 1938, and during the North Sea floods of the night of 31st January 1st February 1953.



Flood water covering the east side of the island (image taken from north looking south)

- 1.4.17 The 'Great Tide' of 1953 had a devastating effect on the island. Having over-topped the sea walls the sea flooded the island to a depth of 5-6ft (1.7-2m), with subsequent tides breaching the walls on the northern side of the island. Only the area immediately around Grapnell's Farm escaped the flooding which covered almost three-quarters of the island.
- 1.4.18 In order to drain the island a sand-bank counterwall was constructed across the island at its narrowest point. On the 13th February 1953 mechanical excavators were landed on the island at an improvised hard standing at Tile Barns, (Greive 1959 in MER 2008:228). There are some visible dumps of stones in the intertidal area in the vicinity of the area once occupied by the Tile Barns, which could be the remains of this work. However a "Breakwater" is shown to the south of the sea wall in the area to the southeast of the Tyle Barn on OS maps from 1873 to 1961. The "dumps of stones" mentioned in the MER could equally be part of the "Breakwater".
- 1.4.19 As part of the island's reconstruction new sea defences were erected. Sections of the medieval and post-medieval sea walls were abandoned along the island's southern side and new earthen bank walls built to seaward.
- 1.4.20 In aftermath the island was essentially 'barren' for 6 years. The land and soil on the island had to be processed by introducing 1000s of tonnes of gypsum to restructure the soil and allow it to recover from the saline intrusion.
- 1.4.21 In the early 1960s extensive re-drainage work took place across the whole island, old boundaries were infilled and new drainage ditches cut. The island to the east of Grapnell's Farm was levelled by a team of bulldozers over a period of six years and deep drainage dykes was put in place.

1.5 Previous Archaeological Works

- 1.5.1 As part of the Wallasea Wild Coast Project Dr Richard Macphail of University College London (UCL) carried out analysis of four trial pits to the northeast of the Cell 1 site. To provide data which would assist in understanding prehistoric and earlier sites which have been affected by the processes of marine inundation. His research identified the taphonomic effects on archaeological sites and provided a good control site for assessing prehistoric archaeological sites affected by similar marine inundation processes (Macphail et al 2008. 51; Macphail 2009).
- 1.5.2 The research illustrated the nature of the buried soil environment along the island's eastern edge. The depths of the trial pits indicated modern (post-medieval) soil environments affected by marine inundation in grassland and arable lands. However the evidence from the trial pits did not provide conclusive evidence for the survival of earlier buried soil horizons (Macphail et al 2008. 54).

Crossrail Archaeological Investigation 2013

- 1.5.3 An archaeological investigation by OAR was undertaken in July 2013 during the excavation of ponds and surface features and distribution of spoil to create the RSPB wetland area within Cell 1.
- 1.5.4 The archaeological works recorded a single feature comprising the remains of an adult cow buried in a shallow pit cut into the silty clay alluvial layers which cover the majority of the island.
- 1.5.5 The lack of associated artefacts negated a confident dating for the animal burial.

1.5.6 The results of the investigation are reported in the Crossrail fieldwork report (Crossrail 2014; C254-OXF-T1-RGN-CRG03-50175 Rev. 2.0).

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2. RESEARCH AIMS AND OBJECTIVES

2.1.1 The overall objectives of all the investigations were to: establish the character, nature, date, extent and state of preservation of any surviving archaeological remains that would be impacted upon by the development. The SSWSI and subsequent AMS contain a number of research and work objectives contain a number of research and work objectives. These are outlined below:

- *The overall objective of the GWB is to mitigate the impact of the breaching works on the archaeological resource through a programme of archaeological investigation, recording, analysis and dissemination.*
- The aims of the watching brief were to;
- *To recover any evidence for the known post-medieval or earlier sea walls that existed on the site, with a subsidiary aim being to establish a chronological framework for the development of sea defences.*
- *Record any buried soil horizons or former land surfaces that may lie sealed beneath the existing sea wall.*

And;

- *To identify and record any evidence for variation to identify and record any evidence for variation in the method or material used to construct the sea wall at breach locations; and to identify and record any evidence to support the historic map and documentary sources that suggest that the southern section of sea wall at Breach 3 may be post medieval in date and relating to the 'inning' of Tile Barn Marsh in 1790.*

3. INVESTIGATION METHODOLOGIES

3.1 Introduction

3.1.1 A broad summary of the methods employed during the project is described below, as well as any significant variation or clarification of the agreed methodology.

3.1.2 The assessment of the likely archaeological resource within the Site identified that the sea walls enclosing Cell 1 had the potential for the survival of archaeological remains associated with medieval or earlier sea walls. And that the remains of any earlier structures may survive within or beneath the existing flood defences in the form of timber revetments or posts, stone retaining walls or earthen banks.

3.1.3 The following archaeological mitigation was developed in consultation with officers from ECC Place Services and was implemented during the breaching works.

Pre-Breaching

3.1.4 No known archaeological assets or relict creeks were been identified within the tidal saltings at each breach location. Consequently no archaeological monitoring was undertaken during these works.

3.1.5 There remained the possibility for unexpected archaeological discoveries in the form of timber structures or the remains of wrecks or hulks buried in the estuarine silts. In the event that such remains were encountered during the excavation of the seaward channels. The Principal Contractor would notify the Crossrail Project Archaeologist and follow the procedures for Unexpected Discoveries set out in this SS-WSI and the C807 Wallasea Archaeological Management Plan (Document Number C807-BNV-W-STPCRT00_ES001-50017).

Sea wall Breaching

3.1.6 Due to the restricted nature of each worksite and lack of safe foot access to the work sites, once machine excavation commenced there was a need to minimise the personnel required at each breach location.

3.1.7 The Site conditions and swing arm radius of each excavator was such that there would be no position of safety or opportunity for an archaeologist to safely enter or reasonably monitor the lowering or breaching of the sea wall.

Post-Breaching

3.1.8 At low tide on the days immediately following the completion of the sea wall breaching the freshly excavated and battered face of the current sea wall at Breaches 1 and 3 were accessible for archaeological inspection and recording.

3.1.9 Archaeological inspection of the exposed sea wall under a general watching brief methodology enabled a visible section through the structure of the sea wall to be investigated.

3.1.10 Following inspection of the sea walls any structural remains present were then identified and recorded.

3.2 Methodological Standards

3.2.1 All the watching brief fieldwork was carried out and this report was produced in accordance with the written AMS (OAR 2015) and with reference to:

- C807 - Wallasea Island – Archaeology Site Specific Written Scheme of Investigation for the Cell 1 Breaching (C807-XRL-T1-XWI-CRT00_ES001-50001 Revision 1.0);
- C807 MSAP 202 Cell 1 Breaching Construction Method Statement (C807-BNV-W-GMS-CRT00_ES001-50108);
- C807 Wallasea Island Emergency Preparedness Plan (C807-BNV-W-STP CRT00_ES001-50013 Rev 12)
- Archaeological Generic Written Scheme of Investigation (CR-XRL-T1-GSTCR001-00003);
- Archaeology Specification for Evaluation and Mitigation (including Watching Brief)(CRL1-XRL-T1-RSP-CRG03-50001);
- Environmental Minimum Requirements (EMR) for Crossrail (CR/HB/EMR/0001) (5th draft, July 2008);
- Works Information (Volume 1 - General), (CR-SD-PRW-X-RT-00151, 5 June 2009 (WIV1)); and
- Works Information (Volume 2 - Particular), (CR-SD-PRW-X-ITT-00001, 13 July 2009 (WIV2)).

