Archaeology South-East

ASE

ARCHAEOLOGICAL INVESTIGATIONS AT SANDWICH TOWN TIDAL DEFENCE SCHEME

NGR: TR 632565 160300 to TR 634241 161532

A POST-EXCAVATION ASSESSMENT AND UPDATED PROJECT DESIGN REPORT

Planning Reference: DOV/12/00656

ASE Project No: 5514
Site Code: TDS 13

ASE Report No: 2016296
OASIS ID: archaeol6-279453
Sandwich Museum, Accession No: TBC

By Chris Russel

With contributions by
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Abstract

Archaeology South-East (ASE) was commissioned by The Environment Agency to undertake an archaeological watching brief as well a series of targeted investigations during the Sandwich Town Tidal Defence Scheme in and around the town of Sandwich, Kent. The scheme was designed to protect homes and businesses in the town and consisted of the construction of 14 Km of floodwalls and embankments along the River Stour from Richborough north-west of Sandwich to Broad Salts in the north-east. Here, a system of ditches and ponds were constructed for flood relief. The work took place between March 2013 and December 2015.

Alongside the general archaeological monitoring of works on the scheme trial trenches were dug in Gallows Field (Reach 3) and into the earthwork known as Monks Wall (Reach 12). Monks Wall was also subject to topographic and walkover surveys prior to the alteration of the monument. Historic building recording of features in Reaches 4, 5 and 7 also took place.

Although residual prehistoric and Roman artefacts were recovered during the monitoring works the majority of the evidence recovered dated to the post-medieval period. A large ditch containing material from this period was encountered in the Gallows Field evaluation. A three phase wooden structure was uncovered during excavations in Kings Lodgings (Reach 4). This consisted of a jetty projecting into the river with two phases of bank revetment. A number of the timbers used in the construction were re-used boat or building timbers. Finds associated with the structure were 17th Century in date and a sizeable number were Dutch in origin. An early post-medieval layer was also observed in Reach 5 with evidence of fish processing recovered during sampling.

Later post-medieval rubbish pits with residual medieval brick were recorded in Reach 2 and evidence for later post-medieval river defences were seen in Reach 12. Evidence of Sandwich's role in both WWI and WWII was uncovered on the scheme. Features relating to the Shipyard No 2 (WWI) were encountered in Reach 8-11 and slit trenches (WWII) were recorded on the south bank of the River Stour in Reach 5.

Trial trenches excavated into Monks Wall revealed that the earthwork was built in two stages by banking up material excavated from the adjacent ditch. No dating evidence was recovered from the three trenches.

CONTENTS

FIGURES

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1.0 INTRODUCTION

1.1 Site Location

1.1.1 The Environment Agency's Sandwich Town Tidal Defence Scheme (STTS) was undertaken along the meander of the River Stour adjacent to the town of Sandwich, Kent. The scheme was conducted on both banks of the river and stretched from Richborough in the north-west, through the town of Sandwich itself and extended out to Broad Salts in the north-east (Figure 1). The scheme was divided into separate sections referred to as 'Reaches'.

1.1.2 The scheme ran through areas under a number of land uses ranging from agricultural to light industrial. Reaches 4 and 5 were situated within the historic centre of Sandwich itself. Each Reach is described in more detail below.

1.2 Geology and Topography

1.2.1 According to the British Geological Survey (BGS 2016) the bedrock geology of the Sandwich area is generally Thanet Formation sand and gravel with Margate Chalk Member chalk to the south and east. Richborough Castle is located on an outcrop of Lambeth Group sand and Harwich Formation sand and gravel.

1.2.2 The drift geology around Sandwich consists chiefly of Tidal Flat Deposits (Clay and Silt) with distinct bars of sand and gravel beach deposits to the east and north-east of the town. Localised deposits of wind-blown sand occur close to the present-day shoreline. Richborough Castle in the north-east of the scheme is located on a localised outcrop of head deposits.

1.2.3 The town of Sandwich lies to the south of a large former tidal inlet referred to as the Wantsum Channel. The Wantsum was once navigable and connected the English Channel with the North Sea. The area of high ground to the north of Sandwich now known as the Isle of Thanet formed a large island at the mouth of the channel. Richborough to the north-east is also thought to have formed a small island within the channel itself. The area known as Stonar, north of the Stour from Sandwich town, was once the southern tip of a shingle bank extending southwards from The Isle of Thanet. Much of the Stonar Bank was quarried away in the 20th century. This quarrying left behind a lake, which today runs parallel to the Stour between Great Stonar and the Stonar Industrial Estate. Subsequent silting and long-shore drift have diverted the course of the Stour and left Sandwich now some 3km from the coast. The town is low-lying between 2m and 6m AOD.

1.3 Scope of the Project

1.3.1 In 2008 the Environment Agency developed a flood defence scheme to protect 488 homes and 94 commercial properties in the town of Sandwich, Kent. In addition to this, the scheme was designed to protect the Discovery Business Park (formerly the Pfizers site) and valuable infrastructure, coastal routes and areas of tourism. The scheme involved the creation of a tidal flood relief area at Broad Salts north-east of the town, 14km of flood

walls and embankments on both banks of the River Stour and a 1m high flood wall at Sandwich Quay.

1.3.2 The proposed works were part of the Sandwich Tidal Defence Scheme and as such are covered by planning consent DOV/12/00656. Prior to formal consent a Specification for Archaeological Mitigation was produced (Halcrow 2012a) on behalf of the Environment Agency and in consultation with English Heritage and the KCC Archaeological Advisor for Dover District Council (DCC). Condition 10 of the planning consent stipulated that,

"An assessment of the potential risk to: …Archaeological sites and ancient monuments", should be undertaken and, *"An appraisal of remedial options and identification of the preferred option(s)"*, put forward.

Archaeology South-East, in its role as Archaeological contractor to the scheme, produced a series of Written Schemes of Investigation (WSI: ASE 2013 a-i) in consultation with Ben Found, Heritage Conservation Group KCC (archaeology advisor to DCC) following consultation with the main contractor (Jacksons) over the likely impacts and following the Archaeological Specification (Halcrow) for the works.

1.4 Circumstances and Dates of Work

1.4.1 The fieldwork was undertaken by ASE between March 2013 and December 2015. The site was project managed by Jon Sygrave and the fieldwork was undertaken by Chiz Harwood, Geoff Morley, Chris Russel and Gary Webster. The general archaeological mitigation for the scheme took the form of a watching brief with Reaches 3, 4, 5, 7 and 12 highlighted for further investigation (see below).

Reach	Monitored Work	Dates of work
1/1a	Flood wall foundation trench, topsoil stripping.	Sept -Oct 2014
2	Sheet piling, foundation trenching	April-July 2013
3	Trial trenching, foundation trenching, topsoil stripping	July-Aug 2013
4	Topsoil stripping, foundation trenching, sheet piling, HBR Survey	Sept 2014-Dec 2015
5	Ground reduction, foundation trenching, topsoil stripping, HBR Survey, Laser Scanning	Oct 2013-June 2014
6	Topsoil stripping	Nov 2014-June 2014
7	Topsoil stripping	June 2013-July 2015
8-11	Topsoil stripping, ground reduction, ditch excavation, sluice excavation	May 2013- June 2015
12\12a	Topsoil stripping, wall foundations	April 2014- May 2015
13	No works	-
14	Sheet piling, topsoil stripping	April 2013- June 2013
15	Sheet piling, topsoil stripping	May 2013-June 2013
16	Topsoil stripping, test pitting, foundation trenching	June 2014- July 2015

Table 1: Location, circumstances and dates of monitored work

1.5 Archaeological Methodology

1.5.1 All works with the potential to reveal buried archaeology were monitored by an archaeologist. These works generally consisted of topsoil stripping and foundation trenches dug using tracked excavators equipped with toothless buckets. An archaeologist was also present during sheet piling works to monitor the removal of any obstructions. Any archaeological features or deposits identified were photographed, drawn and recorded using ASE pro-forma context sheets. A general photographic record of the works was also compiled. Laser scanning and historic building recording was undertaken in Reaches 4, 5 and 7. This work formed a separate report and the methodologies employed are fully set out therein (Appendix 17). They are breiifly summarised below. A topographic and walkover survey of Monks Wall was undertaken prior to works in Reach 12. This also formed a separate report detailing the methodologies used (Appendix 18).

1.5.2 In addition to general methodology detailed for the scheme above three areas on the scheme were subject to further archaeological investigation requiring their own individual methodologies. These are set out below.

1.5.3 *Evaluation of Gallows Field* (Reach 3)

Three trenches were excavated in Gallows Field, Reach 3 (Figure 9) prior to the construction of a temporary haul road. These trenches were excavated using a tracked excavator fitted with a toothless bucket. Topsoil and made ground was removed to the level of the geological substrate or the level that archaeological features were visible. Spoil was stored adjacent to the trenches, which were photographed, drawn and recorded using ASE pro-forma context and trench record sheets. The trenches were backfilled and compacted once the recording process was complete.

1.5.4 *Excavation and Historic Building Recording Reach 4*

During the monitoring of excavations at the 15th century house named Kings Lodgings in Reach 4 a preserved, in-situ wooden structure was unearthed (Figure 12). An excavation strategy for this structure was formulated in consultation with Ben Found (KCC) and Damian Goodburn (woodwork specialist). Deposits surrounding the structure were methodically removed and dateable finds retained for analysis. The structure was photographed, drawn and levels and co-ordinates were recorded using a Total Station. The individual components of the structure were then removed to the proposed formation level as determined by the contractor. The deposits and timbers were photographed and recorded using ASE pro-forma context sheets. The timbers were sub-sampled on site and hand-sawn cross sections were retained for species identification and dendrochronological analysis. A number of timbers exhibiting complex jointing and decorative features were retained in their entirety (where possible) for further analysis. The retained timbers were photographed and drawn at ASE facilities and placed in temporary wet storage.

1.5.5 Historic building recording was undertaken including laser scanning of the two sections of river wall to the west of Toll Bridge as well as recording of the bollards located to the bridge's west (see Appendix 17).

1.5.6 *Historic Building Recording Reach 5*

Historic building recording was undertaken on the bollards to the east of Toll Bridge (see Appendix 17).

1.5.7 *Historic Building Recording Reach 7*

Historic building recording of any surviving dockyard furniture at Guilford Wharf (see Appendix 17).

1.5.8 *Evaluation of Monks Wall Reach 12*

Three trenches were excavated through the linear earthwork known as Monks Wall. The trial trenches were dug after the monument had been recorded by topographic and walkover surveys (this phase of work forms a separate report included in Appendix 18). The trenches were excavated to the base of the upstanding earthwork (Figure 34) and were stepped to allow the safe hand cleaning and recording of the revealed sections. Hand dug sections were also excavated into the adjacent silted-up ditch. A photographic record was kept of the excavations and the revealed deposits and features were drawn and recorded using ASE pro-forma context sheets. The trenches were located and AOD heights recorded using GPS technology. Representative bulk samples and samples for micromorphological analysis were recovered. The trenches were backfilled when the recording process was complete.

1.5.9 In addition to the archaeological bulk samples, a continuous core was recovered using a Russian auger adjacent to the structure. The sediments were recorded using the Troels-Smith (1955) classification system. The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are also identified according to darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Dr) and the sharpness of the upper sediment boundary (UB). The logs can be found in Appendix 1 and are supplemented by digital photography.

1.5.10 All excavation work was carried out in line with KCC General Standards for an Archaeological Watching Brief in Kent (KCC 2007) and with the various Written Schemes of Investigation (KCC 2013; ASE 2013a-i; Halcrow 2012a; 2013a-c)

1.5.11 On-site sampling methodology, processing and recording was undertaken within the guidelines laid out by English Heritage (2002). A standard bulk sample size of 40litres (or 100% of small features) was taken from dated/datable sealed contexts to recover environmental remains such as fish, small mammals, molluscs and botanicals.

1.6 Organisation of the Report

1.6.1 This post-excavation assessment (PXA) and updated project design (UPD) has been prepared in accordance with the guidelines laid out in Management of Research Projects in the Historic Environment (MoRPHE), Project Planning Notes 3 (PPN3): Archaeological Excavation (English Heritage 2008).

1.6.2 The report seeks to place the results from the site within the local archaeological and historical setting; to quantify and summarise the results; specify their significance and potential, including any capacity to address the original research aims, listing any new research criteria; and to lay out what further analysis work is required to enable their final dissemination, and what form the latter should take.

1.6.3 Where possible the results from previous archaeological investigations undertaken during the Sandwich Town Tidal Defence scheme have been integrated and assessed with the results from the main phase of work on the scheme.

2.0 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

2.1 Prehistoric

2.1.1 There is little evidence for early Prehistoric activity from the area covered by the scheme. It is thought that much of the land was part of the Wantsum Channel and would therefore have been uninhabitable intertidal mudflats throughout most of prehistory (DDHS) with the possible exception of the high ground around Richborough and the town of Sandwich. An isolated findspot of Mesolithic flint is recorded from the edge of the former channel hinting at human interaction with this environment (KCC 2003, 2).

2.1.2 Shingle spits began to form across the eastern mouth of the Wantsum from around 4,000 BC (Clarke et al. 2010, 15) causing the land behind to form into a muddy lagoon which silted-up into saltmarsh (DDHS). This combined with a climatic dry period in the late Neolithic and Early Bronze Age led to increased human activity within the Wantsum and the Lydden valleys with a land surface and artefacts of these periods recorded to the southeast and west of Sandwich (ibid). By the Late Bronze Age sea level had risen which resulted in the flooding of the earlier land surfaces.

2.1.3 Later Prehistoric activity is evidenced by findspots of Iron Age coins and pot sherds from the south-east of Sandwich. There is also evidence that Richborough was in use from the 1st century BC in the form of pottery recovered from ditches excavated in the vicinity of the Roman Fort.

2.2 Romano-British

2.2.1 The main focus of evidence from the Romano British period from within or close to the scheme relates to the fortification and associated settlement at Richborough. The earliest phase of the fort (a double ditched enclosure) are presumed to date from AD 43 and it has been hypothesised that it marks the original landing place of the Claudian invasion. Richborough fort developed in the 3rd century with a surrounding settlement and contained a temple and a monumental arch. An amphitheatre is thought to date to the later phase of occupation and is still visible as an earthwork a short distance to the south-west. Further Romano British structures were apparently discovered to the south of the fort during railway construction in the 19th century. After the departure of the Roman administration, the fort apparently became the focus of a Christian community.

2.2.2 In the area of the southern part of the scheme artefacts and burials dated to the Romano-British period have been recorded at Stonar. These discoveries were made in the 19th century and appear to have subsequently become lost to modern review. An isolated find spot of a Roman coin is recorded to the south-east of Sandwich Quay.

2.3 Medieval

2.3.1 The port of Sandwich is thought to have begun its development during the Anglo-Saxon period possibly around a much older crossing point of the River Stour (Clarke et al 2010, 22). The earliest town probably consisted of a collection of small wooden structures with St Clements church the first major stone structure built c.1000 AD (ibid, 22) By the time of its inclusion

in the Domesday Book it had grown to a settlement of 312 houses (Parkin, 1985).

2.3.2 The town continued to grow in the 11th century due to its favourable situation on the southern extent of the Wantsum Channel and good access to its hinterland. By the 13th century it had become one of the most important ports in England (despite an attack by the French in 1216 and a destructive storm in 1287) (ibid.) with trade links to Gascony, Spain and Portugal. As a member of the Cinque Ports league Sandwich was granted certain privileges in return for supplying ships to the monarch for defence.

2.3.3 A castle was constructed in the east of the town in around 1260 and a town wall and ditch were added in the late 14th century. As well as these defensive structures a two storey gun fort known as the Bulwark was built in the east of the town overlooking the Stour. The construction of these later defences coincided with the peak of commercial activity at Sandwich, which had continued to grow despite famine and plague (ibid).

2.3.4 Situated on the northern bank of the Stour the port of Stonar began to develop from the 11th century onwards (Clarke et al 2010, 41). The settlement was constructed at the southern tip of a shingle spit and had direct transport links to the Isle of Thanet to the North. The town was administered by the Abbot of St Augustines Abbey (Canterbury) and sometime in the 13th century work commenced on an earthwork (probably for land reclamation from the river) known as Monks Wall. This earthwork ran from Stonar in a loop parallel to the River Stour to Cliffsend. Stonar appears to have suffered inundation in 1359 and again in 1366 but the settlement persisted until it was attacked and burned by the French in 1385 (Perkins 1993, 4-5).

2.3.5 From its peak, Sandwich's fortunes began to decline. There was another French attack on the town in 1457, which destroyed a number of buildings and the channel linking Sandwich to the North Sea had begun to silt up as a result of land reclamation and the increasing influence of the Deal and Stonar spits. By 1520 the haven could not accommodate large vessels and the focus of international trade moved from Mediterranean to cross channel trade. By 1560 Sandwich had been reduced to 300 households and in 1569 Stonar existed only as a collection of wooden buildings on the north bank of the Stour (Hardman and Stebbing 1942, 54).

2.3.6 Sandwich contains several extant medieval buildings and notable archaeological finds include ships timbers from the town ditch (Clarke et al, 2010, 73), preserved wooden revetments from Strand St (ibid, 115) and a well and pottery dump uncovered in the 1930s at Stonar (Pearce 1937). Excavations in the early 1970's revealed the remains of 11 houses fronting three streets along with a destruction layer that sealed part of the site (Perkins 1993, 8-9). In the early 1990's Wessex Archaeology recorded a section through Monks Wall close to the A256. This revealed four distinct bank deposits and evidence of turf construction (Hearne et al. 1995, 268).

2.4 Post Medieval

2.4.1 With decline of the port in the 1500's a number of properties in Sandwich were vacant. As a result, the mayor invited refugees from the revolt in the

low countries (referred to as 'The Strangers') to the town in an attempt to improve its fortunes. They brought with them weaving skills and cloth became one of the major exports to leave Sandwich by sea (Parkin 1985, 213-215).

2.4.2 The involvement of this immigrant community in the life of the town continued until around 1700 when most had relocated. At one point as much as 50% of the population of the town was Dutch (Lawson and Killingray 2004, 86).

2.4.3 By this point Stonar had become abandoned as a settlement, although a number of structures were still present on the peninsular that served a salt making industry that was still employing 55 people in 1851 (Hardman and Stebbing 1942, 55)

2.5 Modern

2.5.1 After 1700 Sandwich's fortunes as a port continued to decline until 1854 when it ceased to function as such. Several wharves (including Guilford Wharf to the east of the town and served by a narrow gauge railway) and shipyards persisted into 20th century. Brewing was carried out in the town and corn and oil mills operated. Two saw mills are shown of the 1938 OS 25-inch map on either side of the Stour and one in Strand St. The railway arrived in 1847 at which time the town contained a shipyard and coal wharves. Much of the medieval town wall was demolished and an abattoir and tannery was established in Loop St (KCC.2003, 32).

2.5.2 After abortive attempts to establish a cross channel ferry port and coal wharf in Great Stonar and Sandwich Haven in the late 19th and early 20th Centuries the area was requisitioned by the Royal Engineers in 1916. Port facilities, shipyards and railway sidings were constructed on the western bank of the Stour for the movement of stores to the Western front. Troops were housed in three large camps constructed of prefabricated concrete huts (named Haig, Kitchener and Cowan Camps). A second shipyard was constructed on the eastern bank of the Stour for the construction and repair of seaplane lighters. The port was still busy after WW I processing salvage from the European battlefields but by the early 1920's this activity had ceased and it had been sold to a private concern and quickly became derelict, although the area around Stonar House in the south was turned into a boarding school (Butler 1993).

2.5.3 In 1939, 500 refugees from Germany were housed in the former WWI establishment and with the coming of WWII The camp was used for Home Guard barracks and later housed Royal Marine landing craft crews. Richborough port facilities constructed the Mulberry Harbours used during the Normandy beach landings of 1944. Defences existed at the Quay, around Gallows Field and to the east on Broad Salts. Later in the war when invasion threat had receded the flats to the east of the River Stour were used for training (Wessex 2011).

2.5.4 After WWII Stonar Camp again fell into decline until 1953 when the site was purchased by the pharmaceutical firm Pfizer. Sandwich itself saw the decline of much of the industry present in the town in the early 20th century and is now chiefly a centre for tourism and leisure.

2.6 **Historic waterfront archaeology** by Damian Goodburn

2.6.1 In general terms the waterfront of the medieval Cinque Port of Sandwich has been subject to very little systematic archaeological investigation. From the town itself, the discovery of the remains of a large medieval, clinker-built ship in the in-filled medieval 'town ditch' in 1973 demonstrated the enormous potential of archaeological survival on the Sandwich waterfront and its now in-filled inlets (Trussler 1974), with later work of fragments taken to Deal and then Dover Museums carried out by G. Milne and students from UCL London. Tree-ring dating of lifted timbers from that find has now shown the vessel to date to the 14th century, c. 100 years older than first thought.

2.6.2 By the early 1970's the potential of excavations on waterfront sites in medieval port towns had been realised in much of northern Europe, and in London in particular it developed along systematic grounds lead by T Tatton-Brown, G Milne and others resulting in a variety of publications (e.g. Milne and Milne 1982). Although systematic investigations of post-medieval waterfront sites initially lagged behind archaeological work on medieval and earlier waterfront sites, by the late 1980's this began to change. By around 2000, the comparative corpus of evidence for post-medieval timber waterfront structures, including collections of reused nautical timbers, had grown substantially (e.g. Saxby and Goodburn 1998; Heard and Goodburn 2003). This systematic work has provided closely dated evidence of the changes in raw materials and working methods used from late medieval times to the early industrial period.

3.0 ORIGINAL RESEARCH AIMS

3.1 General

3.1.1 Individual Written Schemes of Investigation (WSI) (ASE 2013 a-i) were prepared for each area of the Sandwich Flood Defence Scheme. In areas where specific requirements were identified these were noted.

3.1.2 The general aims and objectives of the archaeological Watching Brief was to record the extent and nature of any archaeological features or finds found during the works.

3.1.3 Area specific aims and objectives are set out below.

3.2 Specific Aims and Objectives for Reach 2 (Halcrow 2013a)

3.2.1 To ensure that any buried archaeology present within the 'footprints' of the working areas are preserved by record.

3.2.2 To understand the early medieval to modern foundation and expansion of Sandwich town, and how industry, including fishing and shipbuilding, town and national defence, international conflict and the natural environment have, influenced its development.

3.2.3 To understand how people have influenced the evolution of the coastal plain through resource exploitation such as salt manufacture, floodplain management and defence against invasion by the sea and from the continent at times of war.

3.3 Specific Aims and Objectives for Reach 3 (ASE 2013b; KCC 2013)

3.3.1 The archaeological evaluation in Gallows Field sought to clarify the precise form and function of the earthworks on the site and assess the presence/absence of other archaeological features associated with the medieval/post-medieval settlement of Sandwich and/or earlier periods.

3.4 Aims and Objectives for Reach 4 (ASE 2013c)

3.4.1 The archaeological Watching Brief was to record the extent and nature of any obstructions encountered as part of the sheet piling works and any other features or finds exposed during other works.

3.4.2 The laser scanning and historic building recording aimed to produce a record of the listed and historic structures due for repair or temporary removal (Appendix 17). Specific areas to be affected included:

- Listed river wall: repair and restoration work of historic stretches of river wall at Dolphin Quay/30Strand Street and adjacent to Toll Bridge (NGRs: (Section 1) 633091 158344; (Section 2) 633174 158279).

- Listed bollards: temporary removal of listed bollards and a historic water pump on the west side of the bridge (NGR: 633174 158279)

3.5 Specific Aims and Objectives for Reach 5 (ASE 2013d)

3.5.1 The historic building recording (photographic survey) aimed to produce a record of the listed bollards due for temporary removal (Appendix 17).

3.6 Specific Aims and Objectives for Reach 7 (ASE 2013f)

3.6.1 The historic building recording aimed to produce a record of any listed or historic structures located within the area of Guilford Wharf (Appendix 17).

3.7 Specific Aims and Objectives for Reaches 8-11 (ASE 2013g)

3.7.1 The archaeological works sought to preserve by record any archaeological finds to be affected by the proposed works. Specifically: The extent and nature of natural sediments across the site, specifically organic estuarine deposits and alluvium, which may preserve environmental indicators and/or larger features or artefacts and inform as to the environmental history of the area and the Wantsum Channel.

3.7.2 Whether shingle banks or other deposits exist which could have drawn previous human activity.

3.7.3 The nature of land use in the area during the medieval and post-medieval periods

3.7.4 The extent of the former Richborough Port and whether remains survive within the footprint of the proposed works and the extent of WWII defences within the site.

3.8 Specific Aims and Objectives for Reach 12 (ASE 2013h)

3.8.1 The archaeological topographic survey and Record of the Monks Wall prior to the commencement of construction works sought to provide an accurate 3D survey and written record of the monument prior to its alteration.

3.8.2 The archaeological evaluation sought to clarify, if possible, the construction method of the Monks Wall, when it was constructed, for how long was it maintained and the environmental conditions present at its construction and during it lifespan.

3.8.3 The archaeological watching brief aimed to record the extent and nature of any archaeological deposits revealed.

3.9 Aims and Objectives for Reach 14 (Halcrow 2013b)

3.9.1 The specific aims of the archaeological inspection and monitoring was to identify and record the presence of salterns and a WWII encampment in Reach 14.

3.10 Aims and Objectives for Reach 15 (Halcrow. 2013c)

3.10.1 The specific aims of the archaeological inspection and monitoring was to identify and record the presence of salterns and general quayside activity in Reach 15.

4.0 ARCHAEOLOGICAL RESULTS (Figure 2)

4.1 Summary

4.1.1 The archaeological results are discussed under provisional date-phased headings determined primarily through assessment of the dateable artefacts, predominantly the pottery, and secondarily through the creation of relative chronologies where stratigraphic relationships exist.

Residual material

4.1.2 There is a 'background' of earlier prehistoric residual worked flint from across the scheme, although the assemblage is small. Similarly, a small group of residual late Roman pottery sherds were recovered from Reach 1a. The material had been re-deposited from the river cliff below Richborough Fort.

Phase 1: Early post-medieval (1540-1750)

4.1.3 The earliest significant activity uncovered by the scheme dates to the post-medieval period. A large ditch containing pottery of his date was noted in the evaluation at Gallows Field in Reach 3, it probably relates to medieval/post-medieval drainage of the area.

4.1.4 Excavations in Sandwich town itself revealed a three phase wooden structure in Reach 4 with an associated assemblage of finds from the Low Countries suggesting that the 'Stranger' population, although on the decline, was still active in the town and still had links to the their homeland. The original phase consisted of a jetty projecting into the river probably for mooring boats with a slightly later phase of riverbank revetment and a final phase of repair. Much of the timber had been re-used, possibly as a reflection of the declining fortunes of Sandwich as a port.

4.1.5 An occupation layer was revealed during excavations in Sandwich Quay (Reach 5) which suggests that this part of the riverfront was being utilised for fish processing. No wooden structures were seen so any jetties or wharves may have been removed by later activities.

Phase 2: Later post-medieval (1751-1900)

4.1.6 Rubbish pits containing late post-medieval material were recorded in Reach 2 to the north-west of Sandwich town. These were probably associated with the brick works that was located there. Further east deposits relating to the embankment of the north bank of the Stour were recorded opposite Town Quay.

Phase 3: Modern (1901-1945)

4.1.7 The 20th century finds and features recorded over the course of the scheme were chiefly military in nature. These included features associated with the WWI Shipyard No 2 in Reach 8-11 and WWII slit trenches in Reach 5. A later phase of wooden riverfront was also observed in Kings Lodgings in Reach 4. This was to the north of the early post-medieval

structure and suggests that this portion of the property had been reclaimed from the river.

Context sheets	826
Section sheets	49
Plans sheets	-
Colour photographs	-
BandW photos	-
Digital photos	6140
Context register	24
Drawing register	6
Watching brief forms	300
Trench Record forms	6

Table 2: Quantification of site paper archive

Bulk finds (quantity e.g. 1 bag, 1 box, 0.5 box 0.5 of a box)	13
Registered finds (number of)	55
Flots and environmental remains from bulk samples	1 box
Palaeoenvironmental specialists sample samples (e.g. columns, prepared slides)	5xcores, 2xpollen samples,1xsoil sample
Waterlogged wood	16 pieces
Wet sieved environmental remains from bulk samples	1box

Table 3: Quantification of artefact and environmental samples

4.5 Reach 1/1a (Figures 3, 4 and 5)

4.5.1 Reach 1a was situated at the north-eastern extent of the scheme close to Richborough Fort (TR 32554, 60312 to 32602, 60248). Works took place either side of the level crossing at the eastern end of Castle Road (Figure 4). The western area was part of residential smallholding and the works consisted of topsoil stripping for a compound area. The works to the east of the railway had minimal impact on subsoil deposits.

4.5.2 Reach 1 was situated to the south-west of Reach 1a and encompassed a narrow strip of land on the western bank of the River Stour from Richborough Road in the south to a railway crossing in the north (TR 32187, 59587 to 32271 59217; Figure 5). The area was in use as an access track for houseboats moored on the Stour and as waste ground and storage. Works here involved the excavation of a foundation trench for a reinforced concrete (R/C) floodwall and topsoil stripping to allow for the construction of a flood defence bund.

4.5.3 Both Reach 1a and Reach 1 were close to the Roman fort and settlement at Richborough, although Reach 1a was at the base of the cliff eroded into the fort by the river Stour and Reach 1 was located on low-lying ground away from the focus of known Roman activity.

Natural Deposits

4.5.6 Only excavations associated with Reach 1 revealed geological deposits which consisted of stiff, yellow brown alluvial clay. These were generally overlain by made ground containing modern plastic and similar material. These deposits were of varying thickness and capped by a loose, dark grey brown topsoil.

Phase 1: Early post-medieval (1540-1750) (Figure 4)

4.5.7 The works in Reach 1a did not reveal any archaeological features although they did reveal a dark earth deposit which contained pottery and CBM dating from 1600-1700. This deposit also contained residual Roman pottery and CBM, which had clearly eroded from the adjacent hillside.

4.6 Reach 2 (Figures 6 and 7)

4.6.1 Reach 2 was situated to the south-east of Reach 1 on the west bank of the River Stour (TR 32271, 59217 to 32490, 58787; Figure 6). The works in the north of Reach 2 consisted of the monitoring of sheet piling works within the precincts of Zen Motor Factors yard. Further to the south, the works consisted of the excavation of a footing trench for a new R/C flood wall. The northern part of Reach 2 was in use as a scrapyard, the mid portion was in use as gardens and the southern portion consisted of waste ground between Richborough Road and the River Stour.

4.6.2 There is little known archaeology relating to this area of the site, although the area around the modern scrapyard is recorded as brickworks on early Ordnance Survey (OS) maps.

Natural Deposits

4.6.3 Where geological deposits were revealed these consisted of yellow brown alluvial clay overlain by bank deposits and topsoil. These deposits were only revealed in the mid and southern portions of Reach 2.