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As well as the following relevant best practice guidance (and any subsequent revisions):

- Crossrail standards and specifications;
- Institute for Archaeologists – Standard and Guidance for an archaeological watching brief, 2008 (revised);
- English Heritage – Geoarchaeology, 2007;
- English Heritage - Archaeological Science at PPG16 interventions: Best Practice Guidance for Curators and Commissioning Archaeologists, 2003;
- Museum of London Archaeology Service site recording manual (MOLA 1994)

3.3 Watching Brief Methodology

- 3.3.1 A Watching Brief, as defined in the Generic WSI, is ‘*a programme of archaeological monitoring (i.e. observation, investigation and recording) which is carried out by a suitably qualified archaeologist during site investigations (e.g. geotechnical test pits, boreholes and utilities trial trenches) and construction works*’. The purpose of the watching brief was to identify the potential of any archaeological remains that were uncovered in the course of the works and record them appropriately (as far as was reasonably practicable).
- 3.3.2 There was the stipulation that ‘*except in cases where unexpected, potentially nationally important, archaeological remains are discovered, the targeted watching brief shall be designed and implemented so as to avoid adverse impact on the construction programme, wherever practicable*’, (Specification for Evaluation and Mitigation (CR-PN_LWS_EN_SP_0001; section 7.H.6).
- 3.3.3 OAR undertook watching brief works in areas of ground disturbance which potentially contained archaeological remains as set out in the SSWSI and when informed by either the works programme or by on site contractors. The scope of attendance included any activities (including those associated with site set-up and demolition) undertaken by the Principal Contractor that involved the removal of modern material, “Made ground” and topsoil, subsoils, and superficial geological deposits such as alluvium and colluvium.
- 3.3.4 Areas that had been previously subject to archaeological excavation and which were known not to contain significant deposits (for example tunnels, cuttings, and areas of known large-scale modern disturbance) were excluded from the scope of the watching brief, unless stated otherwise in the SSWSI.
- 3.3.5 OAR provided a core of appropriately experienced archaeologists commensurate with the scale and nature of the Principal Contractor’s works. They undertook the observations and required investigations to the utmost of their ability, within the constraints of the project.
- 3.3.6 The following observations were recorded on a daily basis.
- The Event Code and location of the area observed;
 - The date of the observation;
 - Personnel employed on site;
 - A description of the construction works observed;

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- Any relevant works sub-contractor and personnel undertaking and supervising the construction activity;
- Depths and extents of excavation works observed;
- A measure of confidence that any archaeological remains would have been observed and reasons;
- The areas and horizons (both those containing archaeological or remains of quaternary geological importance and those which do not) unaffected by construction activity (with special reference to archaeological sites identified for preservation in situ);
- The reasons why any particular area of the works was not observed, and noting those areas not subject to disturbance from construction;
- Location and description of any archaeological remains; and
- Location and description of any modern remains.

3.3.7 The Watching Brief has resulted in the preparation of an ordered co-referenced archive, which will be incorporated into the Post-excavation works and into the publication of the project results.

3.4 Techniques for Watching Brief - Field Work

3.4.1 The techniques outlined below were utilised:

3.4.2 All work was carried out in accordance with relevant Health and Safety regulations and codes of practice in force. Safe working practices overrode archaeological considerations at all times.

3.4.3 All work was carried with the aim of recovering sufficient information to determine function, form, and date.

3.4.4 It was not possible to clean and record the archaeological profile of the sea wall breaches, due to health and safety or access constraints. However every effort was made to establish the presence or absence of archaeological deposits and by establishing a height for significant deposits, including the depth of modern intrusions, key stratigraphic components and natural deposits.

3.4.5 All observations were issued a unique Event Site Code issued by the Essex Historic Environment Advisor (CNWA13). A continuous unique numbering system operated at each breach.

3.4.6 Drawings of appropriate features, structures and individual contexts (1:50 1:20 or 1:10). Isolated archaeological remains (artefacts) were spot located in plan and a height provided where applicable.

3.4.7 The photographic record consisted of digital and 35 mm formats. The photographic record included photographs of archaeological features, appropriate groups of features, structures, and quaternary deposits, as encountered and shot to illustrate work in progress. The archived photographs include an appropriate graduated scale, a north arrow, and a header board detailing (as a minimum) the event code and context/feature number.

3.4.8 All structures, deposits and finds were recorded by OAR according to current best practice and accepted professional standards (see OA Fieldwork Manual 1992, Museum of London Archaeological Site Manual 1990), and as outlined in the AMS.

3.5 Survey Work

- 3.5.1 The relevant survey procedures are set out in Crossrail document CR-PN-LWS-EN-SP-00001
- 3.5.2 Oxford Archaeology uses as a guideline for its metric survey English Heritage Metric Survey Specifications. The survey was conducted with reference to these.
- 3.5.3 All recording was in accordance with The London Survey Grid Standard (formerly Crossrail Survey Grid, see Crossrail standard CR-STD-010).
- 3.5.4 OAR did not obtain dimensions by scaling from the Employer's drawings
- 3.5.5 Surface heights were recorded and related to PGMs (Permanent Ground Marker) or approved Ordnance Survey Bench Marks (OSBM) .The full descriptions and locations of PGMs and OSBMs being supplied to OAR by the Principle Contractor.
- 3.5.6 Survey work was carried out using a Total Station Theodolite (TST) survey utilising Reflectorless Electronic Distance Measurement (REDM). The survey equipment used by OA was a Leica TCRP 1205 TST.
- 3.5.7 All spatial data was recorded by TST in either the internal data-logger, on an appropriate memory card or directly onto a field computer through use of appropriate software (such as TheoLT, Penmap or Leica TST CAD). Non-spatial information was recorded either in a field notebook or logged directly onto a laptop or PDA (Personal Digital Assistant).
- 3.5.8 Each TBM was levelled as part of a closed loop starting and finishing on approved OSBMs or Crossrail PGMs.
- 3.5.9 Survey data recorded in the field was downloaded using Leica GeoOffice, LisCAD or other appropriate downloading software, and saved as an AutoCAD Map DWG file, or an ESRI Shapefile. These files were backed up with originals being stored on an OA server in Oxford.
- 3.5.10 All drawings were composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA Geomatics protocols.
- 3.5.11 The aim of the GIS/CAD work was to produce workable draft plans, which can be produced as stand-alone products, or can be readily converted to GIS format.
- 3.5.12 In all instances, CAD work followed the guidelines set out in Crossrail's CAD Standards (CRL1-XRL-O6-STD-CR001-00014 CAD Standard V4) and Crossrail Archaeology Specification for Evaluation & Mitigation (including Watching Brief) (Document CR-PN-LWSEN- SP-00001).
- 3.5.13 All plan scans were numbered according to their plan site number. Digital plans were given a standard new plan number taken out from the site plan index.
- 3.5.14 All digital data was backed up incrementally on CD or DVD.

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- 3.5.15 Each CAD drawing contained an information layout which included all the relevant details appertaining to that drawing. Information (metadata) on all other digital files will be created and stored as appropriate. At the end of the survey all raw measurements were made available as hard copy for archiving purposes.

3.6 Finds Collection and Retention

- 3.6.1 A strategy for finds collection and retention was developed in consultation with OA's finds department and was set out in OAR's AMS and in accordance with the relevant guidance given in the IFA *Standards and Guidance for Archaeological Field Evaluation* (revised 2001). The UK Institute of Conservators Guidelines *Conservation Guideline No 2* and the Museums and Galleries Commission's *Standards in the Museum Care of Archaeological Collections* (1991), excepting where they are superseded by statements made below.

3.7 Environmental Sampling

- 3.7.1 A strategy for sampling archaeological and environmental deposits was developed in consultation with OA's environmental department and was set out in OAR's AMS.

4. RESULTS

- 4.1.1 This section summarises the results of the archaeological observations. Within each individual area the results are presented as a single chronological narrative describing its chronological development with the earliest first and the most recent last. All periods of activity are phased where possible.
- 4.1.2 Detailed summaries of the archaeological features and deposits are presented in Appendix 1 and full details are available in the fully cross checked project archive.