Phase 2: Later post-medieval (1751-1900)

4.6.4 Two pits ([019] and [023]) were revealed in Reach 2 close to the residential property. The fill of [023] (context [024]) contained a residual flint flake and residual medieval floor tile, alongside pottery dated to 1760-1800. These appear to be refuse pits associated with the former brickworks at the site.

Phase 3: Modern (1901-1945)

4.6.5 A dump of material [046] containing glass bottles, pottery and spent rifle cartridges was revealed close to the residence in Reach 2. The cartridges were .303 calibre (the standard British infantry small arms cartridge from 1889-1950). The dates on the .303 rounds ranged from 1940-1943 and most had been fired from a Bren gun (a type of light machine gun). The glass bottles were a mixture of drinks bottles, medicine bottles and ink bottles as well as containers for cleaning products and medicine. The pottery dated from 1825-1925.

4.6.6 Several concrete antitank obstacles (Dragons Teeth) were removed from the scrapyard during sheet piling works. These were pyramidical with a

flattened top and roughly one metre square at the base and had been removed from their original location and dumped in a layer of made ground.

4.7 Reach 3 (Figures 8 and 9)

4.7.1 Reach 3 was situated to the south-east of Reach 2 and ran from Richborough Road in the west to St Mary's in the east (TR 32271, 59217 to 32950 58470; Figure 8) along the western bank of the River Stour. The area is in use as a nature reserve and sports pitches. Works in Reach 3 consisted of topsoil stripping associated with flood bank improvements as well as a section of trenching to allow the construction of an R/C floodwall. In addition to this work three evaluation trenches were excavated along the line of a new access road in Gallows Field. These trenches were 1.8m wide and approximately 10m long (Figure 9).

4.7.2 The area in the south-west of Reach 3, known locally as Gallows Field, lies just to the north west of the previous location of the Canterbury Gate, Sandwich, demolished in the 19th century. The field takes its name from the town Gallows, which was thought to have been situated c. 100m to the west of the trench locations. At least three substantial earthworks cross the field, identified from aerial photos studied as part of the South-East Rapid Coastal Zone Assessment Survey (Wessex 2011). The earthworks are thought to relate to a former medieval/post-medieval ditch and the line of a WWII barbed wire entanglement that circled Sandwich during the war. A depression to the north of and parallel with Ash road is thought to have been part of a roadblock or to represent disturbed ground where mines had been laid (ibid).

Natural Deposits

4.7.3 Where geological deposits were exposed these consisted of light yellow clay alluvium.

Phase 1: Early post-medieval (1540-1750)

4.7.4 A ditch [2/014] revealed in the evaluation at Reach 3 contained pottery with a date of 1500-1700. This feature was approximately 2m wide and situated at the north end of Trench 2. It was cut by a later much larger ditch [2/012], which did not yield any dateable finds.

Undated

4.7.5 The evaluation in Gallows field partially revealed a ditch in Trench 1 [1/019] and fully revealed another in Trench 2 [2/012] neither of which yielded dateable finds.

4.8 Reach 4 (Figures 2 and 10-18)

4.8.1 Reach 4 was located in the town of Sandwich and ran from Jesus Quay in the west to the Sandwich Toll Bridge in the east along the south bank of the Stour (TR 32950, 58470 to 33182, 58268; Figure 10). Works consisted of sheet piling and excavations associated with the construction of new

flood walls. Reach 4 ran through a mixture of waste ground, domestic gardens and public footpaths.

4.8.2 Reach 4 was situated in the historic centre of Sandwich with Strand Street to its south and is an area that is thought to have contained quays and buildings from the 14th century onwards. The house now called 'Kings Lodgings' is believed to date to the 15th century. The development of the riverside in this area is poorly understood but it is known that the present river frontage at Kings Lodgings gained its present line in 1901. A number of phases or styles of timber riverfront are visible in pre- WWII photographs of the house (Figure 10). It appears that a concrete element was added sometime in the 1940's possibly by the military. Other river frontage structures were apparently recorded at Aynsley Court to the east of the Reach although detailed description of these structures has yet to be published (ASE 2013j; ASE 2014a).

Natural deposits

4.8.3 Where natural geological deposits were encountered in Reach 4 they consisted of blue grey sandy silt alluvium [629]. This deposit contained a residual prehistoric flint flake as well as early post-medieval CBM.

Phase 1: Early post-medieval (1540-1750)

4.8.4 Excavations in the garden of Kings Lodgings revealed a section of wooden revetting. This ran north-west to south-east parallel to the course of the Stour before turning northwards and then turned east again before being truncated by modern sheet piles. The structure ([675] and [740]) appeared to contain three phases, all dating from the 17th century. It appears that the earliest structure was a jetty extending out into the river (WF 1; Figure 13) intended as a berth for vessels. The second phase (WF 2; Figure 14) was constructed to retain the riverbank and may have also supported a small shed or privy. The last phase (WF 3; Figure 15) was constructed to further retain the riverbank and as a possible wharf. The majority of the timbers used in construction were re-used. Deposits on the landward side of the structure contained (notably [693], [762], [763] and [764]) early post-medieval artefacts (particularly pottery and clay tobacco pipe and a Delftware wall tile) many of which were Dutch in origin.

Phase 3: Modern (1901-1945)

4.8.5 Elements of a later timber river front revetment were also revealed by the works in Kings Lodgings and a further section was recorded and removed from the riverfront to the rear of 30 Strand Street. The structure in Kings Lodgings was to the north of the earlier revetment suggesting that this portion of the property had been reclaimed from the river. This timber river frontage was replaced by a concrete floodwall, which was observed to run from Jesus Quay in the west of Reach 4 to the north-eastern corner of Kings Lodgings. Jesus Quay was also observed to contain a concrete slipway and building bases as well as a flagstone and brick surface ([518], [519], [520]; Figure 11). These features may have been constructed by the military in WWII. Also revealed in Kings Lodgings were several elements of masonry ([623], [624], [625], and [626]; Figure 12). These are almost certainly late post-medieval-modern garden features.

4.9 Reach 5 (Figures 2 and 19-21)

4.9.1 Reach 5 ran from Sandwich Toll Bridge eastwards along the south bank of the Stour (TR 33182, 58268 to 33614, 58098; Figures 20 and 21). The west of the reach was in use as a carpark whilst the east was in use as a public park. Works associated with the flood defence scheme included excavations for a new R/C floodwall, the construction of a public open space and topsoil stripping to allow the raising of an existing flood bank.

4.9.2 Reach 5 encompassed an area of riverfront to the North of Strand Street and the Town or 'Common' Quay. Town Quay is first mentioned in documents in the 11th century (Clarke et al 2010, 34) with a ferry to Stonar operating from Davis Gate area (now the Barbican). By the 16th century at least two cranes were being employed to unload vessels (ibid, 129), although the wharf appears to have been in a state of disrepair and in need of costly upkeep by the town. The town ditch and the Bulwark (the site of a 15th century fort) lie to the east of Reach 5.

Natural Deposits

4.9.3 Where natural deposits were revealed in Reach 5 they consisted of red brown alluvial clay overlying grey blue clay silt. There appeared to have been truncation of these deposits through the centre of the Reach by 20th century activity.

Phase 1: Early post-medieval (1540-1750)

4.9.4 Excavations in Reach 5 uncovered a possible early post-medieval layer [210] containing pottery dated to the period 1550-1700, coal, metal working slag, and reused medieval CBM. A bulk sample taken from this context yielded the bones of several species of marine fish, which appear to have been processed on site. This deposit appeared to be a remnant activity horizon in the east Sandwich Quay. This suggests that this portion of Town Quay had been reclaimed from the Stour in the early post-medieval period and that any surviving medieval archaeology is probably located further to the south.

Phase 3: Modern (1901-1945)

4.9.5 A group of brick structures were observed in the east of the works in Sandwich Quay ([296], [297], [298] and [299] (Figure 21). The nature of the structure these relate to is unclear but they may relate to the Sandwich Gas Works, which once stood nearby. The remains of a WWII slit trench [332] was uncovered during the works in Reach 5 (Figure 20). This had been constructed using angle iron uprights lined with corrugated iron sheets. It was recorded running approximately east-west towards the modern public toilets. A cast iron bollard identical to those still standing along Sandwich riverfront was included in the backfill. Substantial concrete footings ([280], [282] and [826] were observed beneath the present day toilet block, which may also be related to military activity at Reach 5. Also uncovered was a large piece of ironwork that had been sunk into modern made ground in an attempt to brace the riverfront. A series of one-man slit trenches ([358], [361] and [364]) was uncovered east of Sandwich Quay.

These had also been constructed using angle iron uprights lined with corrugated iron.

4.10 Reach 6 (Figures 2 and 22)

4.10.1 Reach 6 was situated on the eastern bank of the River Stour in an area to the east of the town of Sandwich. It ran from Green Wall Road to Black Sluice (TR 33661, 58089 to 34227, 58684; Figure 22). The works consisted of a minimal topsoil strip for the construction of a new footpath. The area is outside the precincts of the historic centre of Sandwich and has probably always been a marginal area of low human activity. Ordnance Survey maps show a rifle range just to the east of Reach 6 that had been abandoned by the mid-20th century. The area was in use as a footpath, a flood defence embankment and waste ground.

4.10.2 The flood defence works in Reach 6 did not reveal any archaeological finds or features.

4.11 Reach 7 (Figures 2, 22 and 23)

4.11.1 Reach 7 was situated north of Reach 6 in the east of the flood defence scheme. It ran from Black Sluice in the south-east to Broad Salts in the north-west on the eastern bank of the Stour (TR 34227, 58684 to 34024, 58833; Figure 22). In this area, works associated with the scheme consisted of a topsoil strip as part of the construction of a new flood defence bund. Reach 7 was situated on a narrow area of waste ground between the nursery at New Downs Farm and the River Stour.

4.11.2 Reach 7 was the site of a wharf and tramway terminus in the late 19th and early 20th centuries. Visible upstanding features relating to this facility (a wooden river frontage and metal winch mechanism) were recorded and reported on in a separate ASE report (ASE 2014a; Appendix 17).

4.11.3 The impact on subsoil deposits was minimal in Reach 7 and no significant archaeological finds or features were recorded during the works there.

4.12 Reach 8-11 (Figures 2 and 24-30)

4.12.1 Reaches 8-11 were situated on Broad Salts on the east bank of the Stour opposite the former Pfizers works (TR 34026,58833 to 35140, 59703; Figure 24). The works extended north to TR 34240, 61535 before turning south again and terminating adjacent to Princes Golf Course (TR 351, 59706). The area was low lying and marshy and was in use as agricultural land. Works monitored as part of the scheme included topsoil stripping for the new embankments and haul roads as well as the excavation of four large borrow pits referred to as 'Win' areas. These Win areas were intended to obtain material for the construction of a new flood defence bund or embankment. Also monitored were the excavation of new flood defence ditches and two associated sluice facilities.

4.12.2 Little archaeological work has been carried out in the environs of Reaches 8-11, although the site of a medieval sea battle is said to be somewhere in this area (presumably when it was part of the Wantsum Channel). The area opposite Bloody Point is shown on early 20th century maps as being

the site of 'Shipyard Number 2', part of the WWI facility at Richborough Port. Later aerial photographs show earthworks relating to this shipyard still extant in the WWII (Figure 26) along with anti- glider ditches and a firing range just outside the north-eastern limit of the scheme.

Natural Deposits

4.12.3 Natural deposits revealed in Reach 8-11 varied in nature. Upper deposits generally consisted of laminated mid-brown clay and sand with loose yellow marine sand revealed in the extreme east of the works. Lower deposits were a mixture of beach shingle, marine sand and dark brown organic rich clay.

Phase 3: Modern (1901-1945)

4.12.4 Two cut features ([129] and context [133]) were observed in Win 1 (Figure 25) opposite Bloody point. These were linear in nature and although no finds were recorded from these features they correspond very strongly with maps of the WWI facility at Richborough Port. The group of regular linear features observed in the topsoil strip between Win 1 and Win 2 ([105], [151], [526], [527] and [531] also strongly correspond to features relating to the WWI 'Shipyard No2' (Figure 26).

4.12.5 A regular linear feature [461] was noted in the north-east of the works in Reaches 8-11 which is visible on WWII aerial photographs and is almost certainly part of the anti-glider trench network (Figure 30). A collection of dated cartridge cases were retrieved from this features possibly suggesting that the ditch may have also been used for training purposes related to the nearby firing range or as an anti-aircraft position. A Royal Marines badge and a whistle were recovered from topsoil at the site and these are almost certainly related to the well-attested WWII activity in the vicinity of Reaches 8-11.

Undated

4.12.6 The majority of the features revealed by the works were undated and were linear in nature. Several were sinuous and organic in appearance and were probably natural tidal channels now silted up. One of these natural channels in Win 4 [597] contained the partial skeleton of a juvenile sheep [599] (Figure 29). Others ([459] and [609] for example) were more regular in nature and were probably post-medieval drainage features, although a more recent military origin is equally plausible.

4.13 Reach 12/12a (Figures 2 and 31-34)

4.13.1 Reach 12 occupied two distinct areas. The bulk of the works took place on the low-lying land between the River Stour in the west, the modern A256 road in the north and Monks Way in the east (centred on TR 32569, 59175; Figure 31). A second, much smaller area (Reach 12a) to the north-east of Sandwich toll bridge was also monitored (centred on TR 33261, 58288; Figure 32). The works in Reach 12 consisted of the excavation of two sections of R/C wall footings, excavations associated with the construction of three concrete sluices and topsoil stripping associated with the construction of earthen flood banks. Reach 12 encompassed the Highway

Marine boatyard and an area of marshy livestock pasture, which is also a nature reserve. The works in Reach 12a took place on a small parcel of waste ground to the north-east of Sandwich Toll Bridge and consisted of the excavation of flood defence wall foundations.

4.13.2 Reach 12 contained a section of the earthwork known as 'Monks Wall', which is purported to be of medieval date. A topographic survey and walkover survey of the monument was undertaken by ASE (this is fully detailed in Appendix 18). The interim report on this work (ASE 2014b) noted that the upstanding monument was a simple linear earthwork with subtle variations suggesting more than one phase of construction/alteration or construction by different work gangs. Three evaluation trenches were excavated to the base of the monument in order to better understand and date its construction. Reach 12a occupied a small segment of the southern edge of the medieval port of Stonar.

Phase 2: Later post-medieval (1751-1900)

4.13.3 The excavations monitored in Reach 12a revealed bank deposits relating to the riverfront in Stonar/Sandwich town (Figure 32). These deposits indicated that the course of the Stour had once been further north before silt deposition had shifted the channel to its present position. The excavations did not reveal the basal layers of this sequence. Clay tobacco pipe dating 1750-1900 was recovered from the lowest exposed fill

Undated

4.13.4 Trenches though the Monks wall revealed a series of bank deposits and an adjacent ditch [12/301] which showed evidence of at least one re-cutting episode [12/308] (Figure 34). It appeared from the revealed sections that the earthwork had been constructed using the up-cast of the adjacent ditch in two phases. The ditch had completely silted up and was not visible on the surface. No dateable finds were recovered from the evaluation. Environmental samples taken from Trench 3 revealed that the monument had been constructed in an intertidal environment and had been over topped on more than one occasion. The environmental sample confirmed the episodic nature of Monks Wall's construction. The excavations supported the view of the walkover survey (Appendix 18) which noted that the upstanding earthwork was not uniform, possibly because of post construction alterations. The construction methods revealed by the trenches appear distinctly different to those noted in other archaeological investigations associated with Monks Wall. Documentary sources place the construction of the monument firmly in the medieval period, although no dateable finds were recovered during the excavation and it is included as undated. This feature may be dated as medieval during further analysis.

4.14 Reach 13

4.14.1 No works were monitored in Reach 13

4.15 Reach 14 (Figures 2, 35 and 36)

4.15.1 Reach 14 was situated on the north bank of the River Stour opposite the town of Sandwich. The site consisted of a mixture of residential and light

industrial buildings and encompassed the boatyard at Sandwich Marine. Reach 14 ran from Barbican Court in the west to the south-eastern corner of Stonar Lake (TR 33257, 58278 to 33755, 58746; Figure 35).

4.15.2 The works in Reach 14 consisted of test pitting and trenching associated with the set-up of a construction compound and trenching for sheet piling works in the boatyard.

4.15.3 Reach 14 contained the site of the medieval port of Stonar (now deserted) and in the 20th century was part of the large military facility that stretched along most of Sandwich haven.

Phase 3: Modern (1901-1945)

4.15.4 Excavations in Reach 14 revealed portions of concrete wall footings [008] with a bitumen damp course still in evidence. These foundations were almost certainly structures relating to the sites use as a military camp. They were covered by made ground associated with the demolition and abandonment of the camp.

4.16 Reach 15 (Figures 2, 37 and 38)

4.16.1 Reach 15 ran along the eastern edge of Stonar Lake from the north-eastern corner of Stonar Industrial Estate to the Pfiszers works in the north (TR 33755, 58746 to 33663, 59415; Figure 37). The land consisted of a trackway and waste ground between the western bank of the Stour and the eastern bank of Stonar Lake. Although Reach 15 contained the site of medieval Stonar much of it was destroyed in the 20th century for gravel extraction. During WWI a railway ran through the area serving the Richborough Port facility. Works in this area chiefly consisted of sheet piling with a small amount of shallow topsoil stripping.

Phase 3: Modern (1901-1945)

4.16.2 Despite the limited nature of the works in this area, archaeology was uncovered. A concrete slipway [78] (Figure 38) constructed of interlocking blocks was revealed. It is probable that this structure was associated with the Richborough Port establishment that was present in this area during WWI.

4.17 Reach 16 (Figure 2)

4.17.1 Reach 16 ran along the western bank of the Stour from the North of Stonar Lake to Old Salthouse Reach just north of Bloody Point (TR 33663, 59415 to 33440,60357; Figure 2). Works here consisted of the construction of a new R/C wall and excavations associated with service location. There was also a small amount of topsoil stripping for haul road construction. This part of the scheme was situated within the former Pfiszers works and the site was still in use as an industrial estate.

4.17.2 Reach 16 is situated on the Stonar Bank close to the deserted medieval port of Stonar and was later the site of the WWI military establishment of Richborough Port.

4.17.3 No archaeological finds or features were noted during the monitoring of works at Reach 16 and it seems highly likely that 20th century activity at the site had removed any trace of earlier activity.

5.0 FINDS AND ENVIRONMENTAL ASSESSMENTS

5.1 Summary

5.1.1 A large assemblage of predominantly post-medieval finds was recovered during the archaeological investigations at Sandwich. All finds were washed and dried or air-dried as appropriate. They were subsequently quantified by count and weight and were bagged by material and context (Appendix 6). All finds have been packed and stored following CIfA guidelines (2014).

5.2 Lithology and palaeoenvironmental assessment by Dr Rowena Banerjea, Rob Batchelor and Tom Hill

Introduction

5.1.1 In addition to the archaeological samples several specialist palaeoenvironmental samples were also recovered. A Russian auger was used to recover a continuous core <5> in Reach 4 alongside the wooden revetment structure, which was accompanied by a series of bulk samples <7-12>. A total of 11 subsamples were submitted for palynological and diatom assessment. In Reach 12, during the excavation of a section across the Monks Wall samples were recovered from the bank material for micromorphological analysis.

Lithology: Reach 4

5.1.2 The core <5> was recovered adjacent to timber [666] to a depth of 1.53m below excavated level (-0.52m OD) where a slid obstruction was encountered. This was likely to be either a stone or possible cultural material, such as CBM, which had been deposited in the river. Other attempts were made to recover deeper sediments but again obstructions were encountered.

5.1.3 The deepest deposit (-0.38 to -0.52m) encountered was a very fine sand with occasional lenses of silt which exhibited signs of oxidation. This was overlain by a thin band of sandy silt with occasional black organic flecks. This in turn was overlain by a homogenous sandy silt (-0.24 to -0.34m OD). The upper contact of this deposit was eroded and overlain by a coarse sand and pea grit deposit 0.02m thick. This was sealed by a grey blue laminated silt and sand with well-defined laminations at the base of the deposit. This was overlain by a structureless brown silt clay.

Pollen Reach 4: by Rob Batchelor

5.1.4 A total of 11 subsamples from core <5> were extracted for an assessment of pollen content. The pollen was extracted as follows: (1) sampling a standard volume of sediment (1ml); (2) adding two tablets of the exotic clubmoss Lycopodium clavatum to provide a measure of pollen concentration in each sample; (3) deflocculation of the sample in 1% Sodium pyrophosphate; (4) sieving of the sample to remove coarse mineral and organic fractions (>125µ); (5) acetolysis; (6) removal of finer minerogenic fraction using Sodium polytungstate (specific gravity of 2.0g/cm3); (7) mounting of the sample in glycerol jelly. Each stage of the

procedure was preceded and followed by thorough sample cleaning in filtered distilled water. Quality control was maintained by periodic checking of residues, and assembling sample batches from various depths to test for systematic laboratory effects. Pollen grains and spores were identified using the University of Reading pollen type collection and the following sources of keys and photographs: Moore et al (1991); Reille (1992). The assessment procedure consisted of scanning the prepared slides, and recording the concentration and preservation of pollen grains and spores, and the principal taxa on four transects (10% of the slide) (Appendix 5).

5.1.5 The results of the assessment indicate a very poor concentration and preservation of remains in all samples (Appendix 5). A range of taxa were recorded throughout the sequence, including (most frequently): Quercus (oak), Pinus (pine), Ulmus (elm), Corylus type (e.g. hazel), Poaceae (grasses), Cereale type (e.g. barley), Asteraceae (daisies), Lactuceae (dandelions) and Chenopodium type (goosefoot family). In addition, a low to moderate concentration of microcharcoal was recorded in all samples.

5.1.6 Unfortunately, because the number of grains recorded is so low, it is not possible to provide a useful reconstruction of the former environment or human activities. Normally, it would be possible to suggest that these taxa grew in the nearby vicinity, but due to the nature of the sediment, the pollen might actually be derived from elsewhere. Furthermore, it is highlighted that the cereal type recorded might actually represent the growth of salt-marsh grasses, which have a similar pollen grain morphology.

Diatoms: Reach 4: by Tom Hill

5.1.7 A total of 11 diatom slides were prepared from spot samples obtained from a 1.46m sequence. The sediment was seen to be relatively homogenous, typified by fine-grained silts and clays, with some fine sands also within. There was an overall visible increase in sand content with depth.

5.1.8 0.5g of sediment was required for the diatom assessment preparation. Due to the high silt and clay content of most samples, all samples chosen for assessment were first treated with sodium hexametaphosphate and left overnight, to assist in minerogenic deflocculation. Samples were then treated with hydrogen peroxide (30% solution) and/or weak ammonia (1% solution) depending on organic and/or calcium carbonate content, respectively. Samples were finally sieved using a 10µm mesh to remove fine minerogenic sediments. The residue was transferred to a plastic vial, from which a slide was prepared for subsequent assessment.

5.1.9 A minimum of 100 diatoms were identified for each sample depth. Diatom species were identified with reference to van der Werff and Huls (1958-74), Hendy (1964) and Krammer and Lange-Bertalot (1986-1991). Ecological classifications for the observed taxa were then achieved with reference to Vos and deWolf (1988; 1993), Van Dam et al., (1994), Denys (1991-92; 1994) and Round et al. (2007). Appendix 16 provides a summary of the major and supporting taxa observed within each sample depth.

5.1.10 A summary of the diatom results for the sedimentary sequence is provided in Appendix 16. In the majority of cases, taxa were identifiable to species

level, but in some instances, identifications were only possible to genera level. The table highlights the dominant species (>10% Total Diatom Valves; TDV) for each sample depth. In addition, a selection of key subordinate taxa (<10%TDV) are also highlighted. To assist in the subsequent assessment of palaeoenvironmental potential, simplified ecological and lifeform classifications for each species are also provided. In brackets next to each species name, capital letters refer to salinity preference (M = marine; B = brackish; F = fresh; BM = brackish-marine etc.). In contrast, the lowercase letters refer to lifeform (p = planktonic; t = tychoplanktonic; b = benthic). Planktonic taxa live floating within the water column, whereas benthic taxa are those that live either attached to or within the substrate. Tychoplanktonic taxa are diatoms that readily occur in plankton but are primarily derived from other habitats, such as attached to substrates. Additional lifeform classifications can also be applied to diatom species (epiphytic, epipelic, epipsammic, aerophilous etc), but for the purposes of an assessment level study, these will only be referred to if/when relevant in subsequent discussions. A qualitative assessment of species abundance and diversity is also provided. If abundance is stated to be low, this infers that it was not possible to count 100 diatom frustules during the assessment. Similarly, if diversity is high, over 15 taxa were encountered during assessment; medium = 5-15 taxa; low = <5 taxa.

5.1.11 Diatom preservation was very good in all samples, with high abundance and diversity encountered within all samples submitted for assessment (Appendix 16). Occasional fragments of foraminifera, ostracods, pollen and even radiolaria were encountered in some samples. Whilst these have not been recorded or quantified, their presence may shed some light on the palaeoenvironmental conditions that prevailed at the time of deposition.

5.1.12 The abundance and diversity of diatom taxa encountered throughout the sequence was found to be high. The minimum diatom counts required for this assessment level investigation were easily achieved. As indicated in Appendix 16, there is overall consistency in terms of the diatom species encountered throughout the sedimentary units, but the dominance of specific taxa are found to vary between samples. In the planktonic realm, those taxa most often encountered include the species Paralia sulcata (M), Actinoptychus senarius (M), Thalassiosira eccentrica (M) and Cyclotella sp. (?FB) . In relation to the tychoplanktonic realm, the taxa Odontella aurita, Delphineis surirella and Rhaphoneis amphiceros are most common (all marine). With regards to the benthic taxa, the species that dominate are Cocconeis placentula (BF), Surrirella ovalis (BM), Nitszchia sigma (MB), Synedra ulna (F) and various species of the genus Gyrosigma (most often associated with brackish settings). The variation in dominance of these species (and their associated lifeform-ecological classifications) will provide information regarding the depositional conditions that prevailed in the past.

Waterlogged Bulk samples

Samples <7>, <8>, <9>, <10>, <11>, <12> and <13> [629]

5.1.13 The waterlogged samples were recovered every 10cm from context [629], a silt clay deposit located next to timber structure [675]. The wet sieved fractions were not very rich in organic remains. Uncharred seeds were

present in low numbers and included hemlock (Conium maculatum), stinging nettle (Urtica dioica), docks (Rumex sp.), knotgrasses (Polygonum sp.), elder and sedges (Carex sp.). Wood fragments were generally small and present in low numbers. The only insect remain was a fly pupa from sample <7>.

Discussion: Reach 4

5.1.13 The sedimentary sequence recorded within the core taken adjacent to the wooden revetment in Reach 4 demonstrated variable preservation of environmental proxies. The sediment itself demonstrated oxidation at the base of the sequence suggesting varying hydrological conditions over time. The fine sand at the base of the sequence recorded evidence of oxidation suggesting this deposit may have only been periodically submerged. The sandy silt deposits overlying this lower unit demonstrate laminations up-profile indicative of tidal deposition. The coarse sand and gravel deposit recorded within these deposits may represent an episode of enhanced energy within the system leading to erosion of softer sediments and the deposition of coarser sediment. This may relate to channel migration or storm surge activity. Overall the sediment demonstrated a low organic content, as is evidenced by the bulk samples, and is likely to have a complex relationship with the revetment structure which is in part driven through these deposits as well as the deposits accumulating against it.

5.1.14 The pollen assemblage was poorly preserved which is perhaps unsurprising given the dynamic nature of the fluvial environment. The sediment as described above demonstrated variations in energy over time and a degree of sub-aerial weathering, processes which will have affected the preservation of this proxy. In addition, the taphonomy of the pollen which was able to be identified is likely to be complex, being deposited both via tidal action and perhaps from anthropogenic activity adjacent to the channel.

5.1.15 Despite the poor pollen preservation the diatom assemblage has proven to demonstrate excellent preservation, from which palaeo-depositional conditions can be elucidated and a number of supporting palaeoenvironmental interpretations can be made as part of this initial assessment. As displayed in Appendix 16, the taxa encountered were found to vary in abundance and relative diversity with depth through the profile. The overall species encountered in terms of assemblage diversity indicates that deposition was occurring within an estuarine/coastal setting. In addition, the broad similarity in dominant and subordinate taxa encountered indicates that coastal depositional conditions are likely to be responsible for the formation of the full sequence under investigation. Furthermore, these taxa are primarily associated with deposition within the intertidal zone (between Mean Sea Level [MSL] and Highest Astronomical Tide [HAT]).

5.1.16 However, the variation in the overall dominant taxa within each sample suggests changing intertidal conditions through the sequence which is borne out in the differences in the lithology. This is evidenced by the presence of a variety of taxa with differing lifeforms and ecological tolerances. The changes in abundance of marine-freshwater microflora indicates that there is clear variation evident with regards to the position

within the tidal frame at which deposition took place. For example, the diatom assemblages at 0.21m (0.80m OD) and 0.46m (0.55m OD) depth contained much higher concentrations of taxa requiring lower salinity waters to survive indicating deposition higher up the tidal frame than those encountered above and below these depths. It is beyond the remit of an assessment to comment further on the microfloral diversity and its potential palaeoenvironmental implications, but the sedimentary archive preserves an interesting diatom sequence worthy of further investigation.

Lithology: Reach 12

5.1.17 A machine excavated section was undertaken perpendicular to the alignment of the Monk's wall earthwork in order to better characterise the formation and date of this feature. A total of two samples <12/2> and <12/3> were recovered from the northern side of the bank which was composed of layers of brown sandy silt clay with occasional white sandy lenses.

Micromophology by Dr Rowena Banerjea

5.1.18 Two thin-sections, 11.5 x 7.5 cm, were prepared from micromorphology samples 12/2 and 12/3 (Figure 34). The procedure followed is the University of Reading standard protocol for thin section preparation. The samples were oven-dried to remove all moisture and then impregnated with epoxy resin while under vacuum. The impregnated samples are then left overnight so that the resin can enter all of the pores. The samples are then placed in an oven to dry for 18 hours at 70˚C before they are clamped and cut to create a 1cm slice through the sample. The surface of the 1cm slice is flattened and polished by grinding on the Brot. The prepared surface of the 1cm slice is then mounted onto a frosted slide and left to cure. This is followed by cutting off the excess sample, so the sample is down to a thickness of 1-2 mm. The mounted sample is ground down to approximately 100 µm in thickness using the BROT. The 100 µm section was lapped on a Logitech LP30 precision lapping machine to the standard geological thickness of 30 µm.

5.1.19 The micromorphological investigation was carried out using a Leica DMLP polarising microscope at magnifications of x40 - x400 under Plane Polarised Light (PPL), Crossed Polarised Light (XPL), and where appropriate Oblique Incident Light (OIL). Thin-section description was conducted using the identification and quantification criteria set out by Bullock et al (1985) and Stoops (2003), with reference to Courty et al (1989) for the related distribution and microstructure, Mackenzie and Adams (1994) and Mackenzie and Guilford (1980) for rock and mineral identification, and Fitzpatrick (1993) for further identification of features such as clay coatings. Tables of results use the descriptions, inclusions and interpretations format used by Matthews (2000) and Simpson (1998). Photomicrographs were taken using a Leica camera attached to the Leica DMLP microscope.