Breach 1

- 4.1.3 The remains of the earthen bank of the present sea wall (100) with extensive deposits of marine clay to the seaward (106) and similar clays (107) to the landward and beneath the present sea wall, were seen on both sides of the breach. The structure of the sea wall was made up of a single homogenous bank of mid-greyish brown silty clay covered with a thin layer of topsoil/turf.
- 4.1.4 The sea wall appeared to have been constructed directly onto a homogenous, 2m thick mid-brownish grey alluvial deposit (108/106). This alluvial deposit extended from the current water's edge across the salting seaward of the present sea wall before continuing beyond the sea wall into the interior of the island.
- 4.1.5 In the breach's southern face, a distinct orange brown deposit (101) was observed ca. 1-1.5m below the level of the former sea wall (Plate: 17). This deposit, which was c. 0.6m thick, lay within the grey marine clays and appeared to be an oxidised layer of clay which clearly sloped down from east to west. To the west and sealing the oxidised clay was a dark brown-black "organic" deposit (102) which appeared to be the fill of an infilled former ditch (111). The "organic" deposit was at least 1.5m thick (it appeared to continue below the sea level) and was at least 2.5m wide.

Breach 3

- 4.1.6 The remains of the earthen bank of the present sea wall (105) with extensive deposits of grey marine clay to the seaward (108) and similar clays (109) to the landward and beneath were seen on both sides of the breach. The profile and construction of this stretch of the sea wall was similar, but not identical to that at Breach 1. In Breach 3 the sea wall was made up of a single homogenous bank constructed out of a mid orange brown clay and covered by a thin topsoil.
- 4.1.7 Unlike the sea wall at Breach 1, the seaward face of (105) was protected by a layer of square concrete 'Essex Blocks' (c. 115mm thick) jointed with hot-poured mastic (Plate: 22). The sea wall appeared to have been constructed directly on top of a grey alluvium (108/109) which extended across the whole area of the saltings and breach works.
- 4.1.8 On the breach's western bank the remains of a dry stone "wall" (103/110) was partly excavated by hand and then recorded during the watching brief (Plates: 19-21). This crude structure was 1.10m wide and at least 8.5m long, and appears to have been at least partly covered by the earthen bank of the modern sea wall (105). Aligned east-northeast to west-southwest on the seawall's seaward side, 105 was made of rough-hewn limestone and green sand rocks without any courses or bonding material. The stones, which were up to 400mm in diameter, were partly covered by a grey clay silt. Probably derived from the bank of the former seawall and recent tidal marine/estuarine mud's deposits with patches of darker grey silt in between the stones. Its eastern end disappeared into the channel of the open breach whilst its western end was seen to run beneath the extant sea wall.
- 4.1.9 Similar rough-hewn stones were seen at the foot of the seaward side of extant sea wall west of Breach 3. Further rough-hewn stones were visible forming what might have been a roughly north-south aligned return. This 8m long stretch of dry stone "wall" 110 ran at right angles to the main "wall" on its northern, landward side.
- 4.1.10 Three cut timber posts were found along the back of (103) two lay flat seeming pulled out of place, possibly by the breaching works, and a third was driven into the ground at a 45° angle. The posts which were machine cut, very regular and in good condition and were most likely recent in origin (Plates: 20 and 21).
- 4.1.11 The date and function of the dry stone structures is not clear, although partly covered by the modern sea wall (105) neither was aligned with it suggesting that it predates the construction of the 1950s sea defences.

4.2 Finds

- 4.2.1 No artefactual material was recovered during the watching brief. Material observed was all of twentieth century origin. It was therefore noted and discarded.

4.3 Environmental

- 4.3.1 Due to the absence of suitable deposits, no environmental samples were taken.

4.4 Phasing

- 4.4.1 Broad phasing has been ascribed to the deposits and structures encountered during the works on the basis of relative stratigraphy uncovered, these were used in conjunction with cartographic and documentary evidence. The results are presented below in chronological order.
- 4.4.2 This phasing is provisional as is appropriate for an assessment of the Site, and may be refined in the light of evidence produced from detailed analysis of this and associated datasets. It is also noted that imposing rigidly defined periods on a continuous process is somewhat of a contrivance but is done so for simplicity. The following interpretative narrative is therefore offered with the appropriate caveats.

Breach 1

- 4.4.3 Three broad phases can be recognised in **Breach 1**.

Phase 1

- 4.4.4 The earliest phase in this part of the site consisted of extensive deposits of grey Marine Clays (106/107) which are all alluvial in origin, being lain down by successive tides. No dating material was obtained from these deposits. However their stratigraphic position; they are cut by a ditch (111) and lay beneath the present sea wall (100) - suggest a pre- 18th century date.

Phase 2 - Pre 1777

- 4.4.5 The next phase of activity is represented by feature 111 with its dark grey “organic” fill (102) and possible remains of a bank (101) (Plate 17). The “ditch” clearly cut through the grey marine deposits (106/107) and appears to have been at least partly covered by the latest sea wall embankment. It was probably part of a system of sea defences. Chapman and Andre’s 1777 map of the area (see above) included a bank and ditch. In this part of the island, the line of the present sea defences followed the line of the early sea wall.

Phase 3- Post 1953

- 4.4.6 The present earthen seawall represents the latest pre Crossrail Phase observed in this part of the island. However it was unclear what extent of the embankment was part of the original pre- 1777 sea defences and how much was from later repairs and the post 1953 flood rebuilding.

Breach 3

- 4.4.7 Although tentative, four broad phases can be recognised in Breach 3

Phase 1

- 4.4.8 The earliest phase in this part of the Site consisted of extensive deposits of grey Marine Clays (108/109) which are all alluvial in origin, being lain down by successive tides. No dating material was obtained from these deposits but they lay beneath dry stone structure (103) and the present earthen sea wall (110).

Phase 2

- 4.4.9 Dry stone “wall” (103 - Plates 18-21) has been assigned to this phase of the site. No dating material was found in association with this structure but the fact that “wall” 103 does not follow the same alignment as the still partly extant sea wall suggests that it pre-dates the construction of the present sea defences. Although without secure dating material it is difficult to say by how long. Several alternative dates suggest themselves;
- 4.4.10 It is possible that structure 103 forms part of an 18th century system of sea defences. It is known from documentary sources that the area covered by Breach 3 lay seaward of the bank and ditch sea defences shown on Chapman and Andre’s 1777 map. It is also apparent that this area of the island, called Tile Barn Marsh after the Tile (Tyle) Barn, which stood to the northwest of Breach 3, was ‘inned’ (enclosed by sea walls) in c.1790. The dry stone “walls” could be part of this operation.
- 4.4.11 A series of landings and jetties ringed the island and were used until recent times. A small dock/landing appears on the 1777 map close to the “Devil’s House” to the west of Breach 3 and is almost certainly the landing for a ferry which connected Wallasea Island to Foulness until the 1940s. The 1923 6 inch OS map of the island (Not shown) shows a “Wharf” at the Foulness ferry landing. Structure 103/110 could be the remains of one of these landings. This possibility is further supported by OS maps from 1893-1958 (Not shown) which show a short, north-south aligned, structure marked as “Breakwater” in the intertidal zone seaward of the sea wall in the area of the Crossrail Breach.
- 4.4.12 The ‘Devils House’, which is shown on the same map a little to the northwest of the Breach was, according to local legend, the abode of a witch; Old Mother Redcap, and a ghost or demon. The Devil’s House appears to be same as the Tile (Tyle) Barn which was run as a farm during the Second World War and is shown standing to the northwest of Breach 3 on early OS maps of the island. Although Breach 3 is some 150m to the southeast of the site of the former Devil’s House/Tyle Barn, it is possible that the stone structure is the remains of an outbuilding associated with it.

Phase 3 1790-1953

- 4.4.13 It was unclear how much of the present embankment was part of the 1790 Tile Marsh sea defences and how much was from later repairs and the post-1953 flood rebuilding. From historic OS maps (1873-1963) the line of the present sea walls at Breach 3 appears to largely follow the same line. Although it appears to have become wider with additional bank material on the seaward side.