5.1.20 Micromorphology enables the following properties to be examined at magnifications of x40 - x400 under PPL, XPL and OIL: thickness, bedding, particle size, sorting, coarse:fine ratio, composition of the fine material, groundmass, colour, related distribution, microstructure, orientation and

distribution of inclusions, the shape of inclusions, and finally the inclusions to be identified and quantified. In addition, post-depositional alterations can be identified and quantified such as: effects on the microstructure by mesofaunal bioturbation and cracking due to shrink-swell of clays or trampling; translocation of clays and iron; chemical alteration such as the neoformation of minerals such as vivianite and manganese; organic staining as a result of decayed plant material; and excremental pedofeatures such as insect casts and earthworm granules.

Results

5.1.21 Micromorphology descriptions for each deposit are recorded in Appendix 2, the frequency and types of inclusions within these deposits are recorded in Appendix 3, and the abundance of post-depositional alterations and pedofeatures within the deposits is recorded in Appendix 4. To determine the deposit type classification, each deposit was grouped using the following diagnostic sedimentary attributes and inclusions, which provide crucial information concerning the origin of inclusions, transportation mechanisms of particles and the deposition processes. To ascertain the origin of sediment components descriptions were made of particle size, shape, and the composition of the coarse and fine fraction, particularly the frequency of rock, minerals and anthropogenic inclusions (Appendix 3). The depositional events are characterised by the following sedimentary attributes: sorting, related distribution, orientation and distribution of the inclusions (Appendix 2) and bedding structure (Appendix 3).

5.1.22 Understanding the formation processes for deposits is crucial to interpreting the depositional pathways of rock fragments and minerals, any anthropogenic debris such as charred wood and artefacts, and other types of plant remains and microfossils (Matthews 2010; Schiffer 1987). Analysis of post-depositional features provides crucial information concerning the effects of weathering, preservation conditions (Bisdom et al 1982; Brady and Weil 2002; Breuning-Madsen et al 2003; Canti 1999; Courty et al 1989) and stratigraphic integrity of the deposit (Canti 2003; Canti 2007; Courty et al 1989; Macphail 1994).

5.1.23 In total, nine microstratigraphic units (MU) were examined through micromorphological analysis of the samples (Figure 34): MU1-6 in sample 12/2; MU7-9 in sample 12/3.

Deposit types

5.1.24 The deposit types represent the variation in the energy levels of the depositional processes responsible for the origin of the bank material. Throughout the profile there are a series of sedimentary units that have been deposited by fluvial processes (Appendix 2): MU1 silts; MU2, 4, 8 fine sand; MU3 micro-laminations of silts and fine sand; MU6 is classified as a predominantly sand deposit that has been deposited by fluvial processes, and then reworked; and MU5 has formed in a very low energy environment, most probably in standing water. MU7 and MU9 are classified as re-deposited sediment (Appendix 2).

Fluvial sediment

5.1.25 MU1 is a silt loam, moderately sorted, with an embedded and coated related distribution whereby silt particles are embedded in a finer clay matrix and contains vesicles (Appendix 2), which are evidence of trapped surface water. Vesicles are smooth-walled, simple-curved voids attributed to the incorporation of air bubbles in near-surface horizons, and have also been observed in the puddled layer of paddy soils (Stoops 2003, 64-65). MU2, 4 and 8 are fine sands, well sorted and predominantly have linked and coated related distributions where the fine material forms bridges between the coarser sand particles (Appendix 2). MU3 is formed from micro-laminations of silt loam and fine sand lenses, the former moderately sorted and the latter well sorted (Appendix 2 and 3). The micro-laminations represent single depositional events and indicate periodic deposition over time (Goldberg and Macphail 2006). MU6, a predominantly sand deposit that has been deposited by fluvial processes, is unsorted, with a variable related distribution that is embedded and coated, with occasional pockets that are linked and coated. MU5 is a silty clay with bimodal sorting: poorly sorted sand, well-sorted silt; the coarser silt and sand components are embedded within the clay matrix (Appendix 2). MU2, 3, 4, 5, and 6 have a crystallitic groundmass (Appendix 2), which indicates a calcareous nature to the sediment.

Redeposited sediment

5.1.26 MU7 and 9 are classified as redeposited fluvial sediment. They share similar sediment attributes such as particle size, groundmass and, colour as the units of fluvial sediment, but they are unsorted rather than well sorted, moderately sorted, or having bimodal sorting (Appendix 2). Both units contain sediment aggregates, 20% (Appendix 3) that are reworked silty clay aggregates and contain vesicles, which most probably originate from the fluvial sediment.

Inclusions

5.1.27 All microstratigraphic units identified on the slides predominantly contained geological inclusions that comprise a similar range, of which quartz minerals are the dominant component (Appendix 3). MU7, MU8, and MU9 also contain fragments of charred wood, which are most abundant in MU9, 10%, (Appendix 3). Those fragments within MU8, a deposit of fluvial sands, may have been eroded out from the deposit below MU7. Both MU7 and MU9 are formed from redeposited sediment, which suggests that the charcoal fragments are also redeposited.

Post-depositional alterations

5.1.28 All microstratigraphic units were affected by weathering processes and bioturbation (Appendix 4). Dusty impure clay coatings occurred in MU7 and MU9, which are units of redeposited sediment (Appendix 4). The formation of dusty impure clay coatings can be evidence of dumping under wet conditions due to turbulent hydraulic conditions and the rotational movement of sediment, often associated with disturbances such as trampling processes in external areas (Courty et al. 1989; Shillito and Ryan 2013) and dumping under wet conditions. Chemical alterations and changes in the redox conditions (Brammer 1971; French, 2003) associated with organic decay (Banerjea et al. 2015) can lead to the dispersal of silt

and clay particles and can be highly localised. Silty clay/clay coatings are frequently impregnated with muscovite mica particles as a result of mica weathering in MU1-6 (Appendix 4). The translocation of clay and silty clay particles is influenced by factors related to water flow, chemical conditions and energy and gravity. Movement can occur under any kind of climate, although temperate environments provide the best evidence (Courty et al 1989). Clay coatings that have a different colour from the surrounding sediment matrix suggest that the fine clay material has translocated from elsewhere (Brammer 1971; French 2003), and so as the clay coatings are similar in colour to the sediment matrix, this suggests in situ weathering of units. All units show the translocation of iron, which coats inclusions, has impregnated silty clay coatings (Appendix 4). These chemical alterations indicate that redox processes fluctuated in this sequence as a result of wetting and drying, probably due to inundation from flood events. Free iron is highly mobile only when present in the ferrous state, which occurs under anaerobic conditions (Courty et al 1989). Silty clay coatings are impregnated iron compounds, which have formed as a result of weathered muscovite (Bisdom et al 1982).

5.1.29 Manganese neomineral formation was observed in all units with the exception of MU1 (Appendix 4). Manganese may accumulate at the top of either the water table or the capillary fringe (Bartlett 1988). Fluctuating water tables lead to alterations of reducing and oxidising conditions (Brammer 1971; Brown 1997; French 2003; Lindbo et al 2010). Manganese neomineral formation has a strong association with the decaying organic matter. Organic matter becomes oxidised as Mn(III) accepts electrons to become Mn(II). The pH rises and the rate of redox is slowed. As organic matter is lost by oxidation, black precipitated MnO2 will become evident. Most critical redox happenings occur in areas where the O2 supply is partially restricted either by limited aeration or a predominating electron supply. Most of these regions are redox interfaces such as: meeting points between roots or microbial surfaces and the soil surface; aggregates and soil pores; sediments and free water; the boundary between organic and a mineral horizon (Bartlett 1988).

5.1.30 Bioturbation effects, are evident by the presence of channels and chambers (burrows) in the microstructure, forming sub-angular blocky peds, which are mostly weakly to moderately developed (Appendix 2) are abundant, 10-20%, or very abundant, >20%, in most microstratigraphic units and, given the occurrence of calcitic earthworm granules, which are excremental pedofeatures (Canti 2003; Canti 2007) in MU3 and MU5 most probably result from the reworking of materials by earthworm activity (Appendix 4).

Discussion: Reach 12

5.1.31 The excavation of the section through the earthwork known as the Monk's Wall did not recover any cultural material with which to date the feature. The samples recovered for micromorphological analysis, however, did yield useful information regarding the origin of bank material and the environmental conditions during the life of the structure. Sample <12/2> towards the base of the profile recorded a series of fluvial silts and sands, which demonstrated varying energy levels in their deposition. These fluvial microstratigraphic units represent inundation events prior to the

construction of the flood defence. MU6 represents a period of stabilisation where a soil began to form. The sediments that create the overlaying flood defence bank, in sample <12/3> show that the defence appears to have been constructed in two stages: the first represented in MU7; and the second in MU9. In between MU7 and MU9 is another flood event, which is formed from fluvial sands, and therefore of fairly high energy. This inundation most probably led to the raising or rebuilding of the bank.

5.1.32 The presence of charcoal and microcharcoal within the bank material was considered a possibility for radiocarbon dating. However, the micromorphological analysis has demonstrated that the taphonomic processes are likely to be complex with both flood events identified as well as a degree of redeposition of fluvial material during the construction of the bank. These uncertainties suggest that any charcoal present within the bank material may be significantly reworked and perhaps transported over large distances by high energy fluvial action.

5.2 The Flintwork by Karine Le Hégarat

5.2.1 The archaeological work produced seven pieces of struck flint weighing 489g. They were thinly spread across the site. Five pieces came from four numbered contexts, one was found unstratified in Reach 14 and one was found from an unstratified context. A further five fragments of burnt unworked flint weighing 168g were also recovered from four numbered contexts. The pieces of struck flint were quantified by piece count and weight and were catalogued directly into an Excel spreadsheet. Table 4 summarises the assemblage.

Category	Flakes	Core	Retouched forms	Total
No	2	3	2	7

Table 4: The flintwork

5.2.2 The condition of the flint varies. The majority have suffered extensively from post depositional edge damage and rolling. This indicates that the small assemblage is principally composed of residual material. The raw material selected for the manufacture of the struck flints is mostly dark grey. Where present the outer surface is pitted and mid grey suggesting the use of flint pebble/cobble.

5.2.3 The assemblage comprised two flakes, three cores and two modified pieces. The retouched pieces consist of a side scraper (context [024]) and a retouched flake (context [30]). Overall, the assemblage comprises very few chronologically diagnostic types. The side scraper is likely to be Late Prehistoric in date. The fragmentary core from context [030] exhibits small blade scars and it could be Mesolithic or Neolithic.

5.3 The Roman Pottery by Anna Doherty

5.3.1 A small assemblage of Roman pottery was recovered from the site, totalling 15 sherds, weighing 294g, mostly stratified in organic deposit [508] in area Reach 1a. This layer produced a typical late Roman assemblage,

probably dating to c. AD 350-410. The group contains two sherds of Oxfordshire red-slipped ware, including a flange from a Dragendorff 38 derived bowl form, the rim from an imported Eifelkeramik lid-seated jar, two late Roman grog-tempered sherds including a lid or plain dish form, the base of a Nene valley colour-coated ware beaker, a bead-and-flange bowl in a burnt black-burnished style fabric, a residual or curated sherd of central Gaulish samian ware, the rim of a coarse oxidised storage jar and three sherds in other white/buff oxidised wares.

5.3.2 Three sherds of later Roman pottery were also noted in unstratified deposits from the site, including Oxfordshire red-slipped ware and Baetican amphora from a nearby topsoil deposit, [506], and a sherd of Nene Valley colour-coated ware from area Reach 12.

5.4 The Post-Roman Pottery by Luke Barber

Introduction

5.4.1 The archaeological work recovered 195 sherds of post-Roman pottery, weighing 9,335g, from 31 individually numbered contexts. Of these contexts three were from the evaluation and two can be considered unstratified. The overall assemblage is of variable condition with a great range of sherd sizes. Although the general trend is toward medium sized sherds (i.e. up to 60mm across) larger sherds are also present (i.e. to over c. 200mm) which increase the average sherd weight considerably. The average sherd sizes by period are shown in Table 4. Most of the pottery is in reasonably good condition and most sherds are fresh and unabraded regardless of their size. As such most sherds do not appear to have been subjected to extensive reworking once deposited.

5.4.2 The assemblage has been fully quantified (number of sherds/weight/estimated number of vessels) by fabric and spot dated for archive. Notes on form and decoration have also been made for all sherds. The results of this work have been input onto an Excel table. At the time of assessment only very basic context data was available and no site grouping/phasing had been undertaken.

5.4.3 The whole assemblage is of the post-medieval period – there are no Saxon or medieval sherds present. Although a 16th- century date cannot be ruled out for some sherds all diagnostic pieces point towards a mid/later 17th-century start for the assemblage overall. The site assemblage is characterised at a basic level in Table 5 in order to give a rough idea of quantities and diversity of wares by period.

Period	No./weight	Average sherd size	No. of different ware groups	Approx. No. of contexts dated to each period (excludes unstratified/ mixed contexts and intrusive/ residual material)
Early post-medieval Mid C16th – mid 18th	89/2251g	25.3g	Local - 3 Regional - 3 Imported - 5	14
Late post-medieval Mid/late C18th – mid C20th	106/7084g	66.8g	Local - 1 Regional - 9 Imported - 1	15

Table 5: Characterisation of pottery assemblage by period. NB. Totals include all residual/intrusive and unstratified material. Local equates to Kent wares; Regional to other English wares.

5.4.4 Overall the date range of the pottery from the site spans the mid/later 17th to early 20th centuries with peaks of activity between c. 1675 and 1750 and c. 1780 and 1830.

Early post-medieval: mid-16th to mid-18th centuries

5.4.5 The early post-medieval assemblage was recovered from a number of areas: T2 of the evaluation and Reaches 1, 4 and 5 of the main work. Quantities within these areas consist of 2/82g, 1/12g, 52/1822g and 29/157g respectively (the remaining sherds being unstratified). Clearly the most intense early activity was unsurprisingly along the town frontage.

5.4.6 Local wares consist of a notable scatter of fine sandy red earthenwares (31/503g) but the isolation of these is not easy on the current site due to the presence of Dutch Redwares in some numbers in fairly similar fine sandy fabrics (see below). It is almost certain that some Dutch sherds that lack surviving diagnostic elements may have been included within this group. Overall a standard range of domestic forms is present including plates, bowls, jars and jugs with D-club, tapering and collared rims. A number of vessels show signs of use (sooting) and all can be placed within a c. 1650-1750 date range. There is also a dish with bulbous club rim that has a simple zig-zag decoration of trailed slip around its edge from context [629] and a single sherd of oxidised fine hard-fired earthenware (unstratified).

5.4.7 English regional wares include a few sherds of black-glazed red earthenware with marl streaking that are probably from the midlands or Buckley industries (3/52g). Vessels include a bowl, tankard and cup. There are two sherds of green glazed white Border Ware from the Surrey/Hampshire border (42g), both from Reach 4 (contexts [693] and [762]) and 12 sherds (628g) from 18th- century London stoneware bottles with iron wash and salt glaze (Reach 4: contexts [629] and [630]). Staffordshire products include a 36g sherd from a dish with cogged wheel design in slip (context [629]) and single sherds from a saucer, tea bowl and plate in early/mid-18th- century white salt-glazed stoneware (all context

[629]). Overall these regional wares make up 23.6% of the early post-medieval assemblage.

5.4.8 Imported wares are well represented and appear to constitute a very significant 39.3% of the early post-medieval assemblage by sherd count (more if some of the local redwares prove to be Dutch). Dutch wares dominate, particularly the fine/medium sandy redwares with their lustrous glazes (19/304g). Bowls, pipkins, cauldrons, jars and plates are represented and again a number show signs of use. Rims range from simple to everted, hooked and expanded. There are four sherds from North Holland cockerel bowls with white trailed slip decoration (Reach 4: contexts [686], [762] and [763]) and a Dutch greyware jar with thickened burnished rim (Reach 4: context [693]). Dutch whitewares are also represented with green and clear glazed plates and a bichrome vessel of uncertain form (Reach 4: contexts [693], [763], [765] and [796]). There are also two sherds (40g) from Dutch-type tin-glazed plates (contexts [762] and [763]). German wares are less well represented but include two sherds of Frechen stoneware bottle (Reaches 1a and 4) and two sherds of Westerwald stoneware, (50g) both from Reach 4, including part of a tankard from context [630]. The most exotic sherd consists of a single piece from a bowl in North Italian marbled slipware (124g, Reach 4, context [762]) though this type has been found at Sandwich before (Cotter 2000a).

Late post-medieval: mid-18th- to mid-20th centuries

5.4.9 The late post-medieval assemblage was recovered from Reaches 2, 3, 4, 5 and 8-11. Quantities within these areas consist of, 5/1242g, 2/76g, 84/5330g, 3/22g and 4/32g respectively (the remaining sherds being unstratified). Clearly the most intense early activity was again along the town frontage.

5.4.10 Activity mainly relates to the later 18th to early 19th centuries, with a scatter of later pieces that stretch into the early 20th century. By far the largest and most interesting group was recovered from Reach 4, context [629]. As well as the 15 sherds (456g) of early post-medieval pottery, most of which may well have still been in contemporaneous use in the late 18th century, the deposit produced 70 notably large and fresh late post-medieval pottery (4952g) suggestive of a c. 1780-1820 date range (with a little intrusive later material). Coarsewares in this group include a 36g sherd from an unglazed earthenware flowerpot, part of a glazed red earthenware jar (2/510g) and the large part of three Midlands/Sunderland slipware bowls (38/3984g). The latter are of interest in that they show a diversity of form/rims not often seen together. Finewares in [629] are dominated by fresh conjoining sherds of creamware (21/184g) from four bowls, two tea bowls and three plates, together with a little pearlware (5/110g). The latter includes part of a plate with Wild Rose pattern by Samuel Barker and Son of the Don Pottery, Swinton, Yorkshire (c. 1851 to 1893) that is possibly an intrusive piece alongside a couple of sherds of blue transfer-printed whiteware.

5.4.11 Other areas produced much less pottery of this period. Of note is the complete Seltzer stoneware bottle from context [46] (Reach 2: 1/1206g), but the remaining sherds consist of a scatter of later 19th- to early 20th-

century refined whitewares and transfer-printed wares thinly spread between reaches.

The Assemblage

5.4.12 The majority of the ceramic assemblage was derived from layers and a scatter of cut features. The assemblage is totally dominated by small context groups: that from context [629] (85/5408g) being by far the largest. The next largest being a mere 26 sherds (124g) from Reach 5, context [210]. With the exception of a few of the smaller early post-medieval groups there appears to be a low to moderate degree of residuality or intrusiveness in many context groups, particularly when other material categories such as glass are taken into consideration. Despite this the pottery can be combined to form useful and reliable chronological snapshots of wares at different times at least within Reaches 4 and 5.

5.5 The Ceramic Building Material by Isa Benedetti-Whitton

Introduction

5.5.1 A total of 245 fragments of ceramic building material (CBM) weighing 45,422g were hand-collected from sixty contexts, including 52 excavation contexts and nine evaluation contexts. A further 117 CBM pieces weighing 3,316g were extracted from environmental samples <1>, <2>, and <3>, respectively from contexts [210], [216] and [574]; this material will be considered separately to that collected during the excavation. A broad range of material was recovered from Sandwich, ranging in date from the Roman to the post-medieval period. A breakdown of CBM by form type is provided in Table 6.

Roman material				
CBM form	**Quantity**	**% of total**	**Weight (g)**	**% of total**
Tegula	4	1.1	300	0.6
Imbrex	2	0.5	114	0.2
Roman brick	1	0.3	605	1.3
Subtotal:	7	1.9%	1,019g	<0.0%
Post-Roman material				
CBM form	**Quantity**	**% of total**	**Weight (g)**	**% of total**
Roof tile	126	34.1	9502	19.9
Brick	63	17.1	29491	61.8
Spall	18	4.9	394	0.8
Pipe/drain	9	2.4	945	2.0
Floor tile	7	1.9	1579	3.3
Pantile	6	1.6	1656	3.5
Mortar (lime)	3	0.8	106	0.2
Wall tile	2	0.5	93	0.2
Salt-glaze pipe	2	0.5	284	0.6
Asbestos	1	0.3	n/a	0.0
Cement	1	0.3	182	0.4

Chimney	1	0.3	171	0.4
Subtotal:	245	66.4%	44,403g	93.1%
CBM from environmental samples				
CBM form	Quantity	% of total	Weight (g)	% of total
Roof tile	19	5.1	282	0.6
Brick	28	7.6	2594	5.4
Mortar	28	7.6	87	0.2
Floor tile	2	0.5	159	0.3
Spall	40	10.8	194	0.4
Subtotal:	117	31.7%	3316g	6.9%
Total	369	100.0%	47,719g	100.0%

Table 6: Comparative quantities and weight of CBM by form

Methodology

5.5.2 All the material was quantified by form, weight and fabric and recorded on standard recording forms. This information was then entered into a digital Excel database. Fabric descriptions were developed with the aid of a x20 binocular microscope and use the following conventions: frequency of inclusions as sparse, moderate, common or abundant; the size of inclusions as fine (up to 0.25mm), medium (up to 0.25 and 0.5mm), coarse (0.5-1.0mm) and very coarse (larger than 1.0mm). Fabric samples of the fabrics and items of interest have been retained.

Fabrics

5.5.3 A total of forty fabrics were identified across the CBM assemblage: eighteen brick fabrics (Appendix 7); fifteen roof tile fabrics (Appendix 8); three floor tile fabrics (Appendix 9); and four Roman fabrics (Appendix 10). Three Museum of London (MoL) brick fabrics were included within the eighteen brick fabrics, MoL 3032, MoL 3034 and MoL 3035; fabrics were not recorded for the fragments of drain, pipe or chimney pot included in the assemblage.

5.5.4 There was a considerable amount of diversity amongst fabrics, but some do appear to be similar enough to form groups that may indicate common clay sources. For example B1, B1A, B6 and B6A were all pale, pink-toned calcareous fabrics, and are likely to be medieval in date. Brick fabrics B8 and B8A were also very similar, the principal distinguishing feature being the much darker tone of B8, although this may be related to the firing process. B8 and B8A are also medieval fabrics.

5.5.5 Other fabrics that have been more tenuously dated based on the characteristics of the fabric, form of the CBM or association with more easily dated items are T1 and T2, which are believed to be either late medieval or early post-medieval fabrics; T3-T3C, which are similar also to B8/B8A and are likely to also be medieval in date. B5 and B5A are very similar fabrics, but the brick forms distinctly different, and B5A is thus believed to be the later post-medieval version of B5A, although likely a

common or very similar clay source was still being utilised. The Roman fabrics were all identified based on the forms of the relevant CBM. They were all fairly distinctive and dissimilar from the medieval and post-medieval CBM fabrics.

5.5.6 Five bricks were in fabric types included in the Museum of London typology, all of which were post-Great Fire types, and the bricks forms were indicative of a c.18th-19th century date. These were recovered from contexts [1], [2], [541], [575] and [631]. Bricks in a mid-19th century or later heat-compressed brick fabric were also recovered from [2] and [216], and a machine-made tile in fabric T7 from context [762]. These items – alongside the miscellaneous chimney, drain and pipe fragments (see below) – probably represent the most recent material from site; the brick piece from [216] had a large quantity of cement still attached, indicating a later 19th century or modern date, when cement became more widely used.

Roman brick and tile

5.5.7 Only a small quantity of Roman material was collected. Six pieces (four tegula and two imbrex fragments) from context [508], and a single piece of Roman brick from [524]. All the Roman material was in a state that suggests it was residual in these contexts; only one tegula fragment in fabric R2 had both an intact flange and lower cutaway.

Medieval and post-medieval roof tile

5.5.8 Three forms of roof tile were present: 124 medieval or post-medieval flat tile fragments, several with peg holes indicating them to be peg tiles; six s-shaped pantiles; and a single piece of machine-formed tile (T7) from [762]. Peg tiles are often difficult to date specifically as their form varies very little between the 14th and the 18th centuries. Peg tile was collected from 38 contexts. Much of this tile is believed to be of medieval date, although later re-use is possible and evidenced in some instances by the presence of both earlier lime mortar and later cement mortar on tile fragments (e.g. tile fragments from 'Reach 5'). There were at least two different peg hole styles in evidence – round holes and square-shaped – although there was no apparent correlation between peg hole type and fabric type. Within the group of tiles with round peg holes there was some variation in size, but not enough fragments with holes intact to establish if this was incidental.

5.5.9 The six pantile pieces were collected from contexts [629], [690], [763] and 'R5'. The fragment from 'R5' had cement mortar on both intact and broken edges, suggesting it was re-used as hard-core or similar in the 19th-20th century.

Medieval and post-medieval brick

5.5.10 Sixty-three brick pieces were recovered from 25 contexts, amongst which [216], [629] and [630] were the most fruitful, collectively producing nearly 40% of the whole brick assemblage for this site. Medieval bricks were the most common across the assemblage and were identified based on their fabric types and their generally small size, with a thickness of 50mm or less and a width of 110mm or less, although there was one unusually

broad medieval brick with a width of 130mm recovered from [630], and thicker example at 60mm from [22]. The surfaces of the medieval brick were often much creased and one example showed burnt-out chaff inclusions.

5.5.11 Eleven of the 33 medieval brick fragments had remnants of mortar on them. The white and occasionally sandy lime mortar present on the bricks from contexts [541], [630], [617], [692], [763], and [765] possibly represents the original, medieval mortar. A grey-coloured lime mortar with common very coarse charcoal inclusions is likely to be later, and is likely to indicate post-medieval re-use of older bricks; this mortar type was found on bricks from contexts [17] and [629]. Another piece of broken B2 brick from [629] was fully coated in cement mortar, which is definitely later than the brick, and evidence of medieval brick re-use as later as the latter 19th century.

5.5.12 The remaining 30 brick fragments (including several highly fragmented 'spall' pieces) were all deemed post-medieval or modern. The later bricks were all thicker, between 60-70mm thick, and more sharply formed. Frogged bricks were collected from contexts [1], [25], [575], [630] and [631], including examples in later post-medieval London fabrics MoL 3032 and 3035, both of which were very common stock brick types from the 18th-19th centuries.

Medieval floor tiles

5.5.13 Seven fragments of floor tile – all believed to be medieval in date – were collected from six contexts: [24]; [29]; [120]; [437]; [541]; and [629]; context [541] was the only context to produce more than a single tile fragment. Three discrete fabric types were noted (see Appendix 9), although of these FT3 was the most common, accounting for five of the seven tile pieces.

5.5.14 None of the floor tile was intact enough for dimensions other than thickness to be taken, and ranged from 24-32mm. Fragments from [29], [541] and [629] all had intact knife-trimmed edges, which aided their identification as floor tiles; another from [24] had a lateral linear impression along one edge, evidence of how the tile had been stacked either during the leathering or firing process. The tile from [629] was the only tile to show evidence of being glazed, with the remains of a yellow glaze still intact. 'Plain-glazed' tiles of this type were used between the 14th and 16th centuries, and initially imported from the Low Countries (McComish 2015, 35), although the red, micaceous fabric of the Sandwich example is more typical of British tiles.

Post-medieval tin-glazed wall tile

5.5.15 Two pieces of tin-glazed ('delftware') wall tile were recovered, one each from contexts [545] and [762]. Tin-glazed tile was originally imported from the Netherlands from the mid-17th century, until British production started in the 18th century (Smith 1999, 153). Both tiles depict figural scenes; the fragment from [545] featuring a shepherd with his flock on an otherwise blank background with a partial 'spiders-head' corner motif, and the piece from [762] a male figure with sword, encircled within roundel. Both these design types are associated with Dutch-produced tile of the later 17th

century, as is the spiders-head corner motif (Wilcoxen 1987, 71; Tyler et al 2008, 97).

Other

5.5.16 Also included in the assemblage were loose pieces of cement and lime mortar, the former unstratified, and the latter from context [629]. A single fragment of chimney pot was collected from context [765], and nine large ceramic drain pipe pieces from contexts [524], [539], [541], [545], [550], [573] and one from an unstratified context, none of which can be dated with precision but appear late post-medieval-modern. The two salt-glazed pipe pieces, recovered from contexts [3] and [541], are of 19th century date, and also of recent date was a single scrap of asbestos from [631], which was disposed of with no analysis.

CBM from environmental samples

5.5.17 CBM was recovered from three environmental samples: <1>, <2> and <3>, respectively collected from contexts [210], [216] and [574]. In all cases the CBM recovered from the environmental samples is far greater than the CBM recovered on site. Sample <1> produced 51 pieces of CBM – compared to only three fragments retrieved during excavation – much of which was spall but fragments of B5 and B6 were also present, as were two fragments of medieval floor tile in FT3. A number of lime mortar fragments were also included in this sample.

5.5.18 Forty-five pieces of CBM were recovered from sample <2> (in addition to nine excavated fragments from [216]). Nearly half of this was pieces of sandy lime mortar and the rest was brick fragments. Fabrics were examined by eye and only some pieces of B3 brick could be identified conclusively.

5.5.19 No CBM was recovered by hand from context [574], and the 21 fragments collected from the environmental sample were too broken to assess fabric type and in some instances form. Approximately eleven of the fragments of CBM from sample <3> are believed to be brick spall, and the remainder tile spall.

5.6 **The Clay Tobacco Pipe** by Elke Raemen

Introduction and methodology

5.6.1 A medium-sized assemblage comprising 68 fragments of clay tobacco pipe (weight c. 420g) was recovered from 14 different contexts spread across four different Reaches, although the majority was recovered from deposits in Reach 4 (near Strand Street). Most material dates to the second half of the 17th century, although 18th- and 19th-century material was also included. Bowls and stems are mostly unabraded, suggesting little reworking took place.

5.6.2 Pipes were recorded following guidelines as set out by Higgins and Davey (2004). Bowls were principally classified according to the London "Chronology of Bowl Types" (prefix AO) by Atkinson and Oswald (1969, 177-180), complemented by the 'Simplified General Typology' (prefix OS,

Oswald 1975), to refine dating of the 18th-century clay pipes. Marked, decorated and/or imported pipes were assigned accession numbers (CP <1>-<10>). All pipe data has been transferred onto digital spreadsheet.

Summary of the assemblage

5.6.3 The assemblage comprises 16 bowls and bowl fragments, four mouthpieces and 48 stem fragments. Most bowls are complete or near complete. The earliest bowls, totalling five examples recovered from Reach 4 (deposits [762], [763], [764] and [765]), comprise Dutch bowls dating to the second half of the 17th century. Several contain a mark based on the Tudor Rose (Atkinson 1972, 177) moulded in relief on the bowl sides, and one displays what looks like a bunch of grapes on the bowl sides. None of the bowls contain further maker's marks. The Dutch bowls are of mediocre quality, and although they are burnished and most have a bottered rim, they are not finely finished.

5.6.4 English 17th-century bowls comprise three type AO18 bowls, recovered from deposits [522] (Reach 12), [762] and [765] (both Reach 4), dating to c. 1660-1680. Bowls of 18th-century date were present as well, including four type OS12 bowls, dating to c. 1730-80. Three of these contain maker's marks moulded in relief on the heel sides. Deposit [629] (Reach 4) contained a bowl with initials 'TW' (CP <3>) and one with initials 'I?C' (CP <2>). A second example with initials 'IC' or IG' (CP <6>) was found in rubble layer [762]. Although forms are the same, bowls are from two different moulds. Another OS12 bowl with these initials ('IC' or 'IG') was recovered at previous excavations at Sandwich Castle (Cotter 2000b, 70). The presence of several of these pipes across different locations strongly suggests them to be from a local maker.

5.6.5 Only two bowl fragments of later date were recovered, including a fragment from a type AO27 bowl (c. 1780-1820) with fluted decoration and dots moulded in relief on either side of the seam (CP <1>). The piece was recovered from buried topsoil [27] (Reach 2).

5.6.6 Stems fragments recovered range in date from the earlier/mid-17th-century through to the 19th century. None are marked or decorated. A few 17th-century examples are burnished and are likely to derive from Dutch pipes. Four mouthpieces were also recovered, including two pieces dating between c. 1750-1910 ([472] and [629]). Both are straight cut simple tips. Two earlier pieces were also recovered, both from deposit [763] (Reach 4) and dating to c. 1680-1750. One is a straight cut piece, whereas he second appears to have been fashioned with a knife, probably by the pipe owner after the original mouthpiece broke off.

5.7 The Glass by Luke Barber

Introduction

5.7.1 The archaeological monitoring recovered a relatively large assemblage of glass from the site: 110 pieces weighing just over 11.5kg, from 24 individually numbered contexts. Some 76 different vessels are represented. The assemblage, which reflects a hand-collected sample, includes a large proportion of complete vessels, all of which are of late

19th- to mid 20th- century date. Some early post-medieval glass is also present but with one exception this normally consists of much more fragmentary and heavily corroded shards. The assemblage has been fully listed on pro forma for the archive as part of the current assessment. This contains specific details about each type of vessel, its full embossing details and variations in dimensions and weight. This information has been reproduced here as Appendix 11. The functional breakdown of the late post-medieval assemblage is given in Table 7. A general overview of the assemblage is given here, but detailed work on the branded bottles has not been undertaken as part of the current work.

Early post-medieval

5.7.2 Just 17 shards of glass (1840g) are allocated to this period, spanning the later 17th to mid/later 18th centuries. All was recovered from Reaches 4 and 5. On the whole condition is not good, with most pieces showing extensive signs of corrosion, including significant surface flaking. Some shards are clearly residual in later deposits (e.g. the late 17th- to early 18th- century wine bottle fragment in 19th- century context [617]) whereas sometimes they may represent old bottles in contemporaneous use (e.g. the large part of the early/mid-18th- century mallet-shaped wine bottle in context [629]). However, most pieces derive from apparently contemporary deposits of the later 17th to early 18th centuries.

5.7.3 The early post-medieval assemblage is dominated by wine bottles in dark green/black glass (8/1534g) and include a couple of onion bottle fragments (contexts [762] and [763]). There is also a 24g fragment from a very large vessel in dark green glass that may have been used for storage (context [763]). The remaining pieces are small and from a variety of cylindrical and square bottles or other vessels. Unfortunately pieces are too small to be certain of function/form in all instances.

Late post-medieval

5.7.4 Although there is a scatter of bottles that are of later 18th- to later 19th-century date these tend to be small isolated fragments, representing a background waste scatter, mainly associated with the consumption of wine/beer. The vast majority of vessels, including all complete examples, are of the later 19th to mid-20th centuries, concentrating on a range of around 1920 to 1950. This group was recovered from Reaches 2 and 15 and presumably represent some form of organised refuse disposal/dumping. Full details of all the bottles are listed in Appendix 11, but the assemblage of complete, or very near complete, vessels is summarised in Table 7 by function.

General Type	Specific Type	Estimated Number of Vessels
Drink Alcoholic	Wine/Beer	1
Drink Alcoholic	Spirit	1
Drink Non-alcoholic	Mixer	1
Drink Non-alcoholic	Mineral water	1
Drink Non-alcoholic	Hot beverage	3
Drink Non-alcoholic	Cordial	2
Food	Preserves etc	3
Food	Meat pastes	9

Food	Sauce	4
Household	Medicine	5
Household	Uncertain	3
Household	Light shades	2
Household	Ink	1
Cosmetic	Brylcreem	1
Serving	Tumbler	1
Total		43

Table 7: Breakdown of late post-medieval near complete glass vessels by probable use.

Alcoholic Drinks

5.7.5 These are not common amongst the near complete/complete vessels – the majority consisting of more fragmentary pieces (35/2514g). Unmarked beer bottles appear to make up the majority, though one Sandwich brewer (illegible) is represented (context 1/008]). The miniature French spirit bottle and the 'Ozonic' mixer are the only other types present

Non-alcoholic Drinks

5.7.6 Mineral waters and cordials are well represented, though the former only by more fragmentary bottles: the remains of two Hamilton bottles of the Sandwich-based East Kent Mineral Water Company from Reaches 2 (context [27]) and 3 (unstratified). The only Eiffel Tower lemonade bottle, of late form, was recovered from context [46] (Reach 2).

5.7.7 Hot beverages are present in the form of the 2oz and 4oz Oxo bottles (which could equally be used for cooking/gravy) (both unstratified), the Camp Coffee (Reach 2, context [27]) and the Horlicks jar (Reach 2, context [46]).

Food

5.7.8 Food containers are well represented, particularly meat pastes which were obviously popular. A number are embossed with the Shippam's brand name but most are plain, beyond their ribbed bodies, with unribbed areas to take the paper labels. There is a scatter of preserve jars for jams etc but as is usual, none of these carry a maker's embossing. The other type of food represented is sauces, though only a single Heinz bottle carries a manufacturer's loco (though whether tomato sauce or salad cream were involved is uncertain).

Household

5.7.9 A few bottles, uncertain of original contents, have been included in this group – they probably held polishes and other cleaning products though other medicinal uses cannot be ruled out. The single vessel that is clear as to function is the Watermans' bipartite ink bottle from Reach 2, context [46]. There are also parts of two lampshades in frosted and milk glass, as well as part of a bicycle rear reflector.

Medicines

5.7.10 A notable selection of medicine bottles is present in the assemblage. Two identical chemist's bottles (Woodward, London) were recovered (unstratified and context [46]) as well as a plain example with teaspoons gradations on it (unstratified). The Sanizal bottle from context [46] has tablespoon gradations and is probably a disinfectant that could equally be used for cleaning.

Serving

5.7.11 A single clear glass tumbler is the only vessel specifically for consumption within the assemblage (Reach 5, context [333]).

5.8 The Geological Material by Luke Barber

Introduction

5.8.1 The excavations recovered 5259g of stone from 15 individually numbered contexts. This total consists of 4157g (22 individual pieces) of hand-collected material with the remainder being derived from one of three environmental residues. The vast majority of stone was recovered from Reaches 4 and 5. The assemblage has been fully listed by context and type on geological material pro forma sheets, which are housed with the archive. The information from these has been used to create an Excel database for the digital archive.

5.8.2 The current assessment represents an overview of the stone by type and provisional spot date – at the time of assessment the site grouping and phasing had yet to be completed. Although some deposits could chronologically shift a little during final analysis this is considered unlikely at the present site. As such the current overview is considered to be a reliable guide to the main trends and allows an informed assessment of potential.

Reach 1a

5.8.3 A single piece (88g) of Septaria (from the London clay) was recovered from undated context [508].

Reach 3

5.8.4 A 134g fragment from a 26mm thick slab of Carrara marble was recovered from mid 19th- to early 20th- century context [14]. This probably originated from a wash-stand top or similar, though an oblique partially sawn cut suggests it may be an off-cut or re-used.

Reach 4

5.8.5 This area produced 3845g of stone from one of six contexts. The earliest material consists of two large pieces of coal (754g) from context [763] that are associated with pottery dated to c. 1675-1725. Late post-medieval and undated contexts produced a scatter of coal (490g), Welsh slate (110g – including part of a sawn furniture top slab from [573]) and Bethersden

marble (1/2500g). The latter is from a 46mm thick polished slab from 19th-century fill [617] though it could be a residual piece.

Reach 5

5.8.6 This area produced 441g of coal, most of which came from context [210], broadly dated to between c. 1550-1700 by the ceramics (though a 17th-century date is more probable), and undated contexts [216] and [258]. The same deposits (including undated context [254] also produced 450g of coal shale, much of which appears to have been partially burnt.. Although no Welsh slate was recovered 25 residual pieces of West Country roofing slate (268g) were recovered from the residue from context [210].

Evaluation and unspecified reaches

5.8.7 The remaining assemblage consists of a couple of pieces of iron-pan from the evaluation and a piece of chalk from of no interest.

5.9 The Metallurgical Remains by Luke Barber

Introduction

5.9.1 The excavations recovered 8238g of slag from 11 individually numbered contexts. This total consists of 1205g (21 individual pieces) of hand-collected material with the remainder being derived from one of four environmental residues. The vast majority of slag was recovered from Reach 5, which produced 1797g – although Reach 4 produced 5639g all but 1g of this is in fact iron concreted silts rather than actual slag. The assemblage has been fully listed by context and type on metallurgical pro forma sheets, which are housed with the archive. The information from these has been used to create an Excel database for the digital archive.

5.9.2 The current assessment represents an overview of the slag by type and provisional spot date – at the time of assessment the site grouping and phasing had yet to be completed. Although some deposits could chronologically shift a little during final analysis this is considered unlikely at the present site. As such the current overview is considered to be a reliable guide to the main trends and allows an informed assessment of potential.

Reach 3

5.9.3 Just two pieces of slightly vitrified clinker from coal burning were recovered from context [14], spot dated to c. 1850-1925 (142g).

Reach 4

5.9.4 Virtually all of the material from this reach consists of iron-concreted silts, which incorporate flint pebbles, shells and fragments of iron (notably pieces of wire). Most was recovered from the residues from undated context [574] (5438g), but a 200g lump was recovered from context [617], dated to the 19th century (though with residual early post-medieval material also present). A very small quantity (5-10 spheres) of hammerscale from iron smithing was recovered from [574].

Reach 5

5.9.5 The only dated deposit to produce slag from this reach was layer [210], with broadly dated pottery of c. 1550-1700. This is the earliest dated slag from the work. Three pieces of fuel ash slag (15g), probably from coal burning were hand collected, with the remainder coming from the environmental residue. The latter consists of 3g of fuel ash slag, 98g of matt black aerated clinker (both from coal burning) as well as significant quantities of hammerscale (3g: c. 100-150+ flakes). The other slag-producing contexts did not contain any datable pottery, glass or clay pipe but, judging by the slag, are clearly of post-medieval date (contexts [216], [254], [258] and [317]). Combined these produced 1091g of fuel ash slag, 314g of clinker and 9g (200+ flakes and 200+ spheres) of hammerscale from iron smithing. It would appear the waste derived from a coal-fired smithy, possibly of 17th- to 18th- century date. The reach also produced 10g of magnetic fines (burnt silt and sand stones) and 254g of unsorted residues (which contained similar fuel ash and clinker granules).

Unspecified Reaches

5.9.6 A small group of material (660g) was recovered from unstratified contexts or those not allocated to reach. These are essentially the same as previous examples, consisting of fuel ash slag and clinker, though three pieces (532g) of undiagnostic iron slag (probably smithing) were recovered from a bag labelled ‘upper fill’.

5.10 The Bulk Metalwork by Susan Chandler

5.10.1 A total of 109 iron objects were collected during the works on site, weighing a total of 12448g. The ironwork is in a poor condition, largely corroded and incomplete or fragmentary parts of objects. The assemblage includes 50 nail or nail fragments, weighing 1522g. Largely the nails are stem sections though in some cases both square and round heads survive. No significant groupings of nails were recovered and it is likely they are relatively modern in date. Shell splinters were recovered from eight contexts, all of which are derive from splinters of anti-aircraft shells from the Second World War period. The remaining iron assemblage is largely undiagnostic, with fragments of binding, bar and plate being the most common find.

5.10.2 Further to the iron objects, a single unstratified copper alloy nail weighing 14g was collected. This has round, slightly domed head and square stem and is typical of the types of nails used in the construction of small boats.

5.11 Miscellaneous other finds by Linzi Harvey

5.11.1 A single fragment of decorative plasterwork was recovered from site, from context [693]. White in colour with a few small inclusions, this measured 65 x 60mm and was broken on three sides. It is likely to have formed part of a ceiling cornice length. Cornices are architectural devices to cover structural joins between the wall and ceiling. This fragment would have originally been part of more extensive decorative plasterwork in a well-appointed interior. Stylistically this architectural fragment may date to the mid-18th century or later.

5.12 **The Animal Bone** by Gemma Ayton

5.12.1 A small assemblage of animal bone containing 254 hand-collected fragments has been retrieved from 32 contexts. A further 120g of animal bone was retrieved from whole-earth samples. The animal bone has been collected from features which have been spot-dated to the Late-Roman and Post-medieval periods.

Methodology

5.12.2 The assemblage has been recorded onto an Excel spreadsheet in accordance with the zoning system outlined by Serjeantson (1996). Wherever possible the fragments have been identified to species and the skeletal element represented. Elements that could not be confidently identified to species, such as long-bone and vertebrae fragments, have been recorded according to their size and identified as large, medium or small mammal. Bones have been measured according to von den Driesch (1976), the assemblage does not contain any recordable mandibles (those with two or more teeth in-situ). The bulk of the fish bones have been identified to family at this stage with the occasional specimens identified to species to provide a broad sense of the range of fish families represented.

The assemblage

5.12.3 The animal bone is in a moderate state of preservation showing minimal signs of surface erosion and with a small quantity of complete bones remaining. The bulk of the material derives from features that are, as yet, undated though further stratigraphical analysis may place these contexts within specific time-frames (Table 8)

	Total No. Fragments	NISP
Prehistoric	2	2
Later Roman (c.AD300-410)	8	8
Mixed (Med/Post-medieval)	16	16
Post-medieval	37	36
Undated	191	148
Total	254	210

Table 8: Total number of fragments and NISP (Number of Identified Specimen) counts by period

5.12.4 The hand-collected assemblage is dominated by domestic taxa including cattle, sheep/goat, pig and horse. Cod is the only wild taxa represented in the hand-collected assemblage (Table 9).

	Prehistoric	Later Roman (c.AD300-410)	Mixed (Med/Post-medieval)	Post-medieval	Undated

Cattle		2	3	6	14
Sheep/Goat	1	4	7	9	103
Pig			1	4	2
Horse	1		1		1
Large Mammal			1	10	26
Medium Mammal		2	3	6	2
Cod				1	
Total	2	8	16	36	148

Table 9: NISP counts by phase and by taxa

5.12.5 Whole-earth samples produced a further 120g of bone, the majority of which derive from sample <1>, context [210], a post-medieval dump. Just 50% of the smaller residue has been sorted at this stage, a quick scan of the bone retrieved reveals the presence of anuran, cod, haddock, ling, flat-fish, eel and haddock. Cod is represented by both cranial fragments and vertebrae indicating that whole fish were brought to site.

5.12.6 The greatest concentration of animal bones was found in undated context [599] which contained the articulated remains of a near-complete sheep/goat skeleton represented by 101 bones in total. The bones were in a good condition, no evidence of butchery was observed and the skeleton had not yet reached maturity with a number of bones still unfused. Given the evidence it is likely that these remains represent a diseased animal and are relatively modern in origin.

5.12.7 A total of five measurable bones were recovered and the biometric data is presented in Table 10.

				Measurements (mm)					
Context	Period	Taxa	Element	GL	Bd	Bp	SD	GLI	LI
29	Prehistoric	Horse	Metacarpal	264	60	62	39	253	
1/008	Mixed	Sheep/Goat	Radius	154	29	31	16		
68	Undated	Cattle	Tibia	373	73	117	47		335
68	Undated	Cattle	Radius	313		95	50		
2/020	Undated	Horse	Metacarpal	208	42	46	29	203	198

Table 10: Biometric data in mm, measurements are taken in accordance with von den Driesch (1976)

5.13 **The Shell** by Susan Chandler

5.13.1 In total 31 shells or shell fragments were collected during the works on site, weighing a total of 1011g. Mainly, the shells are Ostrea edulis, with 21 of the shells being this species. The remaining shells include a single Mytilus edulis, 2 Nucella lapillus and 7 Cerastoderma edule. All of these species are common in British coastal waters and are common in the human diet from prehistory, though due to the small numbers (the shells largely being found individually) it is not possible to say if they are waste from consumption or natural occurrences given the costal location of the site.

5.14 Registered Finds by Susan Chandler with Justin Russell and Trista Clifford

5.14.1 A total of 55 registered items were recovered during the works on the Sandwich tidal defences. They have been given registered finds number, RF <0> and recorded on pro forma forms as per standard. The entire assemblage is post medieval, with the main body of objects being WWII era cartridges. Due to their relatively modern nature it has been possible to get dates for most of the objects; the year of filling is stamped on the base of the cartridges as part of their manufacturing process. The legibility this varied depending on the condition each object, where it is not possible to read the stamping on the cartridge they have been given a general WWII era date. All of this information is recorded in the Table 11. It is also possible to identify the factory that filled the cartridge, and what the cartridge would have been for, this is discussed below.

RF No.	Context No.	Description	Material	Date
1	542	Cassette tape	Composite	1996
2	Unstratified	Toy gun	Metal	1980s
3	Unstratified	Mortar part	Aluminium	WW2 era
4	46	Cartridge	Copper Alloy	1941
5	46	Cartridge	Copper Alloy	1940
6	46	Cartridge	Copper Alloy	1940
7	46	Cartridge	Copper Alloy	1940
8	46	Cartridge	Copper Alloy	1940
9	46	Cartridge	Copper Alloy	WW2 era
10	46	Cartridge	Copper Alloy	WW2 era
11	46	Cartridge	Copper Alloy	1943
12	46	Cartridge	Copper Alloy	1940
13	46	Cartridge	Copper Alloy	WW2 era
14	46	Cartridge	Copper Alloy	1940
15	46	Cartridge	Copper Alloy	1940
16	46	Cartridge	Copper Alloy	WW2 era
17	46	Cartridge	Copper Alloy	WW2 era
18	46	Cartridge	Copper Alloy	WW2 era
19	46	Cartridge	Copper Alloy	1940
20	46	Cartridge	Copper Alloy	WW2 era
21	46	Cartridge	Copper Alloy	1940
22	46	Cartridge	Copper Alloy	1943
23	46	Cartridge	Copper Alloy	1940
24	46	Cartridge	Copper Alloy	WW2 era
25	46	Cartridge	Copper Alloy	1943
26	46	Cartridge	Copper Alloy	WW2 era
27	46	Cartridge	Copper Alloy	1940
28	46	Cartridge	Copper Alloy	WW2 era
29	46	Cartridge	Copper Alloy	1941
30	46	Cartridge	Copper Alloy	WW2 era
31	461	Cartridge	Copper Alloy	1942
32	461	Cartridge	Copper Alloy	1928
33	461	Cartridge	Copper Alloy	WW2 era
34	461	Cartridge	Copper Alloy	1942
35	461	Cartridge	Copper Alloy	1942
36	461	Cartridge	Copper Alloy	1942

RF No.	Context No.	Description	Material	Date
37	461	Cartridge	Copper Alloy	1928
38	461	Cartridge	Copper Alloy	1942
39	461	Cartridge	Copper Alloy	1941
40	461	Cartridge	Copper Alloy	1942
41	461	Cartridge	Copper Alloy	WW2 era
42	461	Cartridge	Copper Alloy	1940
43	461	Cartridge	Copper Alloy	1942
44	461	Cartridge	Copper Alloy	1939- dec?
45	461	Cartridge	Copper Alloy	WW2 era
46	461	Cartridge	Copper Alloy	1941
47	461	Cartridge	Copper Alloy	1943
48	461	Cartridge	Copper Alloy	1943
49	461	Cartridge	Copper Alloy	1942
50	461	Cartridge	Copper Alloy	1943
51	461	Cartridge	Copper Alloy	1929
52	Unstratified	Whistle	Copper Alloy	WW2 era
53	116	Badge	Copper Alloy	WW2 era
54	333	20mm cartridge	Copper Alloy	1941
55	27	Coin	Copper Alloy	
56	762	Shoe sole	Leather	Post med
57	762	Shoe fragment	leather	Post med
58	762	Shoe sole	Leather	Post med
59	762	Shoe fragment	Leather	Post med
60	762	Shoe fragment	Leather	Post med
61	762	Shoe fragment	Leather	Post med
62	629	Harness fragment	Leather	Post med
63	629	Shoe sole	Leather	Post med

Table 11: Overview of the registered finds

The coin

5.14.2 A copper alloy farthing of George IV minted in 1829 was recovered from context [027] (RF<55>).

The cassette tape

5.14.3 RF <1> is a modern cassette tape of 'Return of the Mack' by Mark Morrison. The tape is black with white lettering, and the track was released in March of 1996.

The toy gun

5.14.4 RF <2> is a toy cap gun made of metal, with the remains of red paint on the grip. It is unbranded, though it is marked 'made in England'. It is most likely to date to the 1980s.

The cartridges

5.14.5 With one exception, the cartridges are all standard .303 round size. The majority of the cartridges, 43 out of 48 have been fired from a Bren gun

(indicated by an ovoid firing pin mark). 4 of the cartridges, RF numbers <34>, <39>, <46>and <49>, have round firing pin marks, indicating they have been fired from a rifle such as a Lee Enfield. One of the cartridges, RF <10> has not been fired. It may be that the Bren gun was part of an anti-aircraft position.

5.14.6 In total, 34 out of 48 cartridges still have legible dates. From these, 30 cartridges date to the 1940s; 12 of the cartridges date to 1940, 4 to 1941, 8 to 1942 and 6 date to 1943. RF numbers <32>, <37> date to 1928 and <51> dates to the 1929s. They are likely from the stockpiles of arms created in the inter-war years. One cartridge, RF <44> is from 1939, marked 12-39, indicating that it was made in December.

5.14.7 The single 20mm cartridge, RF <54> is stamped with the date 1941. No other markings are present to indicate where it was filled, though it has a round firing pin mark from being fired.

5.14.8 The cartridges would have been manufactured and filled separately. No external markings indicate where the cartridges were initially made; the cartridges would be stamped on the base when filled, allowing the correct information to be added. The company responsible for filling the cartridge is represented by a letter code, often the initials of the company. Of the 48 cartridges, 38 still have legible markings indicating where they were filled.

5.14.9 As would be expected, the most common filling location was England. A total of 16 cartridges were filled here, in 5 different locations. These are; 9 from Birmingham, in the Kynoch factory- RF numbers <4>, <6>, <8>, <25>, <27>, <32>, <37>, <42> and <46>, 3 from Blackpool, in the Royal Ordnance factory- RF <17>, <22> and <28>. 2 from either Doncaster or Guiseley in the Crompton Parkinson factories - RF numbers <33> and <47>. Single cartridges are from Greenwood and Batley of Leeds- RF <48> and from the Royal Armoury of Woolwich, RF <51>.

5.14.10 Twelve of the legible cartridges are from Canada. 11 of these are marked DAC (with the C is crossed by three vertical lines) for the Dominion Arsenal in Montreal. These include RF numbers <5>, <7>, <11>, <12>, <14>, <19>, <21>, <23>, <24>, <39>, <50>. These imported cartridges are mainly from 1940 in date, though <39> is from 1941 <11> and <50> are from 1943. One, RF <34> is stamped with the letters DI, for Defence industries, also in Montreal and dated 1942.

5.14.11 A total of 9 of the cartridges were filled in the USA by the Winchester repeating Arms Company of New Haven, Connecticut. These are RF numbers <31>, <35>, <36>, <38>, <40>, <41>, <43>, <45> and <49>. On 7 of these cartridges it is possible to read the date and on all of those it is 1942. It is likely that the 2 examples where the date is obscured are of this date as well.

5.14.12 A single shell, RF<44> was filled in India at the Indian Government ammunition factory in Kirkee. It is marked with KF. There is little to suggest

why this round would have travelled so far without being used, it may have been part of a munitions shipment during the start of the war - as discussed its stamping also indicates that it was made in December 1939.

5.14.13 Two types of round were found. This is determined by part of the information stamped on the base of the cartridges which indicates the matter added into the cartridge. In general the cartridges recovered were standard rounds, stamped with VII or .303 in the case of American-filled examples. 37 of the total 41 cartridges where this information is legible are standard rounds.

5.14.14 The second type of rounds recovered is tracer type rounds, stamped GII. These rounds had a small amount of phosphorous at their base which would glow when fired; allowing the trajectory of the shots to be followed at night, to ensure the aim was true. RF numbers <17>, <18>, <22> and <28> are tracer rounds.

The mortar part

5.14.15 The partial tail of a mortar, RF <3> was recovered unstratified. This is part of a 2 inch mortar tail, with a screw cap at one end. It is incomplete and fairly undiagnostic, meaning it has not been possible to identify what kind of mortar it is from.

The whistle

5.14.16 RF <52> is a copper alloy policeman's style whistle, with a tubular shaped body, two rectangular slots to create the sound, a tapering mouthpiece and rounded terminal with a loop for a suspension chain. It is stamped with 'Patent' on one side but does not have any other manufacturer's marks. It may be contemporary with the cartridges; whistles of this type were used for signalling during WWII.

The badge

5.14.17 RF <53> is a copper alloy uniform badge from the Royal Marines Artillery, in the shape of a cannon ball with flames immerging from it's top. It has two loops for attachment on its reverse. This badge is most likely to be a collar badge; the design was used from the early 1920s on.

The Shoes

5.14.18 Several fragments of shoes were recovered from two contexts; (629) (which also contained the strap discussed below) contained RF<63>, a shoe or boot sole, with heel, which has become detached but does refit. The heel is constructed of layers of leather with iron tacks to secure them. Context (762) contained two further sole fragments, RF <56> which is rather simple, with a line of stitching close to its edges and RF <58> which is slightly larger and includes part of the heel secured by iron tacks or hobnails. The context also contained RF<57>, which is the partial remains

of a Derby or Oxford style shoe toe, RF <61> a fragment with a line of stitching likely to be from a sole toe and two small miscellaneous fragments, RF's <59> and <60>. All of the shoe fragments are most likely to be mid-19th century to early 20th century in date.

The harness fragment

5.14.19 RF <62> is a section of leather strap, most likely from a horse harness. It is 28mm wide, 5mm thick and 410mm long. One end is square with a single central hole, 5mm in diameter, approximately 10mm from the end, suggesting it was cut or is the terminus of the strap. The other end has broken through a hole which was likely for a fastening. There are two more holes, 5mm in diameter arraigned in a single line below the one where the strap has broken. The strap has basic decoration; with two incised, paralleled lines on each edge and evidence two evenly spaced mounts. The mounts have left circular markings on the leather, suggesting disc forms, with two or three tangs to attach them, one of which partially remains in the back of the leather. It is iron. The strap is likely to be post medieval, perhaps mid-19th or early 20th century in date.

5.15 The Environmental Samples by Mariangela Vitolo

Introduction

5.15.1 During excavation work at the site thirteen bulk soil samples were taken to recover environmental material such as plant macrofossils, waterlogged wood and wood charcoal, fauna and molluscs as well as to assist finds recovery. The following report assesses the contents and the significance of these samples and the potential of the environmental remains to contribute to discussions of environment and fuel use at the site.

Methodology

5.15.2 Samples that were from dry or non-waterlogged deposits were processed by flotation in their entirety. The flots and residues were captured on 250µm and 500µm meshes respectively and were air dried. A series of samples were taken from waterlogged deposits and were therefore wet-sieved. Sub-samples of 2 litres were washed through a stack of geological sieves ranging from 4mm to 250µm, and each fraction was retained wet.

5.15.3 The dried residues from the flotation samples were passed through graded sieves of 8, 4 and 2mm and each fraction sorted for environmental and artefactual remains (Appendix 12). Artefacts recovered from the samples were distributed to specialists, and are incorporated in the relevant sections of this volume where they add further information to the existing finds assemblage. The flots and the wet sieved fractions were scanned under a stereozoom microscope at 7-45x magnifications and their contents recorded (Appendix 13 and 14). Identifications of macrobotanical remains have been made through comparison with published reference atlases (Cappers et al. 2006; Jacomet 2006; NIAB 2004), and nomenclature used follows Stace (1997). The larger flots were not assessed in their entirety,

but samples of roughly 100ml were taken and their volume and weight recorded alongside those of the whole flots.

Results

Flots

Samples <1> [210], <2> [216], <3> [574], <14> [12112], <15> [12311] and <16> [12304].

5.15.4 Most samples produced flots that were dominated by uncharred rootlets and twigs, indicating low level disturbance across the site. A small amount of uncharred seeds of elder (Sambucus nigra) and a grape (Vitis vinifera) pip in sample <1> could also be modern contaminants that have infiltrated the deposit through root action. However, the flots of samples <1> and <2>, were dominated by tiny charcoal fragments and industrial debris and hammerscale. No charred plant remains were recovered.

5.15.5 Charcoal was present in high amounts in contexts [216], [210] and [12304]. However, because ditches tend to fill slowly over time, the charcoal from this feature type is generally deemed unsuitable in terms of providing us with information on fuel selection strategies and use, being more suited to the study of vegetation changes that happen over longer periods of time. Therefore, no identification work was carried out on the charcoal.

Waterlogged samples

Samples <7>, <8>, <9>, <10>, <11>, <12> and <13> [629]

5.15.3.3 The waterlogged samples came from the same context [629], a large silty clay deposit located next to timber structure [675]. The wet sieved fractions were not very rich in organic remains. Uncharred seeds were present in low numbers and included hemlock (Conium maculatum), stinging nettle (Urtica dioica), docks (Rumex sp.), knotgrasses (Polygonum sp.), elder and sedges (Carex sp.). Wood fragments were generally small and present in low numbers. The only insect remain was a fly pupa from sample <7>.

5.16 **Worked Wood** by Damian Goodburn

Introduction

5.16.1 Archaeology South-East (ASE) were commissioned to carry out archaeological recording work just landward of 20th century concrete river walls being rebuilt in 2015. The investigated area lay north-east of Strand Street and riverward of the originally Norman, church of St Marys (Reach 4). The adjacent River Stour is essentially a small, embanked and much silted up, estuarine channel which once lay in a complex area of low lying land and multiple tidal channels before the embankments and waterfronts were made. Traces of a series of medieval and later earthen flood banks or ‘mud walls’ (the ‘Monks Wall’) have been located on the opposite river bank, whilst on the southern and western, town-side, there are still adjacent historic timber and brick buildings and a small dock inlet to the south-east. There is also a small historic inlet to the north-west, just

upstream, side of the site, which must also have been of significance in former times, even though it is not shown on some modern maps.

5.16.2 This opportunity to investigate part of the river frontage was recognised as valuable even though the excavated area was relatively small and access limited. The following comments are based on first-hand experience of relevant traditional woodworking and considerable archaeological evidence originating in Greater London and other historic port areas.