Phase 4 1953-present

- 4.4.14 There is some evidence to suggest a more modern origin for the stone structure. The MER ES records that immediately after the floods of 1953 mechanical excavators were landed at an improvised hard standing at Tile (Tyle) Barns and that visible dumps of stones survived in the intertidal area. However the site of the now demolished Tile Barns Farm was some way to the northwest of Breach 3 and it had its own wharf and landing to the west. It appears more likely that the “dump of stones” mentioned in the MER ES are in fact the remains of a breakwater which formerly stood to the south of the sea wall and from 1872 until 1972 is shown on OS maps.

- 4.4.15 Finally it may be that the stones are simply some form of sub-base or foundation layer for the original sea wall, one of the subsequent repairs or from the extensive post 1953 flood rebuild.
- 4.4.16 The layer of concrete Essex Blocks set in hot poured mastic on the embankment's seaward appears to date from this programme of consolidation in the 1970-1980s. In an attempt to protect the toe of the bank from wave attack (Plate 21).

5. CONSTRAINTS

- 5.1.1 Health and Safety protocols imposed constraints on the work. The excavations were such as to only allow safe physical entry to the north bank of Breach 1 and the western bank of Breach 3. As well as recording any features and structures on these sides of the breaches, OAR was able to record from a distance of up to 70m from the profile along the opposite bank of the breaching channel.
- 5.1.2 The rising tide imposed a lesser constraint with much of the sections through the breach channels being covered by water at high tide. However OAR was able to visit the Site at low water. The rising tide was quite a slow process and the OA archaeologists were able to record the form and function of any archaeological remains and the general archaeological sequence before they were covered by the sea.
- 5.1.3 Despite these constraints the provision and method of the watching brief on Breaches 1 and 3 were deemed suitable and appropriate

6. ASSESSMENT OF THE RESULTS

6.1 Period:

- 6.1.1 The works revealed a series of Marine/Estuarine deposits of unknown date, but which must pre- date the construction of the sea walls which were built over the top of them.
- 6.1.2 They also revealed an infilled ditch and possible bank deposit in Breach 1. These were sealed by the present sea wall and are probably the same as the bank and ditch shown on Chapman and Andre's 1777 map of Essex. Which gives a *terminus ante quem* date for its construction.
- 6.1.3 No secure dating material was found in association with the dry stone structure 103/110 uncovered at Breach 3. However it was partly buried beneath the probable 1790 Tile Marsh sea defences which gives us a *terminus ante quem*. This structure is probably the same as the "Breakwater" first shown on the 1872 OS map of the island and on subsequent OS maps until 1972. Which means it must date from before the end of the 19th century but by how much is currently unknown.

6.2 Relative Completeness:

- 6.2.1 At both breaches the lowest deposits appear to have survived intact. The uppermost sequence appears to have been cut through by Crossrail breaching which has cut through the pre-existing sea walls and has possibly truncated any underlying buried soils or above ground features such as earlier banks.
- 6.2.2 Most of the features appeared to have been damaged by the construction of the earthen seawalls and recent Crossrail breaching operations, but not so much that their form was obscured.

6.2.3 The remains of a pre-1777 ditch (111) and the partial remains of possible bank material (101) could be clearly seen in the side of Breach 1. This feature appears to have been preserved by being buried by the present sea wall and was only revealed because of the Crossrail breaching operations.

6.2.4 The stone structure 103/110 uncovered in Breach 3 also appears to have been preserved by being partly buried by the present sea wall and appears to have survived relatively intact below ground.

6.3 Condition:

6.3.1 The surviving features, deposits and remains encountered were all in a reasonable state of preservation.

6.3.2 The surviving below ground parts of stone structure 103/110 was generally in good order. And the “organic” and bank material in ditch 111 appeared to be largely intact.

6.4 Rarity:

6.4.1 The uncovered remains cannot be regarded as rare. There are other examples of similar remains both visible as extant structures and as below ground features. However, the remains of the pre-1777 ditch and bank uncovered in Breach 1 do represent the earliest evidence found until now of the sea defences of the island. Although the function of the undated stone structure found at Breach 3 is not clear. If it is the remains of one of the wharves or landings then it would be the only example of such a feature uncovered at Wallasea.

6.5 Group Value:

6.5.1 On the whole the value of uncovered remains can be regarded as low. However, the remains of the pre-1777 ditch and bank uncovered in Breach 1 represent the only physical evidence of the pre 1950s sea defences of the island. As such they would be of some considerable local interest being a useful means to help characterise and chart the development of the island and the processes of land reclaiming. Which we know began in the Middle Ages but for which no physical evidence has until now been found. The feature’s value would of course be increased if the ditch proved to be Post-medieval or earlier.

6.5.2 Although the function of the undated stone structure found at Breach 3 is not clear. If it proves to be the remains of one of the island’s former wharves or landings then it would be the only physical example of such a feature so far found on Wallasea Island. If the age of both these features prove to be Post-medieval or medieval then their value would increase.

6.6 Results in Relation to Investigation Aims and Objectives:

6.6.1 Each component of the Wallasea Island Project had specific aims that were established as part of the framework of investigation. Alongside this were general site objectives into which all the work could filter information, these have been stated in Section 4.

6.6.2 The specific aims of the archaeological targeted watching brief were:

‘To recover any evidence for the known post-medieval or earlier sea walls that existed on the site, with a subsidiary aim being to establish a chronological framework for the development of sea defences’.

6.6.3 The remains of undated ditch and the truncated remains of a possible bank 111/101/102 were observed in the section of the southern bank of Breach 1 beneath the recently removed sea wall. Although no dating material was obtained from the ditch fills. This ditch and truncated bank was almost certainly the remains of part of the sea defences shown on Chapman and Andre's 1777 map of the island and are possibly much earlier in date.

6.6.4 In Breach 3 the present seawall runs to the south of the 1777 sea walls and no traces of a post-medieval or earlier embankment was found beneath the existing sea wall.

'Record any buried soil horizons or former land surfaces that may lie sealed beneath the existing sea wall'.

There was no evidence of any soil horizons or land surfaces pre-dating the current sea wall seen in either breach. The embankments appeared to have been constructed onto a homogenous alluvial deposit. At both breaches these natural deposited marine clays extended from the current water's edge across the salting seaward of the present sea wall before continuing beyond the sea wall into the interior of the island.

'To identify and record any evidence for variation to identify and record any evidence for variation in the method or material used to construct the sea wall at breach locations; and to identify and record any evidence to support the historic map and documentary sources that suggest that the southern section of sea wall at Breach 3 may be post medieval in date and relating to the 'inning' of Tile Barn Marsh in 1790'.

6.6.5 In both breaches the sea wall embankments appeared to be built of a single homogenous deposit although the composition of this deposit were not the same in each breach

6.6.6 In Breach 1, the in filled ditch (111) observed beneath the present sea wall on western (landward) side of the present sea wall and the associated oxidised clay of a probable truncated bank seems to be part of an earlier 18th century sea embankment.

6.6.7 In Breach 3 the existing the sea wall was made up of a bank of mid-greyish brown silty clay covered with a thin layer of topsoil/turf. On its seaward side a layer of concrete slabs set in bitumen appears to be a recent facing. As in Breach 1, the sea wall at Breach 3 appeared to have been constructed directly onto a homogenous alluvial deposit. At both breaches this alluvial deposit extended from the current water's edge across the salting seaward of the present sea wall before continuing beyond the sea wall into the interior of the island.

6.6.8 In Breach 3 the present seawall runs to the south of the sea walls shown on the 1777 map of the area and no traces of a post-medieval or earlier embankment was found beneath the existing sea wall.

6.6.9 It was unclear how much of the present embankment was part of the 1790 Tile Marsh sea defences and how much was from later repairs and the post 1953 flood rebuilding. From historic OS maps (1873-1963) the line of the present sea walls at Breach 3 appears to essentially follow the same line. Although it appears to have become wider with additional bank material on the seaward side.

7. POTENTIAL

- 7.1.1 The revealed remains are insubstantial and represent little or no potential for further research or analysis.

8. CONCLUSIONS

- 8.1.1 The archaeological evidence uncovered during the OAR watching brief appears to correspond with the early cartographic and documentary sources, which show a bank and ditch in the area of Breach 1 and a “breakwater” in the area of Breach 3.
- 8.1.2 The archaeological works demonstrated the survival of a number of remains which could help to characterise and trace the development of the island’s sea defences and transport links over time.
- 8.1.3 In Breach 1 the remains of an infilled ditch and possible associated bank material were seen in the southern edge of the breach. The date and origin of this feature is unknown but they have been tentatively identified as being part of the pre 1777 sea defences shown on this part of the island on Chapman and Andre’s map of Essex. Although it could be much earlier.
- 8.1.4 A section of a dry stone “wall” was uncovered, on the western side of Breach 3 partly covered by the present sea wall. The date and origins of this linear structure was not obvious. The fact that it did not follow the line of the present sea wall would suggest that it pre dates the sea wall. Which appears to have been originally built at the end of the 18th century and repaired and partly rebuilt in the later half of the 20th century. Ordnance Survey maps of the island from the second half of the 19th century show a short structure marked as “Breakwater” within the inter tidal zone to the south of the present seawall in the area of Breach 3. This appears to be one of the many wharves, ferry stages and landings which we know stood along the edge of the island. The dry stone structure has been tentatively identified as part of this “Breakwater”. Which may have been used during the landing of heavy equipment on to this part of the island in the clean up operations following the North Sea flood of 1953.
- 8.1.5 The remains of the pre-1777 ditch and bank uncovered in Breach 1 represent the only physical evidence of the pre 1950s sea defences of the island uncovered to date. As such they are a useful means to help characterise and chart the development of the island and the processes of land reclaiming. Which we know began in the Middle Ages but for which no physical evidence has until now been found. If the undated stone structure found at Breach 3 proves to be the remains of one of the island’s former wharves or landings. Then it would be the only physical example so far found of what was once an important part of island life. The once numerous system of ferries and small wharves and docks connecting Wallasea to the neighbouring islands and wider world. The fact that for most of its history Wallasea Island was only connected to the mainland by a single track, which was often covered by water at high tide, made the ferries and wharves even more essential to life on the island.

8.1.6 At both breaches the lowest deposits, marine/estuarine clays of unknown date, appear to have survived intact. The uppermost sequence appears to have been cut through by Crossrail breaching which has cut through the pre-existing sea walls and has possibly truncated any underlying buried soils or above ground features such as earlier banks. Although most of the features appeared to have been damaged by the construction of the earthen seawalls and recent Crossrail breaching operations, but not so much that their form was obscured. Both the remains of a pre-1777 ditch and stone structure appear to have been preserved by being buried by the present sea wall and was only revealed because of the Crossrail breaching operations.

9. PUBLICATION AND DISSEMINATION

9.1.1 A short summary of the results, will be disseminated in a round up of archaeology in Essex in 'Essex Archaeology and History'. This will be undertaken in the year following the archaeological field work.

10. ARCHIVE DEPOSITION

10.1.1 The complete project archive includes paper context records and indices, permatrace drawings, both black and white and colour photographs, digital plans and photographs, artefacts, ecofacts and sieved residues. A full list is given in Appendix 5. These will be prepared following the guidelines set out in *Environmental Standards for the Permanent Storage of Excavated Material from Archaeological Sites* (UKIC 1984, Conservation Guidelines 3) and *Guidelines for the Preparation of Excavation Archive for Long-term Storage* (Walker 1990).

10.1.2 The digital data will be temporarily stored on the server at OA South, which is backed up on a daily basis. For long term storage of the digital data CDs/DVDs will be used and will include the reports, plans, scanned images and digital photographs. Each disk will be fully indexed and accompanied by the relevant metadata as provenance.

10.1.3 The project archive and finds are currently held at the offices of Oxford Archaeology (south) in Osney Mead, Oxford, under the site code CNWA 13.

10.1.4 It is anticipated that in due course, with the agreement of CRL, the archive will be deposited with Southend Museum.

11. BIBLIOGRAPHY AND CARTOGRAPHIC SOURCES

British Geological Survey	1976	1:50,000 Series Geological Map, Solid and Drift, <i>Sheet 258/259 Southend and Foulness</i>
Crossrail	2008a	Archaeology Generic Written Scheme of Investigation (CRPN-LWS-EN-SY-00001)
Crossrail	2008b	Archaeology Specification for Evaluation & Mitigation (including Watching Brief). (CRL1-XRL-T1-RSP-CRG03-50001)
Crossrail	2015	C807 - Wallasea Island – Archaeology Site Specific Written Scheme of Investigation for the Cell 1 Breaching. (C807-XRL-T1-XWI-T00_ES001-50001 Rev. 1.0)
ECC FAU.	2008	Archaeological Assessment Report in EMR 2008, Wallasea Island Wild Coast. Project Environmental Statement – Appendix L
ECC FAU,	2010.	<i>The Greater Thames Estuary Historic Environment Research Framework –Update and Revision of the Archaeological Research Framework for the Greater Thames Estuary (1999)</i> . English Heritage, Essex County Council and Kent County Council
EMR	2008	<i>Wallasea Island Wild Coast Project Environmental Statement</i> . English Heritage 2000.
Heppel, E.	2004.	Wallasea Island: the history and archaeology of a marshland. <i>Essex Archaeology and History</i> 35: 98-113
Macphail, R. I., Allen, M. J., Crowther, J., Cruise, G. M., and Whittaker, J. E	2008	<i>British Academy Small Research Grant SG-49361. Pilot project to assess effects and develop experimental research protocols related to marine inundation of archaeological soils and sites, employing Wallasea Island, Essex ahead of flooding by the RSPB in 2010</i> . (62 pp): London, UCL
Macphail, R. I.	2009	Marine inundation and archaeological sites: First results from the partial flooding of Wallasea Island, Essex, UK. <i>Antiquity</i> , 83 (319) (Antiquity Project Gallery http://antiquity.ac.uk/projgall/macphail/)
Maple, E	1965	“Witchcraft & Magic in the Rochford Hundred” <i>Folklore</i> Vol.76, No.3
OAR	2014	Excavation of an animal burial, Wallasea Island, Essex, Event Code CNWA 13. (C254-OXF-T1-RGN-CRG03-50175 Rev. 2.0)
OAR	2015	C254 – Archaeology West. Wallasea Island Cell 1 Sea Breaching. Archaeology Method Statement

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		(C254-OXF-T1- GMS-CRG04-50001 Rev. 2.0)
Westwood, J. and J. Simpson ‘	2006	<i>The Lore of the Land</i> (Penguin Random House London) 273

Context	Type	Category	Description
100	Deposit	Layer	Earthen bank sea wall. Homogenous single deposit of mid-greyish brown silty clay covered with a thin layer of topsoil/turf (Breach 1)
101	Deposit	Layer	Light brown clay? Slopes down south to north. Possibly a ditch fill or bank
102	Deposit	Layer	Dark deposit landward of sea wall 100. Possibly a ditch fill
103	Structure	Wall	Rude. East –west aligned dry stone “wall”. Runs partly beneath sea wall 105
104	Deposit	Layer	Marine clay sealing 103
105	Deposit	Layer	Earthen bank sea wall. Homogenous single deposit of mid-greyish brown silty clay covered with a thin layer of topsoil/turf (Breach 3)
106	Deposit	Layer	Grey Marine clay seaward of sea wall 100
107	Deposit	Layer	Grey Marine Clay beneath and to landward of 100
108	Deposit	Layer	Grey Marine Clay seawards of sea wall 105
109	Deposit	Layer	Grey Marine Clay beneath and landward of 105
110	Structure	Wall	Rude. North–south aligned dry stone wall. Joined to structure 103
111	Cut	Ditch	Probable north-south ditch filled with 101 and 102. Base not seen

APPENDIX 1: SMR / HER / OASIS RECORD FORM

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OASIS DATA COLLECTION FORM: England

[List of Projects](#) | [Manage Projects](#) | [Search Projects](#) | [New project](#) | [Change your details](#) | [HER coverage](#) | [Change country](#) | [Log out](#)