Methodology

5.16.3 The archaeological watching brief and later targeted excavation was restricted by depth limits, water ingress and safety concerns which were such that none of the timber structures could be absolutely fully exposed and recorded. It is also true that relatively few individual timbers could be fully excavated and lifted for detailed recording. However, substantial information on the nature and composition of the timber waterfront structures was obtained and recorded both *in situ* and off-site.

5.16.4 Indeed, using a targeted, selective approach to investigations of post-medieval waterfronts has developed over the last few years akin to that used in standing building recording, in some respects. After exposing the structures in plan and planning them to scale, representative zones of the partially exposed structures were selected for further excavation and elevations drawn to scale supplemented with photography and pro-forma recording sheets. The author also visited the excavations in order to view the structure *in situ*. Following this recording, a representative sample of the timber elements were then selected for detailed individual recording and dating off-site.

5.16.5 A sub-sample of 16 timbers, or sections of timbers, were lifted and taken to ASE facilities for cleaning, detailed recording and sampling. ASE staff carried out much of this work but were assisted by the author in January 2016. The timbers were also assessed for possible conservation at this point. Many of these items were reused nautical or building timbers. This assessment makes use of the main *in-situ* records, notes made on site by the author and more detailed off-site records.

Quantification

5.16.6 Approximately 165 individual 'timber numbers' were attributed on site. However, the degree to which it was possible to record information about the individual timbers was very varied; from almost nothing, in the case of timbers largely masked by other timbers or deposits, to detailed records with scale drawings, completed timber sheets and individual photographs. A total of 16 of these numbered timbers, or sections of them, were fully cleaned and examined in more detail off site.

5.16.7 A total of eight timbers, [642, 643, 672, 658, 699, 742, 748,751] were photographed off site and three timbers, [642, 643 and 657] were drawn in detail.

5.16.8 A total of 114 timbers were sampled for microscopic species identification, and 54 tree-ring slice samples were taken (Appendix 15).

5.16.9 In the Greater London region this volume of historic waterlogged woodwork would be considered a medium-sized assemblage, though limited by the degree of recording possible, but in the context of excavations on Kent waterfront sites it can be considered a proportionately larger assemblage.

Results

5.16.10 This watching brief and targeted excavation revealed several historic timber waterfront structures and individual timber piles to varying extents. The raw materials used and how they were worked suggests that the earliest structures on the landward side are very unlikely to date before the 17th century and we might suggest a later 17th to c. 1700 date is more likely. Unfortunately, although a large number of samples, 54, were submitted for dendrochronological dating none of the samples cross-matched. The 16 timbers recovered from the site that remain in temporary storage have not been submitted for dating and may have a higher potential for returning age determinations.

5.16.11 It seems likely that the later timber frontages were only a few 10's of years later but had their life extended with the doubling up of the upright posts. The main structures comprised timber revetments with uprights and shuttered planking set on edge behind them i.e. to the landward side. The irregularity of form and spacing of the uprights suggests that they were probably all driven piles, rather than posts tenoned into mortised sill beams or set in a post trench. It is likely that the structures stood a minimum of c. 1.2m high above the foreshore when first built, but only c. 1m's depth of frontage from the decayed top timbers down could be revealed for the latest historic frontage. Interestingly these revetments had the shuttering wedged on the landward side of the uprights in the common and ancient style, not secured on the riverward faces of the uprights with large iron spikes and treenails as was adopted for many larger timber and dock walls in the 17th century on the River Thames.

5.16.12 The timber revetment appears to have been built in three main phases with several episodes of collapse and repair. The first revetment may have been the north-west end of a projecting small quay, Waterfront 1 (WF1), at the south-east end of the site (Figure 13). This was followed by the building of a north-west to south-east orientated timber frontage to the north set a little landward (WF2). Then this later frontage was refaced (WF3) as was the projecting area to the south WF1. This building phase resulted in an 'L' shaped timber frontage, set slightly riverward, WF3 [675]. It would be true to note that the extensive use of cheap reused timber and coniferous wood suggests that relatively little money was being spent on these structures.

5.16.13 Timbers found to the riverward i.e. to the east and north of the revetments, include at least two, [638] and [651], raking shores ('front braces') in the central zone, and a group of small piles [661, 700, 701], seemingly set as protective rubbing posts just off the vulnerable projecting corner of the frontage of WF3 to the south (Figures 12 and 14). The raking shores would have prevented vessels of any size unloading against the northern landward frontage WF2 which would then have simply functioned as a timber wall protecting the earthen bank and land behind it. The southern projection WF3 may still have functioned as a small wharf as it projected further into the river and had no clear front bracing. The rubbing post

group of piles probably prevented craft such as barges or lighters from banging against the projecting corner as the ebb tide carried them downstream.

5.16.14 The timbers located to the far north-west included machine worked conifer piles of late 19th or even early 20th century date. These lay just landward of the recent concrete frontage which was undergoing rebuilding for the flood defence works. Some of these piles may have been for mooring craft and/or supporting relatively recent structures built close to the bank on soft landfill deposits.

5.16.15 All the structures included a variety of second hand or 'reused' timbers with distinctive features indicating their general origin from either ships, boats or timber frame buildings. The nautical timbers included elements of oak carvel ship planking and framing as well as distinctive anchor stock timbers, shipyard off-cuts and decayed fragments of clinker boat planking. The carpentry timbers were of weathered, old oak, had mortice joints, and even mouldings in some cases. It is likely that all these relatively low value reused timbers were of local origin.

Waterfront 1 structure

Wood number	Type	Origin
741	Planking	
742	Collapsed upright	Ship
743	Planking	
744	Planking	Ship
745	Planking	
746	Upright	
747	Upright	
748	Upright	Building
750	Upright	
751	Upright	Ship
769	Upright	
770	Planking	
773	Planking	
787	Planking	
791	Planking	

Table 12: Timbers assigned to Waterfront 1 (WF1)

5.16.16 Waterfront 1 (WF1) is the umbrella number suggested here for what appears to be clearly the earliest waterfront revetment shown in the multi-context phase plans, orientated north-east to south-west out into the river at the southern end of the site (in purple, Figure 13). It seems fairly clear that this comprised uprights which supported the planking set on edge behind them (Table 12). The structure supported a projection out into the river on the southern edge of the site which may have been intended to provide slightly deeper water along side for unloading vessels, i.e. to have been a small wharf. This group of timbers probably represents the eroded, fallen, river frontage of this projection into the river. This area of revetment may have been damaged by scouring during surge flood tides which undermined the uprights leading to collapse. The raw materials used in

WF1 were a mixture of oak timbers, including recut ship timbers, such as fallen post [742], and some imported pine elements such as plank [791], which suggests that a date for this structure before the later 17th century is extremely unlikely. Indeed, an early 18th century date might even be considered on the grounds of the woodwork alone. Thus, WF1 is not part of the medieval frontage thought to have been in the general area but probably part of a small 17th century version.

Waterfront 2 structure

Wood number	Type	Origin
670	Planking	
674	Planking	
676	Planking	
678	Planking	
679	Planking	
680	Planking	
681	Planking	
682	Planking	
683	Upright	
684	Upright	
685	Planking	
686	Planking	
688	Upright	
705	Planking	
778	Planking	
779	Planking	Building
780	Planking	Ship
781	Planking	Building
782	Planking	
783	Planking	
788	Upright	Ship
792	Planking	Ship
793	Planking	
794	Upright	Ship

Table 13: Timbers assigned to Waterfront 2 (WF2)

5.16.17 Waterfront 2 appears to be the earliest revetting of the river bank visible Inside the trench limits to the north-west (in blue, Figure 14). When first seen this revetment, and collapsed planking and associated timbers, was seen to be very decayed and without obvious uprights retaining the planking. Following further excavation the retaining uprights were revealed including timbers [683], [684] and [688], of imported pine timber. These retained planks to their landward side which were also mainly of imported conifer timber, later identified [678] as a pine, probably *Pinus sylvestris* commonly known as 'Scott's pine'.

Waterfront 3

Wood number	Type	Origin
633	Upright	
634	Upright	

Wood number	Type	Origin
635	Upright	
636	Upright	
637	Upright	
639	Upright	
640	Upright	
641	Upright	
642	Upright	
643	Upright	Building
644	Upright	
645	Upright	
646	Upright	Building
647	Upright	Ship
648	Upright	
649	Upright	
652	Upright	
655	Upright	Ship
656	Upright	
657	Upright	Ship
658	Upright	Ship
659	Upright	
660	Planking	Ship
661	Upright	Building
662	Upright	
663	Upright	
677	Upright	Building
699	Planking	Ship
700	Upright	
701	Upright	
749	Upright	
754	Upright	
755	Planking	
756	Planking	
757	Upright	
758	Upright	
759	Upright	
772	Planking	

Table 14: Timbers assigned to Waterfront 3 (WF3)

5.16.18 Waterfront 3 is suggested here as the last phase of historic waterfront revetment found and exposed at the site. It replaced WF2 and WF3 outlined above just riverward of them following an 'L' shaped line from the

north-west corner of the excavation and returning to form a new frontage in the south-east corner north-east of WF1 at that point. It comprised close-set uprights with planking set on the landward side running from uprights [633] and [634] in the north-west to upright [677] to the south and then round the projecting frontage via upright [658] round to [758] at the south-east corner (Figures 12 and 15). This structure was likely to have been principally a timber river wall especially if the raking shores such as timber [651] were linked to it, whilst to the south-east the projecting area WF1 may still have functioned as a wharf front.

Discussion

Waterfront 1 (WF1)

5.16.19 This simple pile and plank revetment had an intact north-east to south-west arm projecting into the river. The uprights were a mix of *Quercus* sp. (oak), *Ulmus* (elm) and *Pinus sylvestris* (Scot's pine) timbers of varied origin. Two of the supporting piles were lifted whole and are of interest as they were clearly halves of a two-part anchor stock [788] and [794]. That is timbers designed to form the cross bar at the top of an otherwise iron anchor. They were both recessed for the iron anchor elements and had treenails used to fasten the two opposed halves together, clasping the ironwork. They also had neatly bevelled, slightly tapering exposed faces. As timber [794] was of elm and [788] of oak they were probably not derived from the same anchor. Such items were often replaced and have been found in larger sizes, much reused in recent excavations at Deptford Royal Dockyard in 17th and 18th century contexts.

5.16.20 The largest retaining pile in this structure, timber [742], was of oak and also of nautical origin. It was made from a hewn (axe and adze shaped) carvel ship frame that was reworked by being pit sawn in half lengthways, cutting through the oak timber and the treenails originally used to fasten the ship's hull planking. As the original frame timber was c. 230mm deep or 'moulded' the parent ship must have been fairly large.

5.16.21 The shuttering planking of this revetment was also of mixed origin including some decayed pine planking, such as timber [791], but was mainly of thicker reused oak planks, such as carvel ship plank [744], which was 45mm thick and pierced by several large treenail holes. Pile timber [751] was also a section of re-sawn, oak, carvel ship frame timber or 'futtock' with redundant treenails (34mm dia, this has a good off site photo). The very decayed remains of what was probably a hull plank from a clinker built vessel, [741], was also found in the collapsed part of this structure. It was oak with close-set holes along one edge, possibly representing relict lap fastening holes. Finally, the collapsed group of timbers also included a fragment of a morticed, old oak building timber, [748], probably derived from a medieval or 16th century local building, or possibly a demolished timber framed waterfront structure.

Waterfront 2 (WF2)

5.16.22 Following partial excavation it could be seen that this structure was originally a lightly built revetment with lightweight pine uprights a maximum of only 90mm thick, [683], [684] and [688]. On the landward side of these, decayed sawn, pine plank shuttering was also found and partially exposed,

planks [674] and [678]. Above the intact parts of this structure were a series of loose disturbed planks of pine and oak that initially appeared to have possibly been ad hoc 'steps' behind the frontage. On reflection it is probable that they were either duck boards or shuttering planking that has been displaced, [779] and [780]. One of these planks was a counter-rebated, sawn plank of knotty fast grown oak with two nail holes, [781]. Such rebated oak planking was used for flooring and sometimes cladding in buildings of the 15th to 16th century in south-east England, such as that seen at Milton Regis Court Hall of the later 15th century.

5.16.23 Three oak timbers set at 90 degrees to the frontage were also recorded, [673], [782] and [783], which were identified as decayed beams or thick planks no more than 100mm thick which may have originally functioned as land tie elements for the revetment. However, as they were discontinuous it may also be that they were just used as chocks to support some form of structure that once rested on the waterfront such as a timber built shed or privy.

5.16.24 Why this assembly of timbers was clearly disturbed before the next timber frontage was built river wards is unclear but it may simply have been to facilitate access for building the next structure Waterfront 3.

Waterfront 3 (WF3)

5.16.25 This structure had retaining uprights on the waterside face and a varied assortment of pine and oak planks wedged behind them set on-edge as shuttering (Figure 15). It was very clear immediately, that the structure included many reused timbers from earlier timber-framed buildings and also of nautical origin.

5.16.26 Further excavation showed a much fuller extent of the structure and it could be seen, from the very close spacing of the uprights, that they had been doubled up or 'sistered' during the life of the structure as a repair to prolong its life. This feature has also been found in a number of waterside revetments and dock walls of post-medieval date on the Thames and its tributaries. The full surviving depth of the structure could not quite be reached, due to safety concerns, but a height from the decayed top down for c. 1.15m was exposed (Figure 17). The original height was probably well in excess of 1.2m.

5.16.27 The condition of the uprights on the riverward side varied being decayed and water worn indicating a long working life for the structure, probably a minimum of 30 years or so. The vast majority were roughly squared and of oak (i.e. our two native species or their hybrids, or a related imported oak, though this is unlikely). Some uprights were converted boxed heart, others box halved and others were box quartered or even the irregular sawn off corners of hewn baulks. One or two were minimally trimmed small oak logs. The largest examples were up to c. 300mm by 150mm but most were substantially smaller in cross section. It is unclear whether individual uprights were 'posts' set in a mortised sill beam or trench, or driven 'piles', though the latter is by far the most likely due to their varied spacing and irregularity. Two sloping front brace timbers or 'raking shores' were also found on the foreshore just riverward of the frontage, [638] and [651]. Timber [638] was c.160mm by 110mm and the top was rotted off before it reached the frontage itself, which is commonly found elsewhere in other

waterfront structures. This timber bore clear pit-saw marks and axe marks on different faces and had several wooden pegs and nails in it showing previous use, probably in a building.

5.16.28 It was possible to examine, record and sample some of the most distinctive uprights and sheathing timbers in more detail on and off site and some of these key representative individual timbers are very briefly described below.

5.16.29 Timber [772] was a short length of thick planking with two nails at one end, from the south-east end of W3, part of a pit sawn waste slab of oak from a hewn baulk. It had an unusual feature of note, a scribed 'M' or 'W' on its sawn face. Such marks on 17th century building timbers have been identified as ritual marks denoting 'Maria' and are believed to be intended to repel witches etc. Whether a woodworker in the vicinity would use such a mark on an off-cut used in a waterfront structure is, however, uncertain.

5.16.30 Several of the oak sheathing planks had relict oak treenails set in staggered pattern across the timbers, at close intervals. This feature indicates an origin in a large boat or small ship built in the carvel style (with planking set edge to edge). Timber [699] was possibly the best preserved lifted example being 270mm wide c. 30mm thick and was cut at a length of 1.36m. The oak treenails used were of either 32mm or 25mm dia, and one face was also pierced by nail holes some of which had been plugged with oak bungs. Although the plank had originally been sawn out, faint adze marks from secondary smoothing of the hull it was used in still survived. The dimensions of this hull plank suggest a probable origin in a large boat rather than a ship. Other examples of carvel vessel planking, also of oak, included timbers [696] and [680]. The latter had traces of large borer damage almost certainly marine borer Terredo (shipworms). As the planking was 70mm thick it is likely to have derived from a largish seagoing ship. Ship timbers with large borer damage have also been found in a number of post-medieval waterfront structures in Greater London, and such damage did not seem to deter carpenters from reusing the timber for relatively humble purposes such as revetments.

5.16.31 Some of the revetment uprights also had relict treenails and nails in them with proportions suggesting that they were originally carvel vessel frame timbers such as oak timbers [655], [660] and [712]. However, these timbers were so cut down for reuse that little more can be said about them.

5.16.32 Upright timbers [657] and [658] from the northeast-southwest limb of the frontage were quite elaborately shaped with a neatly tapering form and two bevelled arises, forming a 'D' shaped cross section. They also had neatly cut recesses where they were thickest and were pierced by several oak treenails. It was clear that they had also been two halves of a wooden anchor stock possibly the same one. The proportions of the timbers at 190mm wide by c. 80mm thick suggests an origin in an anchor for a large boat rather than a ship.

5.16.33 Several sawn waste slabs from the outside faces of hewn baulks were found in the structure and some were clearly curved suggesting ship or boat yard origins such as timbers [704] and [780]. Timber [704] was an example of a clear curving shape with a width of 250mm and thickness of 60mm.

5.16.34 Timber upright [647] was a very unusual item with a smooth cylindrical form shaved down from a ¼ log. It had several small iron nail shanks near the top and a pair of holes lower down it was 140mm in diameter and was cut to lift at a length of 1.03m from the broken top. Later the species was identified as ash (*Fraxinus* sp.). The odd feature here is that the timber was far less decayed that the oak surrounding it which is not normally the case with ash which is classified as a 'non-durable' timber and only very rarely found in historic waterfront structures. If timber [647] is ash it probably has two likely origins, one as a boat spar (timber for holding out sails and rigging) as ash was sometimes used for that purpose alongside imported conifers. Alternatively, it is possible that it derives from wheelwright's work where carefully wrought ash would often be used. However, it does not have the classic form of an 'axletree' which had neatly rounded ends for the wheel hubs to turn on.

5.16.35 Several of the most weathered oak uprights of the W3 frontage had relict mortice and other joints showing that they had been reused from old timber-frame building timbers, [646], [663], [677]. None of these timbers could be removed from the site in long lengths but we can still glean some information from the short sections of them retrieved (Figure). Timber [677] was examined off site and drawn in detail, it was a boxed heart section and had several carpentry joints, comprising two intercutting pegged mortices, part of a scarf joint and a rebate along one edge. It also had a deep planed moulding on one face and was 270mm by 200mm in cross section. The general features of this building timber suggest a likely origin in a 15th to 16th timber framed building of moderately large size. It was probably a horizontal element in the parent building.

5.16.36 Timber [646] was also a boxed heart section of oak but it had two adjacent faces with deep planed mouldings and what was probably part of a scarf joint on one end. It was 160mm wide by c. 120 mm thick. In the scarf joint the remains of what may have been the base of a mortice were also visible. Alternatively, this may have been a sloping recess or 'scutch'. Again it seems most likely that this was a horizontal element in the parent building originally.

Conclusions

5.16.37 In a very practical sense it could be noted that the range of timbers used in this phase of revetting of the waterfront reflected aspects of the character of Sandwich at the time with timber deriving from the demolition or remodelling of old timber-framed buildings and from the breaking up of varied vessels at yards close by. That distinctive off-cuts of curved oak timbers of ship and boat yard type were also found indicates that active building and or repair of vessels was also occurring in the vicinity. The use of what would have been cheap 'second-hand' materials also indicates that the owners of the site were not likely to be very wealthy or at least were not out to impress.

5.16.38 A group of 6 varied piles were found driven adjacent to the projecting corner of the south-east section of W3, [661], [662], [700], [701], [760], and [761] (Figure 12). These timbers would have protected this vulnerable projection into the tidal channel from impacts with vessels and drifting timber. In moving vessels along the frontage they would also have acted as sacrificial 'rubbing posts' on this otherwise sharp corner of the frontage.

Some of the timbers may have been driven in to work with the earlier frontage W1 for the same range of reasons. This group included reused oak building timber [661] which had several joints cut into it, including a single pegged, lap joint part of a stop splayed scarf, a hewn groove along one edge. The latter would have held wattle or boarded infill, suggesting that the timber was originally horizontal in the parent building. Other timbers were a mix of oak and pine with at least two, timbers [700] and [701], being the 'waste' waney corner pieces often cut off hewn saw baulks.

5.16.39 Only a very short section of oak building timber [663] was lifted from just north-east of W3 where it may have functioned as a mooring pile, before other timbers were driven to the north-east of it which would have made this function irrelevant. The lifted section of this timber included a mortice joint with one peg hole and chisel in-cut marks at the base. As the rectangular section timber was hewn from a whole, relatively small, oak log and was very weathered, it is possible that it was a little older than the other building timbers found.

5.16.40 Other timbers found in this location are of varied form and likely dating, including elm plank section [664] and clearly much more recent pile [666]. This timber was cut out with a circular saw, was 130mm square and survived over 2.25m in length. Although it had an axe hewn tip and the very earliest circular saws were used in the 1790's such timber conversion technology was not common until the mid to late 19th century. Such a pile was probably used as some form of mooring post.

6.0 POTENTIAL and SIGNIFICANCE OF RESULTS

6.1 Realisation of the original research aims

6.1.1 The general aims and objectives of the archaeological Watching Brief were successful in so far as archaeological features and finds encountered during the works were recorded to appropriate professional standards. Remains included residual finds of prehistoric flintwork as well as Roman pottery associated with occupation surrounding Richborough Fort. Although currently undated, the remains of Monks Wall likely date to medieval period flood defences associated with the River Stour. Early post-medieval remains comprised land-division in the vicinity of the town of Sandwich as well as important remains of a river frontage. Later post-medieval activity related to industrial land-use, including brick-making north-west of the town. Further management of the river channel was recorded comprising embankments as well as river walls and waterside 'furniture' detailed during historic building survey. Modern activity was also related to river frontages but also comprised remains of WWI and WWII activity relating to the defence of Sandwich and Richborough Port.

Reach 1/1a

6.1.2 There were no specific research aims for this Reach.

6.1.3 The works encountered a 17th century dump deposit containing residual Roman material derived from nearby settlement associated with the Richborough Fort. The results are of local significance.

Reach 2

6.1.4 The work in Reach 2 uncovered two rubbish pits possibly related to the areas use for brick making. The presence of medieval bricks in these features may hint at a long-lived industry in this area or perhaps more likely the disposal of material from a period of demolition in the nearby town. The evidence adds slightly to understanding of industry in the Sandwich area. The medieval floor tile adds to understanding of contemporary buildings in the town. The results are of local significance.

6.1.5 The specific research aims for this Reach were addressed in terms of understanding national defence and international conflict. 27 .303 cartridges were encountered in a deposit of late 19th/early 20th century material. Antitank obstacles were also encountered in the Reach, and were likely related to the defence of Sandwich during WWII. It may be that the anti-tank blocks were designed to protect this relatively remote part of Sandwich from attack, although they may have been transported to the site from elsewhere on the River Stour. The remains hold potential for understanding defence against invasion by the sea during WWII. Considered in isolation the remains are of only local significance, however, when combined with other WWI and WWII features and material from across the scheme the results are of regional significance.

6.1.6 No archaeological evidence relating to saltmaking, fishing, shipbuilding or the natural environment was encountered within the Reach.

Reach 3

6.1.7 The evaluation in 'Gallows Field' successfully revealed three ditches one of which contained early post-medieval artefacts. These features were not fully exposed and so their original form or function could not be conclusivly discerned. It is possible they form part of agricultural land-division in an area that was once immediately outside the town walls. Ditches [2/012] and [2/014] probably relate to the easterly extension of a medieval/post-medieval drainage ditch shown on historic mapping. The southerly feature [1/019] feature may relate to WWII defences that circled Sandwich. The features may provide evidence of medieval-modern land reclamation in the area of Sandwich as well as military activity associated with defence against invasion by the sea. Further analysis would be required to clarify the nature of these features. Considered in isolation the remains are of only local significance, however, when combined with other evidence of land reclamation and military activity across the scheme the results are potentially of local-regional significance.

Reach 4

6.1.8 Archaeological work in relation to Reach 4 was susccessful in recording the extent and nature of obstructions encountered as part of the sheet piling works as well as recording all exposed archaeological remains in accordance with accepted professional standards.

6.1.9 The laser scanning of Reaches 4 successfully recorded in-situ features before they were altered or removed during the works. The historic building assessment appears to challenge the currently held idea the segments of river wall recorded in Reach 4 are medieval suggesting instead that they are much later (Appendix 17). The listed bollards and historic water pump were recorded to accepted professional standards. They most likely date to the later 19th century (Appendix 17).

6.1.10 The three phases of river frontage, associated deposits and later timber revetment encountered in Reach 4 reveal significant evidence of Sandwich's waterfront during the post-medieval and modern periods. The waterfront of the medieval Cinque Port of Sandwich has been subject to very little systematic archaeological investigation a factor which enhances the significance of these remains. The association of diatom evidence with some of the deposits in this area also provides evidence of sedimentation change within the River Stour overtime. The timbers incorporated within the waterfront also have potential for study of local building and word working techniques as well as re-use of timbers during the post-medieval period (see sections 6.2.37-40 below). The results are of regional significance.

Reach 5

6.1.11 The work in Reach 5 observed that some of the recorded river wall appears contemporary with the Sandwich Toll bridge. The historic building recording succeeded in producing a record of the historic structures within the area of Guilford Wharf. Archaeological work within the Reach encountered a 16th-17th century layer incorporating evidence of industrial

activity as well as fish processing. Modern features were probably associated with the Sandwich Gas Works as well as military and riverfront activity. The remains in this area have potential to inform on industrial land-use in and around Sandwich during the post-medieval and modern periods. There is also potential for studying the areas role in defence of invasion from the sea. There is potential for understanding the nature of the riverfront during the post-medieval and modern periods. Considered in isolation the remains are of only local significance, however, when combined with other evidence of riverfront and military activity across the scheme the results are of regional significance.

Reach 6

6.1.12 The flood defence works in Reach 6 did not reveal any archaeological finds or features.

Reach 7

6.1.13 The historic building recording at Reach 7 identified a timber revetment remaining visible of the wharves and tramway that once occupied this area. Considered in isolation the remains are of only local significance, when combined with other evidence of riverfront activity, however, the recording and interpretation of these features is of regional significance.

6.1.14 The impact on subsoil deposits was minimal in Reach 7 and no significant archaeological finds or features were recorded during excavations in this area.

Reaches 8-11

6.1.8 The watching brief on works within Reaches 8-11 successfully recorded features associated with both Richborough Port and the WWII defences. The features observed correlate well with existing cartographic sources relating to Richborough Port specifically the workshops and stores associated with 'Shipyard Number 2' on the eastern bank of the Stour. Other features uncovered corresponded with military remains visible in aerial photographs from WWII. These ditches have been described as anti-glider defences but seem to have had a secondary role as part of a firing range. These features add to knowledge relating to Sandwich's place in the 20th century defence of Britain. They evidence military land-use in the area during the late post-medieval/modern period. Considered in isolation the remains are of only local significance, when combined with other evidence of military activity from the scheme, however, the recording and interpretation of these features is of regional significance.

6.1.9 A number of geological deposits were observed as well as natural tidal channels or creeks. No evidence of early human interaction with this area was recovered. The tidal creeks were examined by a geoarchaeologist but were the associated alluvial deposits were observed to be shallow and oxidised. They were determined to have little potential for geoarchaeological sampling. The remains of a sheep within one of the creeks points to pastoral usage of the area, although the remains are undated. They are of limited local significance.

Reach 12/12a

6.1.10 The archaeological topographic survey and record of the Monks Wall prior to the commencement of construction works provided an accurate 3D survey and written record of the monument prior to its alteration.

6.1.11 The evaluation trenches excavated through 'Monks Wall' in Reach 12 successfully revealed that they had been constructed by digging two parallel ditches and mounding the up-cast between them. Geoarchaeological samples collected from Trench 3 confirm that the monument had been constructed in two phases and revealed that it had been built in an intertidal environment and had been subject to high energy inundation prior to its phase 2 heightening. The trenches failed to recover any datable artefacts. The evaluation trenches did, however, provide valuable evidence on the construction of the monument and thus the development of the port of Stonar. Although currently undated the remains are likely to be of medieval origin. The archaeological evidence is a significant addition to the understanding of flood defences and land reclamation within the South-East. The information gathered is of regional significance and when combined with historical analysis and evidence of medieval/post-medieval management of the River Stour from elsewhere in the scheme this significance is enhanced.

Reach 13

6.1.12 No works were monitored in Reach 13.

Reach 14

6.1.13 No evidence of saltworking was encountered during works in this area.

6.1.14 The archaeological monitoring succeeded in identifying masonry remains related to the WWII encampment in this area. Considered in isolation the remains are only of local significance, when combined with other military activity from across the scheme, however, they are of regional significance. They have the potential to aid understanding of the national defence and international conflict during the post-medieval and modern era.

Reach 15

6.1.15 No evidence of saltworking was encountered during the groundworks.

6.1.16 General quayside activity was evidenced by a concrete slipway probably associated with Richborough Port. Considered in isolation the remains are only of local significance, when combined with other military and waterfront activity from across the scheme, however, they are of regional significance.

Reach 16

6.1.17 No archaeological remains were encountered in Reach 16. Had they been present they would have likely been truncated by 20th century activity within the area.

6.2 Significance and potential of the individual datasets

The Stratigraphic Sequence

6.2.1 The residual prehistoric and Roman material has little potential for further analysis.

6.2.2 Further analysis of the investigations into Monks Wall in Reach 12 may be synthesised with other excavations into this monument and form work of regional interest. Historical documentary analysis and comparison with other medieval flood defences has potential to aid understanding of the feature and clarify whether the currently undated construction is of medieval date. Evidence of high-energy inundation and overbank flooding is of interest and may relate to documented late medieval flooding of coastal areas within the South-East. The feature appears to have been heightened after this event. When combined with further analysis into the management of the River Stour from the medieval through to modern periods the significance of the stratigraphic sequence is enhanced. It has potential to aid understanding of the development of Stonar and Sandwich.

6.2.3 Further analysis of the stratigraphic sequence has the potential to shed light on the post-medieval period in Sandwich. A synthesis of the early post-medieval evidence would provide valuable local evidence for the activities in the town at a time of decline. Analysis of woodworking techniques and CBM has potential to reveal local building traditions within the town.

6.2.4 A comparative study of the wooden revetment in Reach 4, as well as other wooden and masonry waterfronts discovered/recorded during the scheme would shed light on building techniques and the development of Sandwich's historic waterfront overtime. This analysis should draw on any parallels from the wider South-East and beyond. Currently little work has been undertaken on waterfronts within the region and the results of work associated with the Sandwich Town Tidal Defence Scheme has the potential to significantly expand our knowledge in this regard (particularly for the post-medieval period). When combined with further analysis into the management of the River Stour from the medieval through to modern periods the significance of the stratigraphic sequence is enhanced. It has potential to aid understanding of the development of Stonar and Sandwich.

6.2.5 Further analysis of the finds assemblage (which was often of Dutch origin) recovered from around the wooden structure in Reach 4, possibly coupled with documentary research into its immediate environment would help to understand activities of the 'Stranger' population in Sandwich at a time when this population has been supposed to be on the decline. This study may be of interest both regionally and possibly in the Netherlands. Further analysis combining historical documentary work will shed light on the relationship between Sandwich and the near continent.