Printable version

OASIS ID: oxfordar1-223037

Project details

Project name	Sea Wall Breaching Wallasea Island Essex
Short description of the project	An Archaeological Watching Brief was undertaken by Oxford Archaeology/Ramboll UK (OAR) on the Cell 1 tidal lagoon, Wallasea Island, Essex on the 15th July 2015. The Watching Brief took place on two machine cut breaches (Breach 1 and 3) excavated through the present earthen bank sea walls. At Breach 1 the remains of a possible ditch and bank were seen in the southern edge of the breach. The date and origin of this feature is unknown. Parts of a crude, dry stone structure were revealed on the western side of Breach 3. Partly covered by the present sea wall, the date and origins of this linear structure was not obvious. The fact that it did not to follow the line of the present sea wall would suggest that it predates the sea wall, which appears to have been originally built at the end of the 18th century and repaired and partly rebuilt in the later half of the 20th century. No artefacts or ecofacts and, aside from the dry stone wall at Breach 3, no structures were observed during the watching brief
Project dates	Start: 15-07-2015 End: 15-07-2015
Previous/future work	Yes / Not known
Any associated project reference codes	CNWA 13 - Sitecode
Type of project	Recording project
Site status	None
Current Land use	Cultivated Land 2 - Operations to a depth less than 0.25m
Monument type	DITCH Uncertain
Monument type	STONE STRUCTURE Post Medieval
Significant Finds	NONE None
Investigation type	"Watching Brief"
Prompt	Planning condition

Project location

Country	England
Site location	ESSEX ROCHFORD CANEWDON Sea Wall Breaching Wallasea Island Essex
Study area	2 Hectares
Site coordinates	TQ 965 935 51.605447862428 0.837988839158 51 36 19 N 000 50 16 E Point

Project creators

Name of Organisation	Oxford Archaeology/Ramboll (OAR)
Project brief originator	Crossrail
Project design originator	Oxford Archaeology/Ramboll (OAR)
Project director/manager	R. Brown
Project supervisor	Oxford Archaeology
Type of sponsor/funding body	Crossrail

Project archives

Physical Archive Exists?	No
Digital Archive recipient	Oxford Archaeology
Digital Archive ID	CNWA13
Digital Contents	"other"
Digital Media available	"Images raster / digital photography", "Text"
Paper Archive recipient	Oxford Archaeology
Paper Archive ID	CNWA13
Paper Contents	"other"
Paper Media available	"Report", "Survey ", "Unpublished Text"

Project bibliography 1

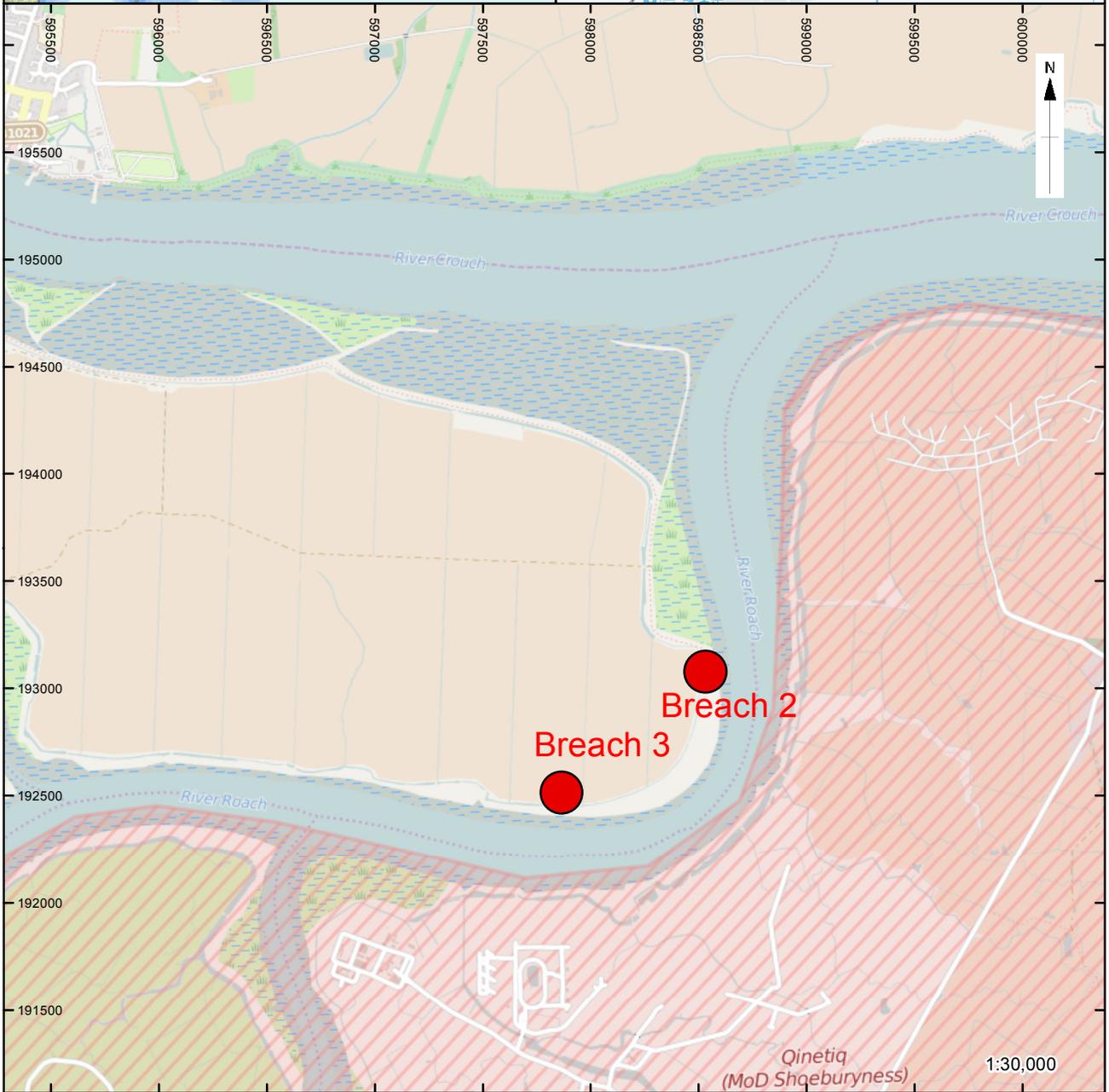
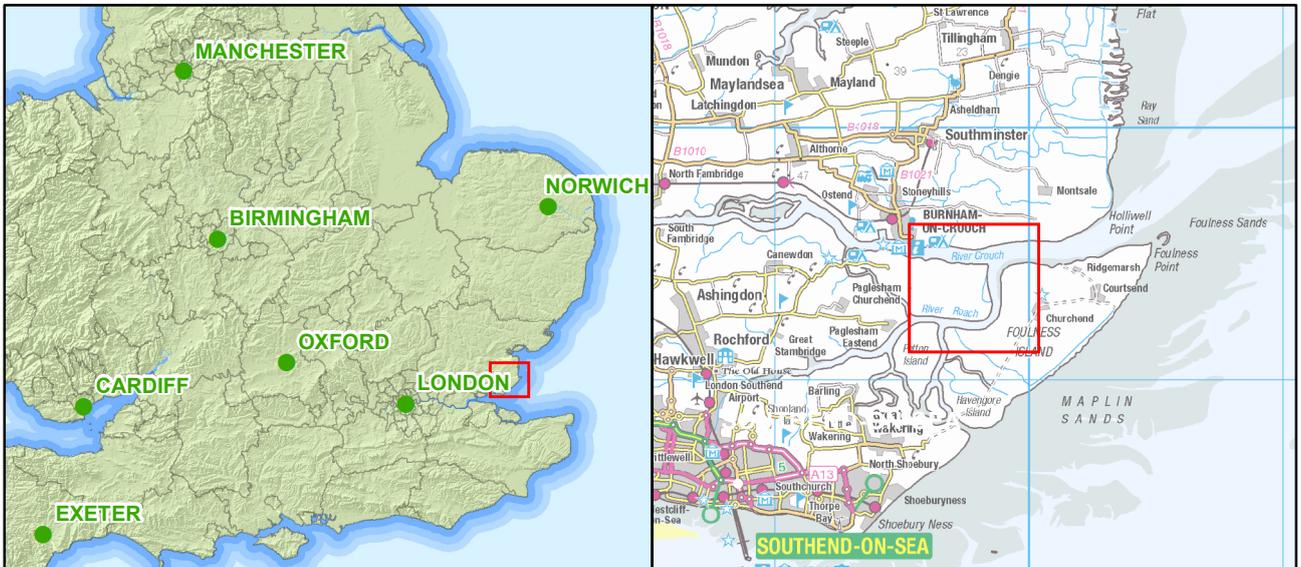
Publication type	Grey literature (unpublished document/manuscript)
Title	C254 - Archaeology West Archaeological Watching Brief - Sea Wall Breaching Wallasea Island Essex_ CNWA13_ Fieldwork Report
Author(s)/Editor(s)	OA/Ramboll
Date	2015
Issuer or publisher	OA/Ramboll
Place of issue or publication	Oxford
Description	Client report
Entered by	Nicola Scott (n.scott@oxfordarch.co.uk)
Entered on	9 September 2015

OASIS:

Please e-mail Historic England for OASIS help and advice

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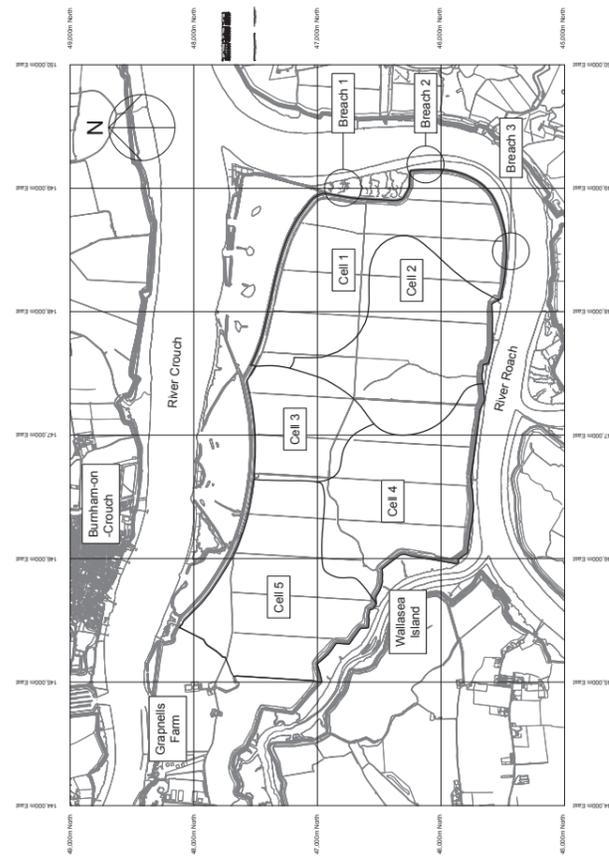
C:\Users\Victoria.hosegood\Desktop\Figure1_Master_with_Grids.mxd*Victoria.hosegood*15/07/2014

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Figure 1: Site location

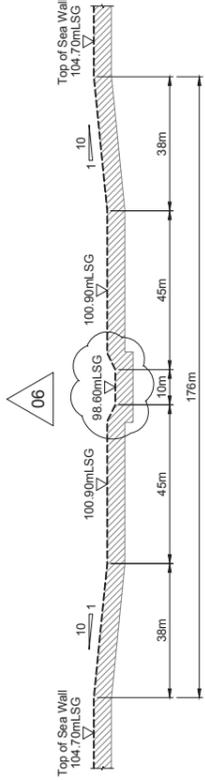
Tidal Range	mAOD	mLSG
HAT	3.25	103.25
MHWS	2.85	102.85
MHWN	1.85	101.85
MLWN	-1.35	98.65

Latest information available from Harbour Authority



Location Plan Including Future Cells

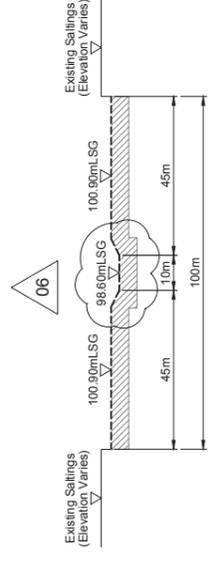
N.T.S.