6.2.6 The archaeological evidence of both WWI and WWII military remains was significant across the scheme. Evidence of the large installation of Richborough Port was encountered and remains of 'Shipyard Number 2' were explored. Further analysis of these remains, combined with historical

analysis and examination of aerial photographs has potential to inform on military activity in and around Sandwich during both WWI and WWII. It has potential to aid understanding of national defence and international conflict during the post-medieval and modern era. Synthesis of evidence of military activity from various sources would aid understanding of stoplines, coastal and riverine defence, logistics and maintenance.

Geoarchaeology

6.2.7 The sediments recovered from Reach 4 adjacent to the wooden revetment demonstrated variable micro and macrofossil preservation. The pollen assessment recorded a poor concentration and preservation of the assemblage and is not recommended for further work. The lack of in situ organic material within the core and bulk samples and given the tidal influence at the site suggest the potential for absolute dating is low.

6.2.8 The diatom assemblage demonstrated a greater level of preservation and if full analysis were to be undertaken, it would be possible to elucidate the approximate position within the tidal frame at which each sedimentary sample was deposited. This is achieved using the classification scheme first developed by Vos and de Wolf (1993). This semi-quantitative approach enables assemblages to be associated with specific palaeo-shoreline elevations (such as deposition within tidal channel, mud flat, saltmarsh below/at/above mean high waters etc). This approach therefore infers changing elevation conditions, relative to the influence of sea level, which in turn can be used to infer shifts in the position of relative sea level over time. The technique also utilises those diatom species that are often present, but in much lower abundances (1-5%TDV). Such taxa can often dictate the reconstructed palaeo-elevations that are applied to a diatom assemblage, but due to their relative abundance, do not always appear to be statistically significant during assessment level studies. Abundance and diversity of diatom taxa is sufficient to enable full analysis to be applied to the complete sequence from site. Indeed, if further samples are available, increasing sample resolution (4cm intervals) would yield even more valuable palaeoenvironmental information.

6.2.9 The value of the diatom data needs to be considered against the lack of absolute dating for the sequence. The taphonomy of the small fragments of wood present in the bulk samples will be complex and these remains may have travelled some distance during tidal inundation. The reliability of such material for radiocarbon dating is questionable.

6.2.10 The micromophological analysis undertaken on the Monk's Wall (Reach 12) has demonstrated the processes at work prior to the construction of the bank as well as identifying flooding episodes during the life of the structure. The slides have been analysed in their entirety and therefore no further work is recommended for this sequence.

Worked Flint

6.2.11 Overall the flint assemblage from Sandwich Town tidal Defences is in a very poor condition. The extensive edge damage is likely the result from successive re-depositions. The assemblage provides evidence for prehistoric presence. A fragmentary core could be Mesolithic or Neolithic in

date, and a side scraper is likely to be Late Prehistoric, but otherwise the material is poorly dated.

6.2.12 The assemblage is too small to have any potential for further analysis and no further work is recommended. The flintwork can be omitted from further specialist reporting

Roman Pottery

6.2.13 The assemblage comprises a single, fairly small stratified group, containing ware types which are fairly typical of late Roman assemblages from east Kent. It is therefore of low significance.

6.2.14 There is no potential for further work on the Roman pottery

Post- Roman Pottery

6.2.15 Although there are no large well-sealed context groups and residuality and intrusiveness are a constant presence, the assemblage has some merit for publication. Despite the amount of archaeological fieldwork undertaken in Sandwich in the past only a tiny proportion has been published. That which has is often in summary form without full publication of the ceramics. The early post-medieval assemblage is considered to be of particular interest considering the high proportion of imports, particularly from the Low Countries. This would appear to relate to the large 'Stranger' population in Sandwich and clearly shows the importation of goods from the 'homeland'. Whether this high percentage of Dutch imports is reflected in other contemporary assemblages from the town remains to be seen. The late post-medieval assemblage is of less importance as it consists generally of the typical range of wares that may be expected on any contemporary site in the south-east. In addition this material is only present in small groups with some residuality and intrusiveness.

6.2.16 The publication of the post-Roman pottery has the potential increase understanding of the early post-medieval ceramics from the town and thus begin to infill this gap in the published record.

Ceramic Building Material

6.2.17 The CBM assemblage is only of local significance, indicating the range of medieval brick fabrics and forms in use in this part of Kent, some of which may have been imported from the Low Countries as the delftware tiles were.

6.2.18 This assemblage has no potential for future research.

Clay Tobacco Pipe

6.2.19 Although a notable number of excavations have taken place in Sandwich, few have been published, and subsequently, little is currently known about clay tobacco pipes from the town. It is of note that the Dutch group from the current assemblage appears at a time when the population of Strangers in Sandwich had declined, as a result of the plague, ongoing conflict between the locals and the Strangers, the loss of the textile

industry and subsequent migration (e.g. Richardson 2006, 44). The presence of the Dutch pipes, which even in Sandwich do not appear to be common finds, in combination with the fact that few assemblages were published, renders the assemblage of regional significance. The 18th-century marked pipes are of interest in that they contribute to the research into the local pipe industry. All pipes are of significance as dating evidence.

6.2.20 Further research into the Dutch bowl types might refine their dates of manufacture. The assemblage, recovered from Reach 4, should be reviewed in the light of detailed context information, i.e. do they relate to the quay, and if so, do they relate to its construction, use or abandonment? Strangers were limited in the types of employment they could take up, in order not to aggravate the local population, therefore the suggestion they were involved with the construction or day to day use of the quay would be of interest. Comparison with other published and unpublished pipe assemblages from Sandwich will put them into context.

6.2.21 The maker's marks require further research in order to establish their makers. Sandwich, like most towns, had its own pipemaking industry, which has not yet been studied in great detail.

The Glass

6.2.22 Although the early post-medieval period is the more interesting its glass assemblage is small and somewhat mundane – essentially consisting of wine bottles and other vessels of unclear form/function. It does not contain any vessels for consumption, nothing that need be imported and nothing that would indicate anything other than a low/middle social status. As such it is not considered to hold any potential for further analysis.

6.2.23 The late post-medieval glass is more informative as to vessel function/commodities represented. However, the assemblage represents an unknown percentage sample from a dump whose source is uncertain. The dumping of refuse was common around the Kent marshes where there was easy barge access and it is uncertain whether this refuse originated from Sandwich or elsewhere. Even if it were assumed to be from the town it has lost all association with the households that generated it and thus its archaeological significance is greatly reduced.

6.2.24 There is no potential for further analysis work beyond that undertaken for this assessment.

Geological Material

6.2.25 The stone from the site includes one or two fragments that may be residual medieval pieces of fairly standard type. The bulk relates to the post-medieval period, the earliest of which appears to derive from the 17th-century importation of coal for fuel, something that clearly continued until the 20th century. The scatter of stone types for the late post-medieval period is not unexpected and there are no good groups.

6.2.26 The stone is not considered to hold any potential for further analysis beyond the work done for this assessment.

The Metallurgical Remains

6.2.27 The excavations have produced a small assemblage of slag as well as a scattering of non-slag materials such as magnetic fines and iron concretions. The proper slag could all be from one or more coal-fired smithies of post-medieval date. Certainly most was recovered from Reach 5 but to what extent the material could have been transported prior to dumping is uncertain. As the slag in in a secondary deposit and represents material that is not unexpected in the post-medieval period, the assemblage is considered to be of low significance

6.2.28 The assemblage is not considered to hold any potential for further analysis beyond that undertaken for this assessment.

The Bulk Metalwork:

6.2.29 In general the significance of the metal assemblage is low.

6.2.30 There is no potential for further work. The assemblage has been recorded in full for the site archive.

The Animal Bone

6.2.31 Due to the size of the hand-collected assemblage and the indication that the majority of the bones derived from modern contexts, it holds no potential for further analysis. The fish bones from the post-medieval context [210], sample <1> have the potential to provide information regarding local fishing techniques. The assemblage is of local significance only

The Shell

6.2.32 The significance of the assemblage is low due to its small size and common nature. There is no potential for further work

The Registered Finds

6.2.33 The finds have significance on a local level, potentially giving information on the use and defence of the area during the WWII period. This will also tie into wider national records.

6.2.34 There is a little potential for further research into why there are so many cartridges in the area. This is outlined below.

The Environmental Samples

6.2.35 The environmental samples from Sandwich Town Tidal Defences have yielded very little archaeobotanical remains. No charred plant macrofossils were recovered from the dry flots, whereas the waterlogged remains presented a low number and a restricted range of taxa and so they are unlikely to provide meaningful information on the local vegetation environment.

6.2.36 Charcoal preserved better, but, as mentioned above, the feature type these fragments originate from hinders its potential to inform us on the environment at a certain time and on fuel selection strategies. The waterlogged wood fragments were generally too small to be identified and therefore they also hold no potential for full analysis.

Worked Wood

6.2.37 Although a considerable number of individual timbers were numbered during this excavation and watching brief only c. 20% of them could be largely exposed and recorded in any detail. So it would be fair to describe the volume of historic woodworking evidence to be small to medium sized compared to other post-medieval waterfront sites in the south-east quadrant of England. However, little archaeological work of this type has been carried out in the Sandwich area and so currently, the main importance of this waterfront excavation is the historical topographic information it should supply about the form and location of the historic waterfront at this point.

6.2.38 The excavation and targeted recording has also shed light on some of the woodworking activities in the area such as ship and boat building and the demolition of local timber-frame buildings. The group of anchor stocks found is particularly unusual. Without the humble anchor, sailing ships and large boats could not operate in large estuaries and off the coast and Sandwich could not have had more than riverine trade.

6.2.39 The general form of the successive timber waterfronts is worthy of targeted summary publication. It was part of the historic built fabric of Sandwich that is not now visible, unlike some of the historic buildings still standing in several areas of the town.

6.2.40 Of the nautical timbers the relatively modest-sized anchor stocks timbers would repay more analysis and comparison with other examples excavated from the large naval dockyards, such as at Deptford. Evidence is also available in early marine art for the changing form of these essential pieces of nautical equipment. A few of the best preserved examples of other reused nautical and building timbers might also warrant selective comparison and publication.

7.0 PUBLICATION PROJECT

7.1 Revised research agenda: Aims and Objectives

7.1.1 This section combines those original research aims that the site archive has the potential to address with any new research aims identified in the assessment process by stratigraphic, finds and environmental specialists to produce a set of revised research aims that will form the basis of any future research agenda. Original research aims (OR's) are referred to where there is any synthesis of subject matter to form a new set of revised research aims (RRA's) posed as questions below.

7.1.2 Historical sources, cartographic evidence, aerial photographs and LiDAR data were consulted during the production of the Desk Based Assessment (Halcrow, 2012b). As part of the revised research agenda, these sources will be re-consulted as appropriate and are listed below for reference:

Pre-Ordnance Survey (OS) Mapping consulted
- Andrews Dury and Herbert, 1769
- Tithe Maps of Sandwich St Clements, St Peter and St Mary, 1840

Ordnance Survey Mapping consulted
- OS, 1" to 1 mile, 1801
- OS Kent Sheets XXXVII NE and XXXVII SE, 6" to 1 mile, 1887
- OS Kent Sheets XXXVII NE and XXXVII SE, 6" to 1 mile, 1892/ 1899
- OS Kent Sheets XXXVII NE and XXXVII SE, 6" to 1 mile, 1908
- OS Provisional Edition, 6" to 1 mile, 1937-38/ 1946
- OS TR 36 SW and TR 35 NW, 1960
- OS TR 35 NW, 1:10,000, 1975
- OS TR 36 SW 1982 and TR 35 NW 1986, 1:10,000

National Monuments Record Centre (now the Historic England photographic archive, Swindon): aerial photographic resources consulted:
- Sortie RAF/ 106G/ UK/ 1131; Library no. 169; Camera RS; Frame 4038; 17th Jan 1946
- Sortie RAF/ 541/ 480; Library no. 1075; Camera RS; Frame 4088; 7th April, 1950
- Sortie RAF/ 541/ 513; Library no. 2605; Camera RP; Frame 3013; 10th May, 1950

LiDAR data (provided by the EA)

7.1.3 The following additional sources will also be consulted:

Historic England photographic archive, Swindon
- Further RAF photographs from the 1940s

The National Archives, Kew
- Documents relating to Richborough Port
- Documents related to Sandwich and the management of the River Stour
- Documents related to Monks Wall

Further sources are likely to become apparent as the analysis phase of the project progresses.

7.1.4 OR1: To understand the early medieval to modern foundation and expansion of Sandwich town, and how industry, including fishing and shipbuilding, town and national defence, international conflict and the natural environment have, influenced its development.

RRA 1: How have medieval flood defences and drainage influenced the development of the town of Sandwich and the port of Stonar?

RRA 2: How has management of the River Stour influenced the development of Sandwich during the medieval-modern periods?

RRA3: Develop a programme of further historical analysis to include secondary sources (Parkin 1985; Richardson 2006; Clarke et al 2010) and, if possible primary sources available in the national archives. The specific objective of this analysis is to enhance our understanding of the relationship between Sandwich and the near continent, particularly the Low Countries, and how this relationship is understood through the archaeological record.

RRA 4: The Dutch pipe assemblage recovered during the fieldwork is of regional importance (see section 6.2.19) and requires further research. The dating of this assemblage has potential to be refined and may shed light on the nature of quayside activity and the presence of the 'Stranger' community within the town (see sections 6.2.19-21). Links between the South-East and the near continent are an important area for further study and this has been highlighted by the South-East Research Framework (SERF/KCC 2007). How can the imported Clay Tobacco Pipe and early post-medieval pottery assemblage (see sections 6.2.15-16) aid understanding of continental migrants and links to the Low Countries within the town of Sandwich? How significant is the link between this material/population and the encountered quayside activity?

RRA 5: How do re-used nautical and building timbers recovered from the structure in Reach 4 compare to those recorded at other sites.

RRA 6: How does the construction of the wooden structure unearthed in Reach 4 compare with other structures of a similar nature excavated elsewhere?

RRA 7: What does the evidence of on-site fish processing tell us about activity zones within Sandwich, specifically its waterfront?

7.1.5 OR2: To understand how people have influenced the evolution of the coastal plain through resource exploitation such as salt manufacture, floodplain management and defence against invasion by the sea and from the continent at times of war.

OR3: The archaeological evaluation in Gallows Field sought to clarify the precise form and function of the earthworks on the site and assess the

presence/absence of other archaeological features associated with the medieval/post-medieval settlement of Sandwich and/or earlier periods.

RRA 8: How have communities in and around Sandwich managed flooding during the medieval-modern periods? For example, the features in Gallows Field may be identified more precisely through a re-appraisal of the cartographic and aerial photographic evidence.

7.1.6 OR4: Specifically: The extent and nature of natural sediments across the site, specifically organic estuarine deposits and alluvium, which may preserve environmental indicators and/or larger features or artefacts and inform as to the environmental history of the area and the Wantsum Channel.

RRA 9: The full analysis of the diatom evidence will enable a more detailed understanding of sediment deposition through time within the River Stour with the aim of further understanding the interrelationship between the river and the development of Sandwich town.

RRA 10: How have the community in and around Sandwich managed the River Stour over time?

7.1.7 OR5: The nature of land-use in the area of Reaches 8-11 during the medieval and post-medieval periods.

OR6: The extent of the former Richborough Port and whether remains survive within the footprint of the proposed works and the extent of WWII defences within the site.

RRA 11: The South-East's role in national defence and international conflict has been highlighted as an important area for further research (SERF/KCC 2007). The WWI military port of Richborough has been specified as an area for archaeological study (ibid; Smith 2012, 24). It has been claimed of this significant port:
"*If it can be said that any one action on the part of the Government won the war, the establishment of Richborough as a port may be cited as that instance*" (Shandel 1921, 18).

Evidence of the port was encountered in Reaches 8-11 (relating to 'Shipyard No2'), Reach 15 (a slipway) and during documentary and aerial photographic analysis conducted for this assessment. The fieldwork represents the first archaeological investigation related to the port. Can in-depth archaeological and historical analysis shed further light on the use of Richborough Port during wartime and in particular the archaeological remains encountered in Reaches 8-11 and 15? Can analysis of cartographic and aerial photo evidence clarify the extent and nature of Richborough Port, its role in national defence and international conflict? What was the nature of the WWI defences and port in and around Sandwich?

RRA 12: Richborough Port was also a significant establishment during WWII and played a role in defence during the early part of the war and invasion during D-Day. It was utilised for the construction of the Mulberry Harbours used during the Normandy beach landings of

1944. Evidence of WWII activity was encountered in Reach 2 (anti-tank obstacles), Reach 4 (building remains and a slipway), Reach 5 (slit trenches) and Reaches 8-11 (artefacts and a firing position). Documentary and aerial photographic evidence utilised for this assessment has revealed evidence of WWII activity across the scheme. What was the nature of the WWII defences in and around Sandwich? Specifically can historical, cartographic and aerial photographic analysis help plot the defences of the town and show how these would have functioned in case of invasion? What was the nature of the stoplines in Sandwich and its immediate environs? How did these function?

7.1.8 OR7: Monks Wall, when was it constructed, for how long was it maintained and the environmental conditions present at its construction and during it lifespan.

RRA 13: How do the inundation events and heightening of Monks Wall tie in with known flooding in the area (if at all)? Specifically does the high-energy inundation relate to known flooding in the South-East's coastal areas during the late medieval period?

RRA 14: By further analysis of the morphology of the Monks Wall and by drawing on other known examples (Rippon 2000) create a model of the possible construction of these medieval flood defences.

7.2 Preliminary Publication Synopsis

7.2.1 It is suggested that the results of the archaeological fieldwork should be published in two articles or occasional papers of c. 10-20,000 words. The anticipated place of publication is either the county archaeological journal, Archaeologia Cantiana or the Journal of Wetland Archaeology (a possible preferred output for the river management article). The articles would form thematic narratives and attempt to answer the questions posed in the revised research agenda. They will be separated upon two specific themes:

- The management of the River Stour from the medieval-modern periods. Its waterfronts and the development of Sandwich.

- Sandwich's role within national defence and international conflict. The archaeology of Richborough Port and its history within WWI and WWII. This will act as an archaeological complement to Robert Butler's (1993) historical work on the subject.

7.2.1 The articles or papers should seek to address the individual site-specific research questions identified in the post-excavation assessment and updated project designs for each site and should be presented within a chronological framework.

7.2.2 It is envisaged that the completion of period-driven, land-use narratives are needed to enable authorship of a publication synopsis for the thematic publications. These reports should present a detailed chronological narrative of the site sequence, attempt to address the questions posed in

the revised research agenda and would pursue the following suggested structure:

Introduction
Natural geology, topography and environment
The management of the River Stour in the medieval period
The management of the River Stour in the early post-medieval period
The management of the River Stour in the late post-medieval and modern period
Specialist sections
Bibliography

Introduction
Natural geology, topography and environment
Sandwich during WWI (Richborough Port)
Sandwich during WWII
Specialist sections
Bibliography

7.3 Stratigraphic Method Statement

7.3.1 Once subgrouping is finalised, the subgroups will be grouped and a basic land-use model will be established for the site. This will provide a land-use led chronological framework for the full analysis and reporting of the site.

7.3.2 After completion of the specialist analysis, reporting and documentary research, an integrated period-driven narrative of the site sequence will be prepared. This will draw on specialist information in order to fully address the revised research aims. The narrative will include relevant selection of period/phase plans, sections, photographs and finds illustrations.

7.3.3 The narrative will then be synthesised with historical and archaeological work from the town of Sandwich and its environs. This will form a holistic narrative focussed on the two specific themes mentioned above (section 7.2.1).

7.4 Geoarchaeology

Pollen

7.4.1 No further work is required

Micromorph

7.4.2 No further work is required

Diatom analysis

7.4.3 Abundance and diversity of diatom taxa is sufficient to enable full analysis to be applied to the complete sequence from site. Further analysis is required on the diatom sampling from the site.

Total **Fee**

7.5 Worked Flint

7.5.1 No further work is recommended

7.6 Roman Pottery

7.6.1 No further work is required. Elements of the above text may be summarised in the main stratigraphic narrative in any future analysis report but there is no need include a standalone specialist report.

7.7 Post- Roman Pottery

7.7.1 It is proposed that the early post-medieval pottery assemblage be subjected to some limited further analysis and a summary report be produced for publication. There are no context groups large enough to warrant detailed analysis in their own right but the assemblage can be amalgamated to increase numbers in order to give a reliable overview and a good range of vessels for illustration. Comparable data will be sought from other published early post-medieval assemblages from Sandwich to see if they too have similarly high proportions of imported material.

7.7.2 The final report will give a brief overview of the whole assemblage, outlining its size, periods represented and range of fabrics. Most detail will be reserved for an overview of the early post-medieval assemblage and up to 10 vessels may be illustrated.

Tasks

7.7.3	Checking selected sherds and finding parallels	0.5 day
	Comparison with previous Sandwich assemblages	1 day
	Report writing	0.75 day
	Selection of material for illustration and description	0.25 day
	Total	**2.5 days**

7.8 The Ceramic Building Material

Tasks

7.8.1	Publication summary of the delftware tiles	0.25 days
	Total	**0.25 days**

7.9 Clay Tobacco Pipe

Tasks

7.9.1	Research Dutch bowl forms	0.5 day
	Compare to other assemblages from the town	1 day
	Research maker's marks	0.5 day
	Compile report	1 day
	Total	**3 days**

7.10 The Glass

7.10.1 No further work is needed

7.11 Geological Material

7.11.1 No further work is required

7.12 The Metallurgical Remains

7.12.1 No further work is required

7.13 The Bulk Metalwork

7.13.1 No further work is required

7.14 The Animal Bone

7.14.1 No further work is required on the hand-collected assemblage, any notes necessary for the publication report can be extracted from the above text.

Tasks

7.14.2 Retrieval of fish bone from the remaining, unsorted residue from sample <1> 0.5 days

Identification of fish bone from sample <1> 1 day

Analysis and production of written report regarding local fishing exploitation strategies to include a comparison with contemporary, local and regional sites including Rye, Hastings and Lewes 1.5 days

Total **3 days**

7.15 The Shell

7.15.1 No further work is required.

7.16 The Registered Finds

7.16.1 Little further work is needed, though it would be beneficial to any further reporting text to try to establish if there was a rifle range or anti-aircraft position on site which the cartridges may have come from. This may be possible through a search of records from the time period indicated by the cartridges. Further reporting text may also be taken from the above.

Tasks

7.16.2 Further research on rifle ranges or anti-aircraft positions 1 day

Total **1 day**

7.17 The Environmental Samples

7.17.1 This assemblage is of low significance and no further work is required.

7.18 Worked Wood

7.18.1 The preparation of a fully updated and referenced specialist text could be achieved in 2-3 days depending on the format intended. It is also essential that such a text be accompanied by a range of detailed plans, elevations, general photographs and selected timber drawings. As some of the reused timbers are not commonplace items they also need some supporting explanatory figures such as a reconstruction of the anchor from which the anchor stock timbers derived etc. These might total c. 5 in number. This work might take c. 3-4 days depending on the intended format of the final report required.

7.18.2 The timbers recovered and in storage at ASE facilities have not been subject to dating and these remaining items should be sub-sampled for dendrochronological analysis and radiocarbon dating should the dendro not succeed (however, see 7.18.3, below). These are destructive techniques and will have an effect on the physical appearance of the timbers.

7.18.3 There is no intrinsic need for any of the items to be conserved. However this may be necessary for up to four items depending on the requirements of the receiving museum (Sandwich Museum). Should this be the case, then destructive further analytical techniques (dendrochronology) will not be undertaken on these pieces.

Tasks

7.18.4 The preparation of a fully updated and referenced specialist text 3 days
Figures 4 days

Total **7 days**

7.19 Illustration

7.19.1 There will be c. 20 stratigraphic figures across two proposed publications 4 days
10 illustrations and/or photographs of post-Roman pottery are proposed 3 days
Up to 10 bowls of Clay Tobacco Pipe are recommended for illustration and/or photographs 2 days

1 artists reconstruction of activity on Sandwich quayside in the early post-medieval period 3 days

Total **12 days**

Stratigraphic Tasks	
Medieval-post medieval waterfront: finalise grouping, land-use and stratigraphic text	5 days
Medieval-post medieval waterfront: background research and thematic discussion	12 days
Medieval-post medieval waterfront: shipbuilding, palaeo-environmental and geoarchaeological text	13 days
National defence and international conflict: grouping, land-use and stratigraphic text	2 days
NMR and National Archive visits	2 days
National defence and international conflict: background research and thematic discussion	15 day
Total	***49 days***
Specialist Analysis	
Lab liaison, facilitating compilation and synthesis of geoarchaeological/paleo-environmental texts	7 days
Geoarchaeology/Diatom analysis (external lab)	Fee
Post Roman pottery	2.5 days
CBM	0.25 days
CTP	3 days
Animal Bone	3 days
Registered finds	1 day
Worked Wood (shipbuilding)	7 days
Wood conservation (external lab) – if required	*Fee*
Total	***21.75 days + fee's***
Illustration	
Pottery and finds illustration	5 days
There will be 20 stratigraphic figures, and site photographs	4 days
Artists reconstruction of Sandwich waterfront	3 days
Total	***12 days***
Production	
Editing of the period-driven narrative	3 days
Project Management	3 days
Journal page feed/ASE layout	Fee
Total	***9 days + fee***

Table 15: Resource for completion of the period-driven narrative of the site sequence

7.20 Artefacts and Archive Deposition

7.20.1 The site archive is currently held at the offices of ASE. Following completion of all post-excavation work, including any publication work, the site archive will be deposited with Sandwich Museum.

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Appendix 1: Borehole Logs for Russian Sample Kings Lodgings

Core 1 1.01m OD

0-0.20m	DA	ST	EL	SICC	UB
	3	0	0	3	1
	Ag2 As1 Sh1				
	Mottled brown-black silt with well humified organics				
0.20-0.97m	DA	ST	EL	SICC	UB
	3	3	0	2	3
	Ag2 Sh1 Gmin1				
	Laminated grey brown silt sand, well humified organics, occ rootlets				
0.97-1.18m	DA	ST	EL	SICC	UB
	4	0	0	2	3
	Ag2 Sh2 Tl+ Gmin+				
	Black grey mottled organic silt, occ small woody fragments				
1.18-1.55m	DA	ST	EL	SICC	UB
	3	0	0	2	2
	Ag2 Sh2 Tl				
	Pale grey black mottled organic silt, woody fragments				
1.55-1.80m	DA	ST	EL	SICC	UB
	2/3	3	0	3	3
	Ag2 Sh+ Gmin2				
	Laminated pale grey silt and sand				
1.80-2.30m	Black homogenous fine sand				
2.30-3.20m	DA	ST	EL	SICC	UB
	3	3	0	3	2
	Ag2 Sh++ Gmin2				
	Laminated black pale brown sand and silt, occ organic laminations well humified, becoming compact with fine sand and gravel, obstructed at base				

Samples

<5> 0-1.60m obstructed full depth not reached, 1.01m OD
Sediment oxidised in tube, was blue grey in the field

0-0.18m	DA	ST	EL	SICC	UB
	3	0	0	4	0
	Ag3 As1				
	Brown silt clay, homogenous				
0.18-0.83m	DA	ST	EL	SICC	UB
	3	3	0	4	2
	Ag2 Gmin2				
	Laminated silt and sand, more defined laminations at base				
0.83-1.23m	DA	ST	EL	SICC	UB
	3	0	0	4	2
	Ag2 Gmin2				
	Homogenous sandy silt				
1.23-1.25m	Coarse sand and gravel, rounded pebbles				
1.25-1.35m	DA	ST	EL	SICC	UB
	3	0	0	4	2
	Ag2 Gmin2				
	Homogenous sandy silt				

1.35-1.39m	DA	ST	EL	SICC	UB
	3	0	0	4	2
	Ag2 Gmin2 Sh				
	Band of sandy silt occasional organic flecks				
1.39-1.53m	DA	ST	EL	SICC	UB
	2	0	0	4	2
	Gmin4 Ag				
	Very fine sand, occasional silt, oxidised and compact at base				

<6> taken close to <5> but from within section against revetment, 0.42m OD

0-0.15m	DA	ST	EL	SICC	UB
	2	1	0	4	0
	Ag3 Gmin1 Sh				
	Weakly laminated silt and fine sand, occ organic flecks				
0.15-0.20m	Coarse sand and rounded gravel				
0.20-0.36m	DA	ST	EL	SICC	UB
	3	1	0	4	4
	Ag2 Gmin2				
	Weakly laminated silt and fine sand, orange oxidation at base				
0.36-0.54m	Mixed sand silt, with cbm, gravel Disturbed alluvium				
0.54-0.83m	DA	ST	EL	SICC	UB
	2	3	0	4	4
	Ag1 Gmin3				
	Laminated sand with silt, cbm recovered at 0.63m				
	Obstruction during sample recovery not bottomed				

<7-12>
Diatoms sent for assessment (T Hill)
0.01m, 0.11m, 0.26m, 0.41m, 0.56m, 0.71m,0.86m, 1.00m,1.15m,1.31m,1.46m
Pollen sent for assessment (Quest)
0.01m, 0.11m, 0.26m, 0.41m, 0.56m, 0.71m,0.86m, 1.00m,1.15m,1.31m,1.46m

Appendix 2: Description of sediment attributes for microstratigraphic units, Monks Wall, Sandwich, Kent

Deposit type	Sample	Microstrat Unit number	Basal Boundary	Particle size	Sorting	Fine material	Groundmass	Colour	Related distibution	Microstructure	Inclusions: Orientation and Distribution
Fluvial silts	12/2	1	N/A	Silt loam	Moderately sorted silt	Mineral	Porostriated, granostriated	PPL: light brown, light orangey brown; XPL: light orange	Embedded and coated, with occasional pockets that are linked and coated.	Vughs 10% Chambers 10% Vesicles 2%	Unoriented, unrelated, random and unreferred
Fluvial sands	12/2	2	Smooth, wavy sedimentological, diffuse in places	Fine sand	Well sorted	Mineral	Crystallitic	PPL: grey/ pale yellow; XPL: Silver	Linked and coated, and intergrain aggregate	Bridged, intergrain aggregate	Unoriented, unrelated, random and unreferred
Fluvial silts/ sands	12/2	3	Smooth, wavy sedimentological, diffuse in places	lenses of Silt loam/ fine sand	Lenses of moderately sorted silt/ well sorted fine sand	Mineral	Crystallitic, stippled specked, granostriated	Lenses PPL orange/ grey; XPL: silver/ orange	Lenses: embedded and coated; linked and coated	Chambers 10% Channels 5% Vughs 5% Bridged	Unoriented, unrelated, random and unreferred
Fluvial sands	12/2	4	Smooth, wavy sedimentological, diffuse in places	Fine sand	Well sorted	Mineral	Crystallitic	PPL: grey/ pale yellow; XPL: Silver	Linked and coated	Bridged	Unoriented, unrelated, random and unreferred
Low energy waterlaid sediment	12/2	5	Wavy diffuse, sedimentological	Silty clay	Bimodal poorly sorted sand, well sorted silt	Mineral	Crystallitic, stippled specked, granostriated	PPL: orange/grey; XPL: orange/ silver	Embedded and coated	Chambers 10% Channels 5% Vughs 5% Sub-angular blocky peds weakly to moderately developed, accomodated/ partially accomodated	Unoriented, unrelated, random and unreferred