Typical Cross Section Through Seawall Breach

1:1000

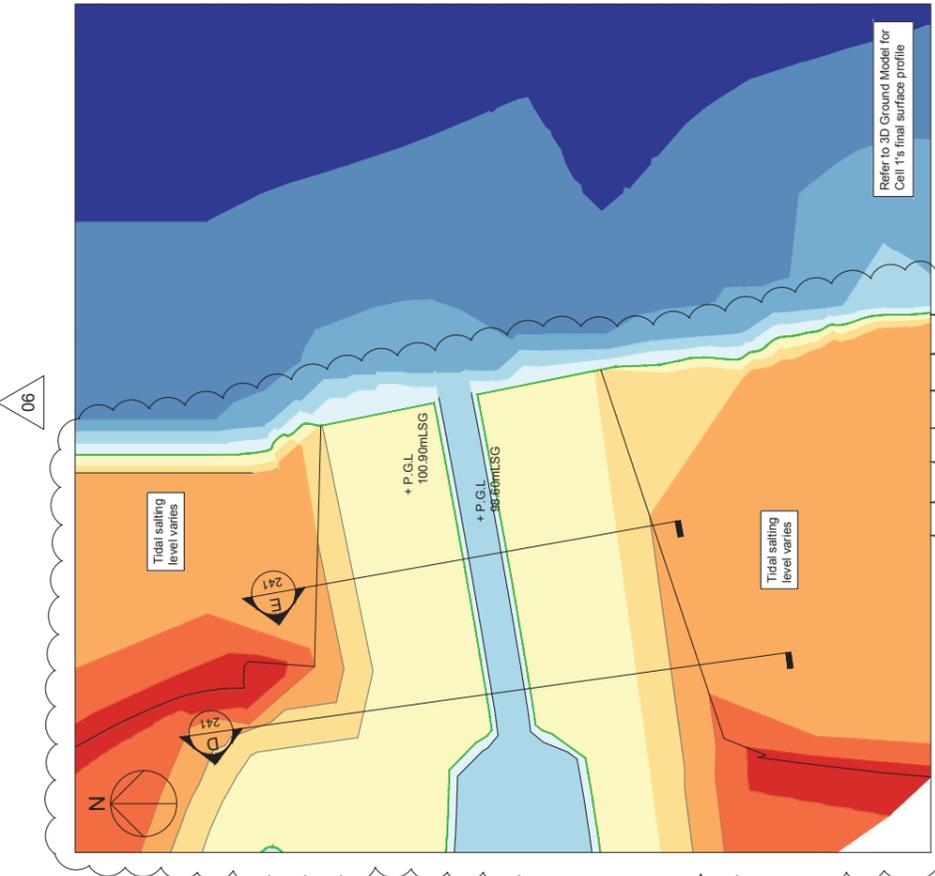
D 241



Typical Cross Section Through Tidal Saltings

1:1000

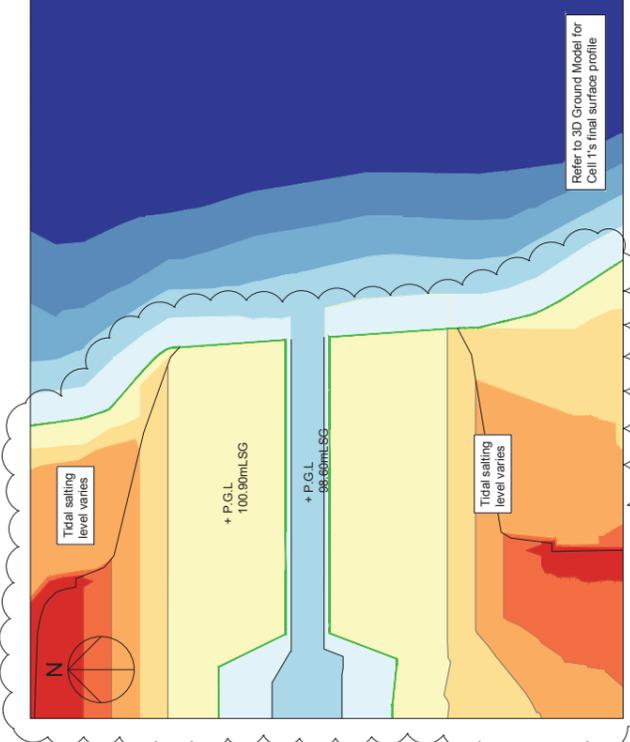
E 241



Proposed Breach 1

1:1250

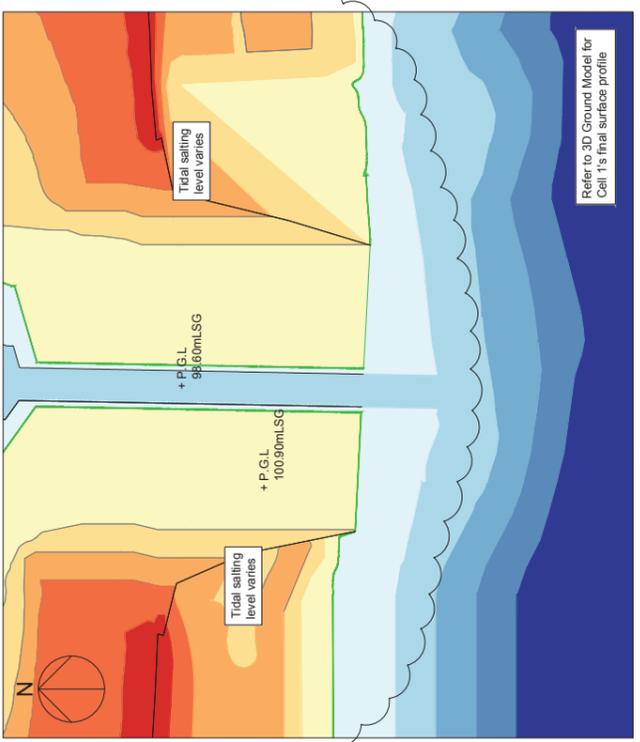
D 241



Proposed Breach 2

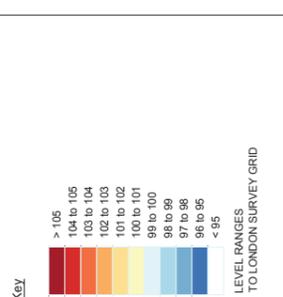
1:1250

E 241



Proposed Breach 3

1:1250



Safety, Health and Environmental Information
Notes below are additional to hazards/risks associated only with earthworks.

Construction - Earthworks

- Ci. Very soft muds, underlay the site, high water table poses risk to trafficability of plant around site.
- Cii. Sides of existing drainage and soak ditches may be too weak for plant.
- Ciii. Land drains exist throughout site, interception may weaken the embankment.
- Civ. Firm will continue to operate during works. Inexperienced drivers may be present during harvest. Clear signage required in working area.
- Cv. Public footpath is present on the crest of the seawall and over conveyor culvert. Will require exclusion fencing and signage during works to prevent public access to working area.
- Cvi. Site access / egress shall be laid out and signed to ensure the safety of other road users.

Construction - Breaching

The breaching works will expose operatives to the hazards of working in tidal zones and on formations that are likely to be of insufficient strength to support plant. Hazards that must be managed include: - Drowning - Formation collapse under plant

- Cvi. Breaching works are considered the first step in operating the site
- Cvii. There will be tidal working during the breach of the seawall and may increase the hazard referred to in Ci above. Before any work commences the Principal Contractor shall submit its proposals to the CDM Coordinator for discussion.
- Cix. The breaching works may restrict evacuation routes for plant and operatives undertaking the works. The Principal Contractor shall indicate the tide levels indicated on the drawing. Tide charts are available - see Specification Clause 3.
- Cx. Using logs into/out of structure will be in presence of public.
- Cxi. Continuation of estuary from breach works completion of Cell 2 and 3. Structure to be opened after Cell 1 is under tidal influence.
- Cxii. Sufficient geotechnical information about the area for breaching works may not be available. (Method statement specific ground investigation may be necessary).
- Cxiv. Access to lower areas of structures will be under tidal influence

Emergency Evacuation:
The working formation may not be suitable for use by emergency vehicles. These notes are based on the use of experienced and competent contractors carrying out the work using an approved safe method of working.

Rev.	Date	Description	By	Chkd	App	AuR
06	18/08/14	Cell 1 ground model updated. For Construction.	MKW	PE	AZ	SFC
05	28/08/12	Construction Re-issue Following RF Meeting	MKW	PE/DK	AZ	SFC
04	25/04/12	Issued for Construction	JW	RL	RL	VH
03	26/10/11	Sections D and E moved from drawing 60148989-3519-241.	JW	GP	RL	VH
02	21/09/11	Issued for Tender	CW	GP	VH	VH
01	16/12/10	Amendments based on meeting comments as of 30/11/10.	CW	LM	VH	VH
00	25/05/10	Issued for Comment	CW	LM	VH	VH

Notes

- Confirmation of all survey data must be obtained from the Crossrail survey team.
- Coordinates to the London Survey Grid, heights to the London height datum which is 100 metres below Ordnance Datum Newlyn. See Crossrail standard CR-STD-010.
- All dimensions are in millimetres unless specified otherwise.
- Do not scale from this drawing.
- Benchmark levels from Capital Surveys Ltd 1735 (dated 28th March 2009)
- Existing levels based on CRL Survey supplied - Document 10100-0000-001-a-50001. The Contractor shall check and then agree on site with the Supervisor all existing and proposed levels prior to construction.
- This drawing to be read in conjunction with Technical Specification. The Specification for the works is the Civil Engineering Specification for the Water Industry 6th Edition by UNWR together with the special clauses contained in the

Technical Specification.

- It is the responsibility of the Contractor to confirm the position and level of services. Whilst working adjacent to and around services the Contractor shall comply with the requirements of the Statutory Undertakers and the Health and Safety Executive Guidance Note HSE/67 avoiding danger from underground services.
- The Contractor shall excavate drainage gulleys as required to enable surface water to drain from all excavations. Prior to any breaching all gulleys shall be backfilled to adjacent ground level unless instructed otherwise by the Supervisor.
- No trees on site. Existing site is approximately 10m LSG tid farmland.
- All weather hard roads to connect to existing concrete track (4.0m width) as repeated passes on soils will result in deep rutting.

12. Concrete revetment (not shown) exists on inward face of seawall.
13. Refer to drawing 60148989-3519-240 for dimensions and tide levels.

Contract: C176
Contractor: AECOM Ltd
Location: Wallasea Island
Title: Proposed Breach

Crossrail Limited
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London
E14 4LQ
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www.crossrail.co.uk

Overall Drawing Reference No: C176-FAB-C-DWG-CRT00_ES001-50017
Drawing and CAD file No: 60148989-3519-241
Scale: As Noted @ A1
Rev: 06
Stat

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CHECKED BY:



Plates 1-11: Montage showing north facing section through the sea wall in Breach 1



Plates 12-16: Montage showing east facing section through sea wall in Breach 3



Plate 17: Southern side of Breach 1. Detail of possible ditch 111 and organic fill and bank material 101/102



Plate 18: Breach 3. Stone structure 103. Looking west



Plate 19: Breach 3. Stone structure 103. Looking east



Plate 20: Breach 3. Stone structure 103. Looking south



Plate 21: Breach 3. Detail of stone structure 103 showing wooden stake.



Plate 22: Breach 3. Seaward base of existing sea wall showing disturbed concrete Essex block facing and rough hewn stones along the toe of the clay bank