Reworked fluvial sediment	12/2	6	Wavy diffuse, sedimentological	Loamy sand/ sandy silt loam	Unsorted	Mineral	Stippled specked, granostriated, crystallitic	PPL: orange/grey; XPL: orange/ silver	Embedded and coated, with occasional pockets that are linked and coated.	Chambers 10% Channels 10% Vughs 5% Sub-angular blocky peds weakly to moderately developed, accomodated/ partially accomodated	Unoriented, unrelated, random and unreferred
Re-deposited fluvial sediment	12/3	7	N/A	Loamy sand	Unsorted	Mineral	Stippled specked, mosaic speckled, granostriated,	PPL: orange/greyish brown; XPL: orange/ light greyish brown	Embedded and coated	Chambers 10% Channels 10% Vughs 5% Sub-angular blocky peds weakly accomodated	Unoriented, unrelated, random and unreferred
Fluvial sands	12/3	8	Wavy diffuse, sedimentological	Fine sandy silt loam	Moderately sorted fine sand	Mineral	Crystallitic, stippled specked, granostriated, parallel striated	PPL: orange/grey; XPL: orange/ silver	Loosely embedded and coated	Chambers 10% Channels 10% Vughs 5% Sub-angular blocky peds weakly developed, accomodated	Quartz particles are moderately oriented aligned to basal boundary, and edges of channels and chambers

Re-deposited fluvial sediment	12/3	9	Wavy diffuse, anthropic	Silty clay/ Silty clay loam/ Silt loam	Unsorted	Mineral	Stippled specked, mosaic speckled, granostriated,	PPL: orange/greyish brown; XPL: orange/ light greyish brown	Embedded and coated	Chambers 10% Channels 10% Vughs 5% vesicles 5% Sub-angular blocky peds weakly to moderately developed, accomodated/ partially accomodated	Unoriented, unrelated, random and unreferred

Appendix 3: Percentage of inclusions within microstratigraphic units, Monks Wall, Sandwich, Kent

Key: ****** Very dominant >70%; ***** Dominant 50-70%; **** Common 30-50%; *** Frequent 15-30%; ** Few 5-15%; * Very few <5%

Deposit type	Slide number	Microstrat unit number	Thickness on slide (cm)	Bedding	Rock Fragments	Minerals							Building materials and Sediment aggregates	Bioarch	Organic/Plant remains				
					Flint	Calcite	Quartz	Muscovite	Glauconite	Manganese	Iron	Calcitic earthworm granules	Sediment aggregate non burnt	Shell	Wood (non-charred)	Charred wood	Plant tissue ferruginous	Amorphous plant tissue	Vascular bundle
Fluvial silts	12/2	**1**	**0.3-0.7**	Massive		**	*****	*	**		**								
Fluvial sands	12/2	**2**	**0.3-0.5**	Massive		****	****	*	**	*	*						*		
Fluvial silts/ sands	12/2	**3**	**0.4-0.6**	Microlaminated		**	*****	*	**	*	**	*					*		
Fluvial sands	12/2	**4**	**0.3-0.6**	Massive		****	****	*	**	*	**						*		
Low energy waterlaid sediment	12/2	**5**	**4.0-4.7**	Massive		**	*****	*	**	*	**	*					*	*	
Reworked fluvial sedimentt	12/2	**6**	**3.9-4.1**	Massive		**	****	*	**	*	**				**		*		

Re-deposited fluvial	12/3	**7**	**3.2-4.9**	Massive			****	*	**	*	**		***	*	*	*	*		
Fluvial sands	12/3	**8**	**0.9-1.6**	Microlaminated		*	*****	*	***	*	**					*	*		
Re-deposited fluvial sediment	12/3	**9**	**3.3-4.3**	Massive	*		****	*	*	*	**		***		*	**	**		*

Appendix 4: Type and percentage of post-depositional within microstratigraphic units, Monks Wall, Sandwich, Kent

Deposit type	Slide number	Unit number	Weathering							Bioturbation			
			Translocation			Chemical alteration				Microstructure effects	Excremental pedofeatures		
			Dusty impure clay coatings: unlaminated	Silty Clay Coatings: moderately/ strongly orientated unlaminated	Iron	Gypsum crystal formation/ precipitation	Mica weathering	Calcite hypocoatings	Manganese neomineral formation	Mesofaunal / root bioturbation	Mesofauna cast	Organic/ organo-mineral	Earthworm granule
Fluvial silts	12/2	**1**		●●	●●●		●●			●●●			
Fluvial sands	12/2	**2**		●●	●●		●●	●●●	●●			●●	
Fluvial silts/ sands	12/2	**3**		●●●	●●●		●●		●●	●●●●		●●	●
Fluvial sands	12/2	**4**			●●●		●●	●●●	●●			●●	
Low energy waterlaid sediment	12/2	**5**		●●●●	●●●		●●		●●	●●●●			●
Reworked fluvial sediment	12/2	**6**	●●	●●●	●●●		●●	●●	●●	●●●●●			
Re-deposited fluvial sediment	12/3	**7**	●●●	●●	●●●				●●	●●●●●		●	
Fluvial sands	12/3	**8**		●●●	●●●				●●	●●●●●			
Re-deposited fluvial sediment	12/3	**9**	●●●	●	●●●				●●	●●●●●			

Key: ●●●●● Very abundant >20%; ●●●● Abundant 10-20%; ●●● Many 5-10%; ●● Occasional 2-5%; ● Rare <2%

Appendix 5: Results of the pollen assessment from sample borehole <5>, Kings Lodging Timber Revetment, Sandwich Tidal Defences

	Depth (m bgs)	**0.01**	**0.11**	**0.26**	**0.36**	**0.41**	**0.56**	**0.71**	**1.06**	**1.15**	**1.31**	**1.46**
Latin name	**Common name**											
Trees												
Alnus	alder	1										1
Quercus	oak	2			1			1			1	1
Pinus	pine	2	1			1	1	1		1	1	
Ulmus	elm				1	1	1					
Betula	birch			1								
Shrubs												
Callluna vulgaris	heather				1					1		
Corylus type	e.g. hazel			1	2			2				1
Ilex	holly							1				
Herbs												
Cyperaceae	sedge family	1			1							
Poaceae	grass family	2		2	1	3		1	2	1		3
Cereale type	e.g. barley				1	1	1					
Asteraceae	daisy family	1					1		1	1		
Lactuceae	dandelion family	1						2				1
Plantago lanceolata	ribwort plantain										1	
Chenopodium type	goosefoot family					1		4				
Rumex acetosa/acetosella	sorrel									1		
Sinapis type	e.g. charlock						1					
Aquatics												
Sparganium type	bur-reed								1			
Spores												
Pteridium aquilinum	bracken									1		
Polypodium vulgare	polypody									1		
Total Land Pollen (grains counted)		10	1	4	8	7	5	12	4	7	3	7
Concentration*		2	1	1	2	1	1	2	1	1	1	1
Preservation**		4	2	3	4	4	4	4	4	4	4	4
Microcharcoal Concentration***		3	3	3	2	4	3	3	2-3	2-3	2-3	2-3
Suitable for further analysis		**YES**	**NO**	**NO**	**NO**	**NO**	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

*Key: *Concentration: 0 = 0 grains; 1 =1-75 grains, 2 = 76-150 grains, 3 =151-225 grains, 4 = 226-300, 5 =300+ grains per slide; **Preservation: 0 = absent; 1 = very poor; 2 = poor; 3 = moderate; 4 = good; 5 = excellent; ***Microcharcoal Concentration: 0 = none, 1= negligible, 2 = occasional, 3 = moderate, 4 = frequent, 5 = abundant*

Appendix 6: Quantification of bulk finds

Context	Pottery	Wt (g)	CBM	Wt (g)	Bone	Wt (g)	Shell	Wt (g)	Flint	Wt (g)	FCF	Wt (g)	Stone	Weight	Fe	Wt (g)	Cu Alloy	Wt (g)	Glass	Wt (g)	CTP	Wt (g)	Slag	Wt (g)	Mortar/Concrete/plaster	Wt (g)
TP1/003			3	144	1	408																				
TP2/003			4	212	3	988									2	608										
TR5/005	1	88	18	834	1	148																			3	282
TP5/006			2	728	1	88																			1	32
001			1	880																						
002			2	426																						
003			1	248																						
005																			5	704						
68					24	3456																				
116																	1	6								
207			1	26																						
209			1	248																						
210	4	38	3	274	2	116							3	26	1	10							3	16		
211	1	14																								
212	1	18	1	22																						
216			7	974																						
222			2	38																						
232			1	92															2	<2						
254													1	10									2	8		
258							1	16					12	34									5	50		

Context	Pottery	Wt (g)	CBM	Wt (g)	Bone	Wt (g)	Shell	Wt (g)	Flint	Wt (g)	FCF	Wt (g)	Stone	Weight	Fe	Wt (g)	Cu Alloy	Wt (g)	Glass	Wt (g)	CTP	Wt (g)	Slag	Wt (g)	Mortar/Concrete/plaster	Wt (g)
261			11	342															1	<2						
298																							1	880		
317																							3	148		
333	3	24																	1	22						
349			1	34																						
399			1	110																						
406			3	150																						
409							1	16					2	2												
412			2	94																						
415									1	86																
431															1	168										
431															2	196										
437			4	224																						
439			1	30																						
440			1	62																						
444			2	108																						
450	3	22													1	46										
451	3	1594	4	1066	2	6	1	108					1	188												
458															3	418										
460															11	624										
461															2	64										
467			2	98	3	102																				

Context	Pottery	Wt (g)	CBM	Wt (g)	Bone	Wt (g)	Shell	Wt (g)	Flint	Wt (g)	FCF	Wt (g)	Stone	Weight	Fe	Wt (g)	Cu Alloy	Wt (g)	Glass	Wt (g)	CTP	Wt (g)	Slag	Wt (g)	Mortar/Concrete/plaster	Wt (g)
472																					3	12				
483							20	<2																		
504					1	776																				
506	2	20													1	2			1	8						
506					2	286																				
507	1	12					1	<2	1	16																
508	5	76	20	1728	4	44			1	22	1	2													1	4
508	6	160																								
508	1	34	6	422	11	172					2	34	1	88												
509			4	72							1	104														
515			2	3988																						
520			1	1960																						
521															2	322										
522																					1	208				
539	1	10	2	256																						
541			3	290																						
545	1	50																								
545			1	155																						
550	2	36	1	126	1	30							2	28					1	4						
573	5	350	2	206	1	84	1	14					1	82												
575			4	434			1	14					2	84	1	52										
579			2	98	2	34																				

Context	Pottery	Wt (g)	CBM	Wt (g)	Bone	Wt (g)	Shell	Wt (g)	Flint	Wt (g)	FCF	Wt (g)	Stone	Weight	Fe	Wt (g)	Cu Alloy	Wt (g)	Glass	Wt (g)	CTP	Wt (g)	Slag	Wt (g)	Mortar/Concrete/plaster	Wt (g)
599					141	1228								1369					11	984			1	200		
617	2	30	4	1298									1	6331												
629	68	2916	22	2846	18	658	3	222	2	76			4	254	11	290			12	1216	12	62			3	106
629	17	294	13	1000	2	45							1	1430	1	20			1	5	1	3				
630	13	648			1	10	1	52											1	22						
630	4	92	5	325	5	66								497	6	63			4	90						
631	5	247	2	2700	41									2995							2	10				
654															1	190										
667															2	110										
674															4	39										
686	1	2																								
689			2	158																						
690			3	318																						
693	10	1136					1	60	1	2											4	16				
693			1	496																						
706															1	4										
762	9	675	6	812	7	190	1	44	1	63									1	118	10	93				
763	5	129	4	1995	1	362							2	757					4	545	17	130	1	491		
764																					5	47				
765	2	197	1	946	1	33													1	<2	7	61				
796	1	11																			1	7				

Context	Pottery	Wt (g)	CBM	Wt (g)	Bone	Wt (g)	Shell	Wt (g)	Flint	Wt (g)	FCF	Wt (g)	Stone	Weight	Fe	Wt (g)	Cu Alloy	Wt (g)	Glass	Wt (g)	CTP	Wt (g)	Slag	Wt (g)	Mortar/Concrete/plaster	Wt (g)
12102			1	114	1	14	4	12					1	14					2	40			2	128		
431 CH1400															2	40										
431 CH1500															1	42										
524 R1 CH390			2	662																						
630 R4 quay	11	4706																								
670 R4															1	28										
670 R4 Bolt 2															1	10										
693 from between W678+W679															1	18			3	33						
696+697															1	6										
Lower fill*	1	24							1	168					2	68			5	64	1	4				
R.8-11N CH1350															1	72										
R-12 u/s	1	4																								
R12/12112					1	4	3	14																		
R3																			1	318						
R5			4	1496																						
R8 - 11 CH1325															2	180										
R8 - 11N CH1450															1	129										
R8-11			1	270	2	340																				
U/S	1	82													1	1674										
U/S Dredged R4	1	136			2	80													1	246						
unstrat															1	186			9	1726						

Context	Pottery	Wt (g)	CBM	Wt (g)	Bone	Wt (g)	Shell	Wt (g)	Flint	Wt (g)	FCF	Wt (g)	Stone	Weight	Fe	Wt (g)	Cu Alloy	Wt (g)	Glass	Wt (g)	CTP	Wt (g)	Slag	Wt (g)	Mortar/Concrete/plaster	Wt (g)
Upper fill*			4	200											23	1730	1	34	1	24	1	1	3	532	1	184
W655															3	90										
W671															1	10										
W687															1	38										
<6>			2	48																						
Total	192	13875	204	32883	282	9768	39	572	8	433	4	140	34	14189	96	7547	2	40	68	6169	65	654	21	2453	9	608

Appendix 7: Brick fabric descriptions

Fabric	Description
B1	Soft, pale pinkish-brown calcareous fabric. Common fine-medium quartz or sell. Sparse oxides up to 1mm. Calcareous speckle; sometimes merges to form paler patches
B1A	Pale brown-pink fabric with common medium mixed quartz and shell fragments up to 1mm.
B2	Yellow fabric; hard-fired with fine quartz.
B2A	B2, but slightly calcareous and with sparse faint-to-dark red iron-rich inclusions and pale brownish silty patches up to 6mm.
B3	Medium-hard fired orange-red fabric; slightly micaceous, with common fine quartz.
B3A	harder fired version of B3 with common fine and medium voiding, common dark red iron-rich flecks and deposits up to 4mm; moderate quartz, mostly fine and medium, some very coarse.
B4	Mauve-purple fabric with common fine yellow / calcareous speckle. Sparse coarse burnt oxide patches.
B5	Cream and pink fabric, with pink, calcareous clay merging into clean looking cream clay (like B5A). Sparse iron-rich inclusions up to 1mm.
B5A	Clean, cream fabric, similar to B5 but with moderate medium angular grey quartz.
B6	Fine, pale, pink-grey fabric, occasional moderate white calcareous speckle; common medium grey and white quartz.
B6A	Dark, pink fabric with cream calcareous speckling and large, silty deposits up to 1.5mm.
B7	Post-medieval fabric. Calcareous pink fabric with sparse cream silty deposits and marbling, and very coarse red deposits up to 10mm.
B8	Medieval fabric. Hard, dark brown-pink abundantly speckled and marbled with yellow calcareous material (makes up majority of fabric).
B8A	Medieval fabric. Paler [underfired?] B8; pink with abundant white calcareous material.
COMP	Compressed brick fabric, mid-19th century or later.
MoL 3032	Dark red, reddish purple fabric; parts of the surface are often discoloured by fine yellow speckling. Common burnt black ash and flint inclusions (up to 6mm) with varying amounts of quartz (up to 0.8mm). Clay pipe stems in some bricks
MoL 3034	Dark red, reddish purple fabric with burnt black ash, flint inclusions (up to 6mm) with varying amounts of quartz (up to 0.8mm). Common yellowish white silty bands in clay matrix.
MoL 3035	Generally yellow; occasionally pale brown. Common burnt black ash and chalk inclusions (up to 4mm). Scatter of quartz (up to 0.6mm).The fabric is hard and riddled with tiny air pockets where organic matter has burned out during firing.

Appendix 8: Roof tile fabric descriptions

Fabric	Description
T1	Fine, dense orange fabric with sparse fine-medium white inclusions (shells?), dark red iron-rich inclusions up to 1mm and calcareous deposits up to 1.5mm. Occasional very coarse quartz. (Fine moulding sand)
T2	Fine, dense orange fabric with moderate-common sub-rounded quartz. (Fine moulding sand)
T2A	T2 but with more common quartz including opalescent blue-toned quartz.
T3	Fine, dense, pinkish fabric with common calcareous speckle and sparse-moderate calcareous deposits up to 2mm.
T3A	Pinkish fabric with fine calcareous speckle and well-defined cream marbling.
T3B	Pinkish fabric, abundantly speckled and marbled with calcareous material (speckle much coarser than T3). Tile version of B8A?
T3C	Pinkish fabric with abundant calcareous speckle and irregular dark red inclusions up to 1.5mm. Overfired variant: dark brown-purple with yellow speckle.
T4	Very fine pale orange fabric with pale/cream marbling. Sparse calcareous and darker orange iron-rich deposits.
T4A	Similar to T4 but only occasionally marbled. More inclusions than T4: fine dark red and calcareous speckling. Tile surfaces often patinated.
T5	Gritty-looking fabric with common fine quartz, sparse coarse and very coarse quartz and oxides.
T6	Grey-brown fabric with paler smears and sparse dark red deposits up to 0.5mm. (Reduced version of another fabric?)
T7	Machine made tile. Pale yellow fabric with common angular grey and rose quartz and fine iron oxide speckle.
T8	Hard red fabric with calcareous speckle, sparse quartz and pebble fragments up to 2mm and burnt out oxides up to 3mm. Dirty looking fabric.
T9	Pink fabric with white streaks and silty deposits up to 4mm (moderate-common); common white quartz up to 1mm; sparse red deposits up to 8mm.
T10	Medium orange fabric with common medium quartz and sparse very coarse quartz and pebble sherds.

Appendix 9: Floor tile fabrics

FT1	Dense and slightly micaceous red fabric. Moderate dark red iron-rich speckle.
FT2	Hard-fired reddish fabric with fine quartz and sparse fine-medium white/shell fragments, Sparse pebble fragments up to 2mm.
FT3	Medium orange fabric with varying quantities of calcareous speckle up to 0.5mm and medium quartz (sparse-moderate); sparse red iron-rich pellets up to 1mm.

Appendix 10: Roman CBM fabrics

R1	Fine but gritty orange fabric with common fine-medium crushed shell and sparse oxide speckle.
R2	Dense orange fabric with sparse to moderate medium and coarse iron-rich and calcareous inclusions.
R3	Dense, medium orange fabric with visible fine and medium mica, common fine quartz and sparse red iron-rich inclusions up to 2mm.
R4	Pale, pinkish fabric with moderate fine oxide speckle and inclusions up to 1mm. Sparse medium grey quartz (in clusters).

Appendix 11: Catalogue of glass assemblage

Context	Glass period	Form/type	Colour	No	Weight	Corrosion	Dimensions	Markings/embossing	Closure	%	ENV	Notes
1/008	LPM	Beer bottle	Dark green	4	208	None	x1 base 85mm	x2 'N in circle' on base, x1 ? SAND[WICH] around front			3	Beer/wine
3/002	LPM	Cylindrical form	Pale blue	1	310	Rainbow	Base 119mm	A.C.R. and Co' around base			1	Medicine
3/002	LPM	Lamp shade cylindrical	Frosted	1	8	None					1	Light
3/002	LPM	Cylindrical bottle	Aqua	1	52	Slight rainbow sheen					1	Misc
u/s	LPM	Cylindrical bottle	Colourless	1	202	None	Rim - 40mm, Base - 45mm, Height - 145mm	REGD No 704846 around base, Q747 // UGB across base. Ribbed lower body – diamond ribbing above paper label space	Ext screw	100	1	Cordial
u/s	LPM	Hexagonal jar	Colourless	1	146	None	R - 47mm, B - 45mm, H - 95mm	Rd No ?884057 around base. Vertical ribbing on body	Fe lidded	100	1	Shippams meat paste
u/s	LPM	Cylindrical jar	Colourless	1	138	None	R - 47mm, B - 38mm, H - 91mm	Vertically ribbed with oval space for paper label	Fe lidded	100	1	Shippams meat paste
u/s	LPM	Cylindrical jar	Colourless	1	140	None	R - 47mm, B - 34mm, H - 94mm	SHIPPAM'S' obliquely on rear. Vertically ribbed with round paper label space	Fe lidded	100	1	Shippams meat paste
u/s	LPM	Oval bottle	Amber	1	162	None	R - 50mm, B - 55x38mm, H - 78mm	OXO // 4OZ' down sides. 'A 590 // C3 // UGB across base	Fe lidded	100	1	Oxo
u/s	LPM	Oval bottle	Amber	1	118	None	R - 48mm, B - 45x32mm, H - 65mm	OXO //2OZ down sides. 'B445 // C6 // UGB' across base	Fe lidded	100	1	Oxo
u/s	LPM	Oval bottle	Amber	1	514	None	R - 65mm, B - 85x58mm, H - 163mm	Across base: '365 // 3 // ?'. Remains of black and yellow paper label	Ext screw	100	1	Necked jar/bottle
u/s	LPM	Rectangular bottle	Colourless	1	96	None	R - 25mm, B - 49x27mm, H - 129mm	Down front: 'Tea-spoons' (with gradations)	Cork	100	1	Medicine
u/s	LPM	Oval bottle	Colourless	1	204	None	R - 23mm, B - 66x38mm, H -	Down front: 'WOODWARD // CHEMIST // LONDON'. Across	Ext screw	100	1	Medicine

Context	Glass period	Form/type	Colour	No	Weight	Corrosion	Dimensions	Markings/embossing	Closure	%	ENV	Notes
							151mm	base: 'C 742 (over 'A') G'				
upper fill	LPM	Cylindrical bottle	Colourless	1	24	None					1	Misc
lower fill	LPM	Lamp shade cylindrical	Milk	2	48	None					1	Light
lower fill	LPM	Window	Colourless	2	10	None	Thickness 1.6mm				1	Window
lower fill	LPM	Beer/wine bottle	Dark green	1	8	None					1	Beer/wine
R3	LPM	Cylindrical bottle	Aqua	1	316	None		Invicta horse in shield over motto around hick is 'EAST KENT MINERAL WATER COMPANY SANDWICH'	?	95	1	Mineral water. Hamilton bottle. Sandwich Mineral Water Company c. 1930-34 or East Kent Brewery, Strand Street 1887-1923 - both use this name
R4 u/s	LPM	Lid	Colourless	1	248	None	117mm di	Internally cut glass/facetted with hexagonal knob handle	n/a	100	1	
5	LPM	Cylindrical bottle	Colourless	1	64	None	R - 12mm, B - 31mm, H - 105mm	Around shoulder: Cross on orb mark below which is 'CoeCHARTREUSE'	Cork	100	1	Convex neck miniature spirit
5	LPM	Rectangular bottle	Colourless	1	202	Slight rainbow sheen	R - 21mm, B - 62x36mm, H - 157mm	Across base: 'UGB // ? 07'	Ext screw	100	1	
5	LPM	Cylindrical jar	Colourless	1	186	None	R - 62mm, B - c. 55mm, H - c 117mm	None	Lidded	90	1	Preserve
5	LPM	Oval jar	Colourless	1	178	None	R - 50mm, B - 55x49mm, - H - 91mm	Arced over shoulder: 'BRYLCREEM // REGD'. X2 recessed finger grooves on sides	Ext screw	100	1	Brylcreem
5	LPM	Cylindrical jar	Colourless	1	76	None	R - 42mm, B - 32mm, H - 67mm	Obliquely up rear: SHIPPAM'S' Vertical ribbing with circular flat area for paper label. Around base: 'FOUNDED 1750' Middle of base: '28'	Fe lidded	100	1	Shippams meat paste

Context	Glass period	Form/type	Colour	No	Weight	Corrosion	Dimensions	Markings/embossing	Closure	%	ENV	Notes
27	LPM	Cylindrical bottle	Aqua	1	132	None	B - c 105mm	Across base '?Ld // K // 11'	Lidded		1	Preserve
27	LPM	Cylindrical bottle	Aqua	1	70	None		Invicta horse in shield over motto around hick is 'EAST KENT MINERAL WATER COMPANY SANDWICH'	?		1	Mineral water. Hamilton bottle. Sandwich Mineral Water Company c. 1930-34 or East Kent Brewery, Strand Street 1887-1923 - both use this name
27	LPM	Square bottle	Colourless	1	90	None	B 49x49mm	On sides: '…N'S' and '…?RY' (Paterson's Camp Coffee with Chicory)	?		1	Camp Coffee
46	LPM	Cylindrical bottle	Colourless	1	314	None	R - 47mm, B - 42x37mm, H - 147mm	None	Fe lidded	100	1	Preserve
46	LPM	Rectangular bottle	Colourless	1	94	None	R - 30mm, B - 42x37mm, H - 58mm	Across base: 'WATERMAN'S // 4 // REGD No // 808853	Ext screw	100	1	Bipartite carinated body
46	LPM	Square bottle	Colourless	1	96	None	R - 26mm, B - 36x36mm, H - 104mm	Down opposite sides: 'FOSTER CLARK Ltd // MAIDSTONE' and 'EIFFEL TOWER // LEMONADE'. Across base: 'B300 // G 2 // UGB'	Ext screw	100	1	
46	LPM	Oval bottle	Colourless	1	216	None	R - 25mm (fe top), B - 65x38mm, H - 152mm (with lid)	Down front: 'WOODWARD // CHEMIST // LONDON'. Across base: 'A 89 // C // UGB'	Fe top ext screw	100	1	Brown liquid inside
46	LPM	cylindrical bottle	Colourless	1	416	None	R - 27mm, B - 62mm, H - 224mm	Around base of body (x2): 'OZONIC' on textured 'zone'. Shoulder also has dentritic texture	Crown top	100	1	Mixer
46	LPM	cylindrical bottle	Dark green	1	648	None	R - 29mm, B - 79mm, H - 256mm	None	Cork	100	1	High kick
46	LPM	Panel bottle	Colourless	1	256	None	R - 25mm, B - 44x44mm, H - 200mm	None	Ext screw	100	1	Sauce. Recessed on x3 faces

Context	Glass period	Form/type	Colour	No	Weight	Corrosion	Dimensions	Markings/embossing	Closure	%	ENV	Notes
46	LPM	Square bottle	Colourless	1	304	None	R - 26mm, B - 47x47mm, H - 222mm	None	Ext screw	100	1	Sauce Chamfered edges
46	LPM	Square bottle	Colourless	1	214	None	R - 23mm; B - 42x42mm, H - 172mm	Across base: 'T 1'	Ext screw	100	1	Sauce. Slight chamfered edges
46	LPM	Oval bottle	Aqua	1	340	None	R - 22mm, B - 84x36mm, H - 197mm	Across shoulder: 'POISONOUS'. Across base of body: 'SANIZAL'. Ribbed front with 'TABLESPOONS' up and down edges. Across base: '532 // 2B'	Ext screw	100	1	
46	LPM	cylindrical bottle	Colourless	1	250	None	R - 40mm, B - 50mm, H - 168mm	Around base: 'HEINZ Co 821'. Facetted lower body	Fe top ext screw	100	1	Sauce
46	LPM	cylindrical jar	Colourless	1	248	None	R - 68mm, B - 72mm, H - 118mm	In base centre: 'M' in circle. Around base: 'S R 444 13 UGB'	Fe top ext screw	100	1	Preserve
46	LPM	cylindrical jar	Colourless	1	262	None	R - 54mm, B - 62mm, H - 126mm	Around shoulder: 'HORLICKS' x2. On base 'R (in circle)	Fe top ext screw	100	1	
46	LPM	Rectangular bottle	Colourless	1	202	None	R - 20mm, B - 62x37mm, H - 157mm	Across base: UGB // 6OZ	Ext screw	100	1	
46	LPM	Rectangular bottle	Colourless	1	136	None	R - 24mm, B - 56x33mm, H - 135mm	Remains of paper label with mention od cod liver oil	Cork	100	1	
46	LPM	cylindrical jar	Colourless	1	148	None	R - 47mm, B - 40mm, H - 93mm	Body with all over vertical ribbing (divided by x2 bands of three horizontal girth lines. X2 oval spaces for paper labels	Lidded	100	1	Meat paste
46	LPM	cylindrical jar	Colourless	1	180	None	R - 57mm, B - 51mm, H - 78mm	Groups of 4 horizontal fine ribbed lines. On base: '7'	Lidded	100	1	Meat paste
46	LPM	cylindrical jar	Colourless	1	74	None	R - 47mm, B - 43mm, H - 53mm	Around base (in straight lines) 'A175 / FGC / 2'	Lidded	100	1	Meat paste

Context	Glass period	Form/type	Colour	No	Weight	Corrosion	Dimensions	Markings/embossing	Closure	%	ENV	Notes
46	LPM	Hexagonal jar	Colourless	1	146	None	R - 47mm, B - 40mm, H - 94mm	Vertically ribbed body over lower portion of tapering hexagonal faceted body. Around base: 'Rd No 684057'	Lidded	100	1	Meat paste
46	LPM	7-sided jar	Colourless	1	102	None	R - 42mm, B - 34mm, H - 85mm	Vertically ribbed 7-sided body but x3 sides smooth for paper label	Lidded	95	1	Meat paste
232	EPM	cylindrical	Colourless	2	1	Flaking rainbow surfaces	Thickness 1mm				1	Uncertain form
261	LPM	Lamp shade cylindrical	Red	1	1	None		Fruit gum' embossed reflector face	n/a		1	Bicycle
333	LPM	Cylindrical glass	Colourless	1	22	Slight rainbow sheen					1	Tumbler
506	LPM	Beer/wine bottle	Dark green	1	6	None					1	
550	LPM	Cylindrical vessel	Pale green	1	2	None					1	1850-1925
574	LPM	Window	Colourless	9	2	None	Thickness 2mm				2	
574	LPM	Cylindrical vessel	Aqua	1	1	None					1	
617	EPM	Beer/wine bottle	Dark green	1	86	Heavy gold flaking					1	L C17th - e 18th
617	LPM	Beer/wine bottle	Dark green	9	878	None	B - 96 and 97mm				3	Rounded deep kicks
617	EPM	Square bottle	Dark green	1	16	Rainbow sheen					1	Gin?
629	LPM	Beer/wine bottle	Dark green	8	176	None	R - 32mm				2	cylindrical form
629	LPM	Beer/wine bottle	Dark green	3	1014	Some rainbow sheen	R - 23 and 30mm; B - 118mm, H - c. 205mm				3	x1 e/m C18th mallet type with high kick (118mm base, c. 205mm tall - 95%)
629	EPM	Cylindrical vessel	Pale green	1	26	Purple/blue flaking					1	Goblet/glass
630	LPM	Beer/wine bottle	Dark green	8	108	Some purple sheen					2	cylindrical form

Context	Glass period	Form/type	Colour	No	Weight	Corrosion	Dimensions	Markings/embossing	Closure	%	ENV	Notes
693	EPM	Cylindrical bottle	Green	3	38	Heavy gold flaking	R - 28mm				1	
762	EPM	Beer/wine bottle	Dark green	1	118	Heavy gold flaking					1	onion form
763	EPM	Beer/wine bottle	Dark green	3	316	Heavy gold flaking					1	onion form
763	EPM	Cylindrical vessel	Dark green	1	224	Heavy gold/rainbow flaking					1	large amphora/storage vessel
765	EPM	?	Colourless	1	1	Heavy opaque					1	
12102	LPM	Cylindrical bottle	Aqua	2	40	None					1	Mineral water

Appendix 12: Residue quantification (* = 1-10, ** = 11-50, *** = 51-250, **** = >250) and weights in grams

Sample Number	Context	Sample Volume litres	Sub-Sample Volume litres	Charcoal >4mm	Weight (g)	Charcoal <4mm	Weight (g)	Charred botanicals (other than charcoal)	Weight (g)	Bone and Teeth	Weight (g)	Burnt bone >8mm	Weight (g)	Burnt bone 4-8mm	Weight (g)	Burnt Bone 2-4mm	Weight (g)	Fishbone and microfauna	Weight (g)	Marine Molluscs	Weight (g)	Land Snail shells	Weight (g)	Other (eg ind, pot, cbm)
1	210	20	20	***	32	****	10	*	<1	**	62			**	3			****	43	**	248			CBM **/ 2296g - pottery **/ 87g - Cu **/ 3g - Fe */ 15g - burnt slate **/ 51g - industrial mat. ****/ 130g - flint **/ 28g - coal ***/ 257g - mag. Mat. ****/ 17g - mortar **/ 86g - slate **/ 268g
2	216	20	20	**	12					*	<1			*	<1									CBM **/ 754g - mortar **/ 146g - flint */ 6g - pot */ 1g - mag. Mat. ****/ 314g - burnt slate **/ 716g - coal ****/ 337g - slag ****/ 987g - industrial material ****/ 808g
3	574	30	30																	*	13			pottery */ 5g - CBM */ 27g - glass */ 5g - metal object */ 1g - flint */ 7g - coal ****/ 23g - mag. Mat. ****/ 130g - burnt clay **/ 62g - industrial mat./ conglomerate ****/ 5015g
14	12112	30	30	*	<1	**	<1															*	<1	
15	12311	40	40	**	1	***	3	**	<1													*	<1	flint */ <1g
16	12304	40	40	**	4	****	8	*	<1	*	2									**	5	**	2	industrial material */ 2g

Appendix 13: Flot quantification (* = 1-10, ** = 11-50, *** = 51-250, **** = >250) and weights in grams

Sample Number	Context	Weight g	Flot volume ml	Volume scanned	Uncharred %	Sediment %	Seeds uncharred	Charcoal >4mm	Charcoal <4mm	Charcoal <2mm	Land Snail Shells	Industrial debris hammerscale
1	210	6.5	50	50	40	20	*** *Sambucus* sp., *Vitis vinifera* (1)			**		***
2	216	54	120	100	20	20						****
3	574	7.5	75	75	70	10						
14	12112	2.6	25	25	70	20				**		
15	12311	3	30	30	80	10				*		
16	12304	15	150	100	50	10		**	**	****	**	

Appendix 14: Waterlogged samples data (* = 1-10, ** = 11-50, *** = 51-250, **** = >250)

Sample Number	Context	Sieves used	Sub-sample scanned ml	Macrobotanical Remains	Idenitification and preservation notes	Wood	Notes on Preservation of Wood	Insects and Fly pupae	Notes on insect remains
7	629	1,500,250	50	*	Polygonaceae			*	1 fly pupa
8	629	2,1,500,250		*	unidentified seed	*	smaller than 2mm, no round wood noted		
9	629	1,500,250	50	*	*Urtica dioica*, *Conium maculatum*				
10	629	1,500,250	50	**	*Conium maculatum*, *Carex* sp., *Chenopodium* sp., Apiaceae	**	smaller than 2mm, occasional tiny twigs present		
11	629	2, 1500250	50	*	cf *Conium maculatum*, cf *Sambucus* sp., Polygonaceae, indeterminate thorn				
12	629	1,500,250	50	*	*Rumex* sp., *Stellaria media*	**	only <2mm flecks, no round wood		
13	629	4,2,1,500,250	50	*	*Sambucus nigra*	**	very few fragments >4mm, some twigs present		

Appendix 15: List of wood samples taken for dendro or species ID

Sample Number	Sample for dendro	Sample for species ID	Object	Box	SPECIES	Comments
633	1	1		1	*Quercus* sp.	
634	1	1		1	*Quercus* sp.	
636	1	1		1	*Quercus* sp.	
637	1	1		1	*Quercus* sp.	
638	1	1		1	*Pinus* cf *sylvestris*	
638	0	0	1	Peg Bucket	*Pinus* cf *sylvestris*	
638	0	1		Species ID Box	*Pinus* cf *sylvestris*	
639	1	1		2	*Quercus* sp.	
640	1	1		2	*Quercus* sp.	
641	1	1		1	*Quercus* sp.	
641	0	1		Species ID Box	*Quercus* sp.	
644	1	1		2	*Quercus* sp.	
645	1	1		1	*Quercus* sp.	
647	0	1		Species ID Box	*Fraxinus excelsior*	
648	1	1		2	*Quercus* sp.	
649	1	1		1	*Quercus* sp.	
650	0	1		Species ID Box	*Pinus* sp.	
651	0	1		Species ID Box	*Pinus* cf *sylvestris*	
653	0	1		Species ID Box	*Pinus* sp.	
654	0	1		Species ID Box	*Pinus* cf *sylvestris*	
655	1	1		1	*Quercus* sp.	
657	0	0	1	Peg Bucket	*Quercus* sp.	
658	1	1		1	*Quercus* sp.	

658	0	0	1	Peg Bucket	*Quercus* sp.	
658	0	1		Species ID Box	*Quercus* sp.	
659	1	1		3	*Quercus* sp.	
660	1	1		3	*Quercus* sp.	
661	1	1		2	*Quercus* sp.	
662	0	1		Species ID Box	*Pinus* cf *sylvestris*	
664	0	1		Species ID Box	*Ulmus* sp.	
665	0	0	1	Peg Bucket	*Quercus* sp.	
665	0	1		Species ID Box	*Quercus* sp.	
667	0	1		Species ID Box	*Quercus* sp.	
668	0	1		Species ID Box	*Pinus* sp.	
669	1	1		2	*Pinus* cf *sylvestris*	
670	0	1		Species ID Box	*Pinus* sp.	
671	0	0	1	Peg Bucket	*Pinus* sp.	
671	0	0	1	Peg Bucket	*Pinus* sp.	
671	0	1		Species ID Box	*Pinus* sp.	
672	0	1		Species ID Box	*Quercus* sp.	
674	0	1		Species ID Box	*Pinus* cf *sylvestris*	
676	1	1		1	*Quercus* sp.	
678	0	1		Species ID Box	*Pinus* cf *sylvestris*	
679	0	1		Species ID Box	*Quercus* sp.	
680	1	1		1	*Quercus* sp.	
680	0	1		Species ID Box	*Quercus* sp.	has large FE nail in it
680	0	0	1	Peg Bucket	*Quercus* sp.	
681	1	1		2	*Quercus* sp.	
682	1	1		2	*Quercus* sp.	

683	0	1		Species ID Box	*Pinus* cf *sylvestris*	
684	0	1		Species ID Box	*Pinus* cf *sylvestris*	
685	1	1		1	*Quercus* sp.	
686	1	1		1	*Quercus* sp.	
687	0	1		Species ID Box	*Pinus* sp.	
688	0	1		Species ID Box	*Pinus* cf *sylvestris*	
696/697	0	1		Species ID Box	*Quercus* sp.	
698	0	1		Species ID Box	*Quercus* sp.	
698	0	0	1	Peg Bucket	*Quercus* sp.	
700	1	1		2	*Pinus* cf *sylvestris*	
701	1	1		2	*Quercus* sp.	
702	0	1		Species ID Box	*Pinus* sp.	
703	0	1		Species ID Box	*Pinus* cf *sylvestris*	
704	1	1		2	*Quercus* sp.	
705	1	1		3	*Quercus* sp.	
706	0	1		Species ID Box	*Pinus* sp.	
712	0	1		Species ID Box	cf *Quercus* sp.	
715	1	1		3	*Quercus* sp.	
716	0	1		Species ID Box	*Pinus* cf *sylvestris*	
717	1	1		1	cf *Quercus* sp.	
718	0	1		Species ID Box	*Ulmus* sp.	
720	0	1		Species ID Box	*Quercus* sp.	
721	1	1		2	*Pinus* cf *sylvestris*	
722	0	1		Species ID Box	*Pinus* cf *sylvestris*	
729	1	1		3	*Pinus* cf *sylvestris*	
731	1	1		3	*Pinus* cf *sylvestris*	

732	1	1		3	*Pinus* cf *sylvestris*	
736	0	1		Species ID Box	*Pinus* cf *sylvestris*	
737	0	1		Species ID Box	*Pinus* cf *sylvestris*	
738	0	1		Species ID Box	*Pinus* cf *sylvestris*	
739	0	1		Species ID Box	*Pinus* cf *sylvestris*	
741	0	1		Species ID Box	*Quercus* sp.	
743	0	1		Species ID Box	*Quercus* sp.	
747	0	1		Species ID Box	*Quercus* sp.	
749	0	1		Species ID Box	*Quercus* sp.	
750	0	1		Species ID Box	*Quercus* sp.	
752	1	1		3	*Quercus* sp.	
753	0	1		Species ID Box	*Quercus* sp.	
754	1	1		3	*Quercus* sp.	
755	1	1		3	*Quercus* sp.	
756	1	1		3	*Quercus* sp.	
757	1	1		3	*Quercus* sp.	
758	1	1		3	*Quercus* sp.	
759	0	1		Species ID Box	*Quercus* sp.	
761	1	1		3	*Quercus* sp.	
766	1	1		3	*Quercus* sp.	
767	0	1		Species ID Box	*Quercus* sp.	
768	1	1		3	*Quercus* sp.	
769	1	1		1	*Quercus* sp.	
770	1	1		3	*Quercus* sp.	
771	1	1		3	*Quercus* sp.	
772	0	1		Species ID Box	*Quercus* sp.	

774	0	1		Species ID Box	*Ulmus* sp.	
775	0	1		1	*Quercus* sp.	
776	1	1		3	*Quercus* sp.	
777	1	1		3	*Quercus* sp.	
778	0	1		Species ID Box	*Pinus* cf *sylvestris*	
779	0	1		Species ID Box	*Pinus* cf *sylvestris*	
780	1	1		2	*Quercus* sp.	
781	0	1		Species ID Box	*Quercus* sp.	
782	0	1		Species ID Box	*Quercus* sp.	
783	1	1		3	*Quercus* sp.	
785	0	1		Species ID Box	*Ulmus* sp.	
786	0	1		Species ID Box	*Pinus* cf *sylvestris*	
787	0	1		Species ID Box	*Pinus* cf *sylvestris*	
788	1	1		3	*Ulmus* sp.	
789	1	1		2	*Quercus* sp.	
790	1	1		2	*Quercus* sp.	
791	0	1		Species ID Box	*Pinus* cf *sylvestris*	
792	0	1		Species ID Box	*Pinus* cf *sylvestris*	
793	0	1		Species ID Box	*Pinus* cf *sylvestris*	
794	1	1		3	*Quercus* sp.	
795	0	1		Species ID Box	*Pinus* cf *sylvestris*	
Total	**54**	**114**	**8**			

Appendix 16: Diatom assessment results

Unit	Depth	Dominant species	Other (minor) species	Abundance	Diversity
Homogenous silts and clays, occasional organic mottling, increasing sand content with depth	0.01m	*Paralia sulcata (M, p)* *Actinoptychus senarius (M, p)* *Rhaphoneis amphiceros (M, t)*	*Odontella aurita (M, t)* *Pseudomelosira westii (M, p)* *Delphineis surirella (M, t)* *Cocconeis placentula (BF, b)*	High	High
	0.11m	*Paralia sulcata (M, p)* *Actinoptychus senarius (M, p)* *Thallasiosira eccentrica (M, p)* *Delphineis surirella (M, t)*	*Rhaphoneis amphiceros (M, t)* *Cocconeis placentula (BF, b)* *Pseudomelosira westii (M, p)*	High	High
	0.26m	*Cocconeis placentula (BF, b)* *Paralia sulcata (M, p)* *Surirella ovalis (BM, b)* *Odontella aurita (M, t)* *Delphineis surirella (M, t)*	*Rhaphoneis amphiceros (M, t)* *Synedra ulna (F, b)* *Thallasiosira eccentrica (M, p)* *Navidula cuspidata (FB, b)* *Cyclotella sp (BF, p)*	High	High
	0.41m	*Surirella ovalis (BM, b)* *Synedra ulna (F, b)* *Paralia sulcata (M, p)* *Cocconeis placentula (BF, b)* *Delphineis surirella (M, t)*	*Pleurosigma aesturi (BM, b)* *Rhaphoneis amphiceros (M, t)* *Delphineis surirella (M, t)* *Thallasiosira eccentrica (M, p)* *Gyrosigma peisonis (BF, b)*	High	High
	0.56m	*Cocconeis placentula (BF, b)* *Surirella ovalis (BM, b)* *Cyclotella sp (BF, p)* *Paralia sulcata (M, p)* *Pseudopodosira stelligera (M, p)*	*Nitzschia sigma (MB, b)* *Synedra ulna (F, b)* *Odontella aurita (M, t)* *Melosira varians (FB, p)*	High	High
	0.71m	*Surirella ovalis (BM, b)* *Nitzschia sigma (MB, b)* *Cyclotella sp (BF, p)* *Paralia sulcata (M, p)*	*Cocconeis placentula (BF, b)* *Odontella aurita (M, t)* *Navicula avenacea (B, b)* *Delphineis surirella (M, t)*	High	High
	0.86m	*Cocconeis placentula (BF, b)* *Paralia sulcata (M, p)* *Surirella ovalis (BM, b)* *Delphineis surirella (M, t)*	*Rhaphoneis amphiceros (M, t)* *Pleurosigma aesturi (BM, b)* *Gyrosigna balticum (B, b)* *Odontella aurita (M, t)* *Thallasiosira eccentrica (M, p)*	High	High
	1.00m	*Cocconeis placentula (BF, b)* *Paralia sulcata (M, p)* *Surirella ovalis (BM, b)*	*Delphineis surirella (M, t)* *Thallasiosira eccentrica (M, p)* *Pleurosigma aesturi (BM, b)* *Nitzschia sigma (MB, b)*	High	High
	1.15m	*Paralia sulcata (M, p)* *Cocconeis placentula (BF, b)* *Surirella ovalis (BM, b)* *Thallasiosira eccentrica (M, p)* *Odontella aurita (M, t)*	*Actinoptychus senarius (M, p)* *Pleurosigma aesturi (BM, b)* *Rhaphoneis amphiceros (M, t)* *Pseudomelosira westii (M, p)*	High	High
	1.31m	*Cocconeis placentula (BF, b)* *Paralia sulcata (M, p)* *Surirella ovalis (BM, b)* *Pleurosigma aesturi (BM, b)*	*Thallasiosira eccentrica (M, p)* *Gyrosigna balticum (B, b)* *Gyrosigna wansbecki (B, b)* *Odontella aurita (M, t)*		
	1.46m	*Cocconeis placentula (BF, b)* *Paralia sulcata (M, p)* *Surirella ovalis (BM, b)* *Odontella aurita (M, t)* *Nitzschia sigma (MB, b)*	*Thallasiosira eccentrica (M, p)* *Delphineis surirella (M, t)* *Gyrosigna spenceri (B, b)* *Gyrosigna wansbecki (B, b)* *Navicula salinarum (B, b)*	High	Medium

Appendix 16: Sandwich Town Tidal Defences Scheme. Historic Building Recording within Reaches 4, 5 and 7.

Appendix 17: Sandwich Town Tidal Defences. Inerim report on the topographical survey and record of 'The Monks Wall

HER Summary

HER enquiry no.						
Site code	TDS 13					
Project code	5514					
Planning reference	DOV/12/00656					
Site address	Sandwich Town Tidal Defence Scheme, Sandwich, Kent.					
District/Borough						
NGR (12 figures)	TR 632565 160300 to TR 634241 161532					
Geology						
Fieldwork type	**Eval**	**Excav**	**WB**	**HBR**	**Survey**	Other
Date of fieldwork	March 2013-December 2015					
Sponsor/client	Environment Agency					
Project manager	Jon Sygrave					
Project supervisor	Chris Russel, Geoff Morley					
Period summary	Palaeolithic	Mesolithic	Neolithic	Bronze Age	Iron Age	
	Roman	Anglo-Saxon	Medieval	**Post-Medieval**	Other	
Project summary **(100 word max)**	Archaeological monitoring of the Sandwich Town Tidal Defence Scheme revealed residual prehistoric and Roman artefacts but the majority of the evidence uncovered dated from the Post Medieval period. A wooden structure was excavated in Sandwich town and many of the associated recovered artefacts originated in The Netherlands. Evidence of 20th Century military activity in the town was also observed. Excavations into the upstanding monument known as Monks Wall found that the earthwork was built in two stages but failed to recover any dateable finds.					
Museum/Accession No.	TBC					

Finds summary

Find type	Material	Period	Quantity
Bulk	Pot	Roman/Post Med	436
Bulk	CBM	Roman/Post Med	2836
Bulk	Animal Bone	Unknown	276
Bulk	Shell	Unknown	39
Bulk	Worked Flint	Prehistoric	9
Bulk	FCF	Unknown	4
Bulk	Stone	Unknown	29
Bulk	Fe	Unknown	91
Bulk	Cu Alloy	Post Med	2
Bulk	Glass	Post Med	63
Bulk	CTP	Post Med	65
Bulk	Slag	Unknown	23
Bulk	Coal	Post Med	6
Bulk	Wood	Unknown	3
Bulk	Coconut Shell	Unknown	1
Bulk	Architectural Frag	Unknown	1
Bulk	Mortar	Post Med	5
Bulk	Bullet	Post Med	1
Registered	Cassette	Post Med	1
Registered	Toy	Post Med	1
Registered	Mortar Part	Post Med	1
Registered	Bullet	Post Med	50
Registered	Whistle	Post Med	1
Registered	Badge	Post Med	1
Registered	Coin	Post Med	1
Registered	Leather	Post Med	8

OASIS Form

OASIS ID: archaeol6-279453

Project details

Project name	Sandwich Town Tidal Defence Scheme
Short description of the project	Archaeology South-East (ASE) was commissioned by The Environment Agency to undertake an archaeological watching brief as well a series of targeted investigations during the Sandwich Town Tidal Defence Scheme in and around the town of Sandwich, Kent. The scheme was designed to protect homes and businesses in the town and consisted of the construction of 14 Km of floodwalls and embankments along the River Stour from Richborough north-west of Sandwich to Broad Salts in the north-east. Here, a system of ditches and ponds were constructed for flood relief. The work took place between March 2013 and December 2015. Alongside the general archaeological monitoring of works on the scheme trial trenches were dug in Gallows Field (Reach 3) and into the earthwork known as Monks Wall (Reach 12). Monks Wall was also subject to topographic and walkover surveys prior to the alteration of the monument. Historic building recording of features in Reaches 4, 5 and 7 also took place.
Project dates	Start: 01-03-2013 End: 01-12-2015
Previous/future work	Yes / Not known
Any associated project reference codes	TDS13 - Sitecode
Type of project	Recording project
Site status	None
Current Land use	Coastland 2 - Inter-tidal
Current Land use	Coastland 6 - Other
Current Land use	Cultivated Land 1 - Minimal cultivation
Current Land use	Other 11 - Thoroughfare
Current Land use	Other 15 - Other
Monument type	RIVER FRONTAGE Post Medieval
Monument type	MILITARY REMAINS Modern
Monument type	FLOOD DEFENCE Medieval
Significant Finds	FLINTWORK Early Prehistoric
Significant Finds	POTTERY Roman
Significant Finds	CBM Roman

Significant Finds	CBM Medieval
Significant Finds	WORKED WOOD Post Medieval
Significant Finds	POTTERY Post Medieval
Significant Finds	CBM Post Medieval
Significant Finds	CTP Post Medieval
Significant Finds	ORDNANCE Modern
Investigation type	''Field observation'',''Full excavation'',''Part Survey'',''Watching Brief''
Prompt	Planning condition

Project location

Country	England
Site location	KENT DOVER SANDWICH Sandwich Town Tidal Defences
Postcode	CT13 XXX
Study area	14 Kilometres
Site coordinates	TR 632565 160300 50.882887077744 1.743227941037 50 52 58 N 001 44 35 E Line
Site coordinates	TR 634241 161532 50.883915710381 1.74569437908 50 53 02 N 001 44 44 E Line
Lat/Long Datum	Unknown
Height OD / Depth	Min: 1m Max: 6m

Project creators

Name of Organisation	Archaeology South East
Project brief originator	Halcrow Group Limited
Project design originator	ASE
Project director/manager	Jon Sygrave
Project supervisor	Chris Russel
Type of sponsor/funding body	Environment Agency
Name of sponsor/funding body	Environment Agency

Project archives	
Physical Archive Exists?	No
Digital Archive Exists?	No
Paper Archive Exists?	No
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	ARCHAEOLOGICAL INVESTIGATIONS AT SANDWICH TOWN TIDAL DEFENCE SCHEME. A POST-EXCAVATION ASSESSMENT AND UPDATED PROJECT DESIGN REPORT
Author(s)/Editor(s)	Russel, C.
Other bibliographic details	ASE Report No: 2016296
Date	2017
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Entered on	16 March 2017

Archaeology South-East

ASE

SANDWICH TOWN TIDAL DEFENCES SCHEME

HISTORIC BUILDING RECORDING WITHIN REACHES 4, 5 AND 7

(NGRs: Reach 4 (Section 1) 633091 158344; Reach 4 (Section 2) 633174 158279; Reach 5 633199 158262; Reach 7 654165 158708)

Commissioned by

CH2M Hill

ASE Project No. 5514
ASE Report No: 2014176

July 2014

Prepared by Amy Williamson

SANDWICH TOWN TIDAL DEFENCES SCHEME

HISTORIC BUILDING RECORDING WITHIN REACHES 4, 5 AND 7

(NGRs: Reach 4 (Section 1) 633091 158344; Reach 4 (Section 2) 633174 158279; Reach 5 633199 158262; Reach 7 654165 158708)

Commissioned by
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ASE Project No. 5514

ASE Report No: 2014176

July 2014

Prepared by Amy Williamson

1.0 INTRODUCTION

1.1 Site Background

1.1.1 Archaeology South-East (a division of the Centre for Applied Archaeology, University College London) was commissioned by CH2M Hill to carry out a programme of historic building recording at specific locations within Reaches 4, 5 and 7 of the River Stour as part of the Sandwich Town Tidal Defences Scheme (Figs. 1-3). The results of this work will ultimately form part of a wider archaeological report for the scheme, but are presented here as an interim summary report.

1.1.2 A specific written scheme of investigation (WSI) has been produced for the work within each of the reaches (ASE 2013a-c).

1.1.3 Part of the site (Reach 4, Dolphin Quay/River Wall Section 1) has also been the subject of a separate heritage assessment (Williamson 2013a), relevant information from which has been incorporated here.

1.2 Aims and Objectives

1.2.1 The general aim of the historic building recording work was to produce a record of any listed or historic structures located within the areas that will be affected by the proposed works, including those that will be repaired or temporarily removed.

1.2.2 Specific areas to be affected are (Fig. 2):

Reach 4

- Listed river wall: repair and restoration work of historic stretches of river wall at Dolphin Quay/30Strand Street and adjacent to Toll Bridge (NGRs: (Section 1) 633091 158344; (Section 2) 633174 158279).
- Listed bollards: temporary removal of listed bollards and a historic water pump on the west side of the bridge (NGR: 633174 158279).

Reach 5

- Listed bollards: temporary removal of listed bollards on the east side of the bridge (NGR: 633199 158262).

Reach 7

- Guilford Wharf (NGR: 654165 158708).

1.3 Scope of Work

1.3.1 The work will comprise:

Reach 4

- Historic building recording, including laser scanning of the two sections of the river wall to the west of Toll Bridge.
- Historic building recording of the bollards located to the west of the bridge.

Reach 5

- Historic building recording of the bollards to the east of the bridge.

Reach 7

- Historic building recording of any surviving dockyard furniture at Guilford Wharf.

2.0 METHODOLOGY

2.1 Ben Found, the archaeological advisor for Dover District Council (DDC) requested that building recording at English Heritage Level 3 was undertaken in Reaches 4, 5, and 7. A Level 3 record is essentially an analytical record; further detail is given in *Understanding Historic Buildings: A guide to good recording practice* (English Heritage 2006).

2.2 The work was carried out in accordance with the WSIs produced for the work (ASE 2013a-c) and the IfA's *Standards and guidance for the archaeological investigation and recording of standing buildings or structures* (IfA, last updated 2008).

2.3 The laser scanning of the river wall within Reach 4 was produced by J D Rogers Ltd in June 2013.

2.4 The remainder of the site recording was carried out by Amy Williamson and Rachel Cruse on 2nd July 2013, with a further visit to Reach 7 made by Amy Williamson and Michael Shapland on 1st April 2014. The recording entailed the compilation of written descriptions and the production of a photographic record. Recording of the river wall within Reach 4 was undertaken from the opposite river bank.

2.5 The photographic record was created using an Olympus digital SLR camera. Within the report selected digital images have been reproduced as plates. A full catalogue of all photographs is included in the archive.

2.6 The site archive, which includes all project records, has been prepared in accordance with *Guidelines for the preparation of excavation archives for long-term storage* (UKIC 1990). All records are identified with the site code TDS13.

3.0 RESULTS

3.1 Reaches 4 and 5

General historical background

3.1.1 The historical development of medieval Sandwich has been charted in detail (Clarke *et al* 2010) and is summarised in the Draft Heritage Strategy for Dover District.

3.1.2 The town's historic prosperity was inextricably linked to its geographical position, its strategic location on the southern shore of the former Wantsum Channel allowing it to control the large natural harbour of Sandwich Haven and the passage of vessels travelling through the Wantsum Channel towards Canterbury and the Thames Estuary. As such, during the medieval period Sandwich developed to form one of the great Cinque Ports of the south-east coast of England, with its prosperity reaching a peak in the first half of the 14th century. The extent of the mid-14th century town has been mapped (Clarke *et al* 2010, 56 Fig. III.I) at which time the landward side of the town was defined by earthen ramparts and shallow moats, while the riverbank fronting the town was partly revetted by wharfs (Clarke *et al* 2010, 55-56). Monkenquay at the western end belonged to Christ Church Priory; private quays lined the waterfront west of Davis Gate; the town quay was located to the east, while the waterfront associated with the castle lay beyond (*ibid.*117). At this time it is noted that the riverfront had no defensive walls.

3.1.3 In the later 14th and 15th centuries the earthen ramparts were modified, presumably in connection with defence of the town during the Hundred Years War, and masonry walls were constructed on the northern side of the town. The walls were confined to the western and eastern ends of the waterfront (see illustration in Clarke *et al* 2010, 120 Fig. IV.I), though there is to date no evidence for any such wall between the Delf mouth (west of the site) and Davis Gate (east of the site). While no precise chronology for the construction of the walls has been established, 15th century historical records suggest a lengthy campaign of building over a hundred years or so (Clarke *et al* 2010, 155).

3.1.4 Archaeological evidence in the form of accumulation of silt against the northern face of the western stretch of the town wall indicates that this section of the wall (at least in part) formed the south bank of the Delf. In 1475 and 1478, the eastern stretch of the town wall was said to stand upon the foreshore (*ibid*, 156), indicating a considerable degree of land reclamation by that point, and a gradual progression northwards of the riverside.

3.1.5 It has been suggested (Clarke *et al* 2010) that the central portion of the river bank (between Monkenquay to the west and Davis Gate to the east) is likely to have been consolidated in stages. Surviving buildings allow the location of the waterfront to be mapped with reasonable accuracy: a stone cellar at 27 Strand Street which might have opened directly onto the waterfront placing the late-13th century quayside just south of present-day Strand Street, while timber buildings surviving from the early 14th century at 33, 39 and 41 Strand

Street, on the opposite side of the street to the site, indicate that the street frontage had by that point been pushed forward, through reclamation, to its present position (Clarke *et al* 2010, 115; 56 Fig. III.1; 97 Fig. 7.8). It is thought that the buildings were separated from the river by an open area that might have served as a quayside. This area is thought to have been lined with private merchant quays interspersed with public gates (Clarke *et al* 2010, 117 & 155).

3.1.6 Although there is reference to property on the north side of the street in 1387, there is no evidence for extensive development of the northern side of the street until 1414 when tenements next to Pillory Gate are mentioned (Clarke *et al* 2010, 217). None of the surviving buildings date to before the middle of the 15th century. Nos. 32 & 34 Strand Street, bordering Dolphin Quay are listed as being of 16th century date (English Heritage, National Heritage List; Appendix 1), although it is noted (Clarke *et al* 2010, 217) that No. 34 has few remaining features and is not precisely datable; further up Strand Street just to the west of Pillory Gate, No. 42 is recorded as being of *c.* 1500 (*ibid.*).

3.1.7 There has been very little archaeological investigation of the historic waterfront, although traces of successive revetments have been noted close by (Clarke *et al* 2010, 115: Site 52 – Aynsley Court and Site 72 – Strand Street). An article by Southam (1980, 309) provides some detail regarding Site 72 which according to the illustration (p304; point C on map) lies close to the south-east property boundary of King's Lodging on Strand Street. Here, the remains of a very substantial quay wall reinforced with heavy timbers was revealed during the renewal of a drain (*ibid.* 309). Between this and the river, the remains of two other timbered constructions were observed marking the advancement of the quay. No further details have been published however, so their date and exact form are unknown.

3.1.8 Two discrete sections of river wall were recorded within Reach 4: a section bordering 30 Strand Street and Dolphin Quay, plus a relatively longer section immediately west of Toll Bridge, the main access route into Sandwich from Thanet.

<u>Reach 4: river wall (Section 1) bordering 30 Strand Street/Dolphin Quay</u>

Site specific historical background

3.1.9 The list description for this section of wall states:

The Dolphin Quay itself is another section of the mediaeval quayside extended out to this position about the C14. Consists of large stone of this date. Length approximately 60'0".

3.1.10 This section of walling is located fairly centrally to the area which is thought to have been extended out to this position from the early 14th century onwards (see Section 3.1.5). Illustrations plotting the probable position of the waterfront at this time (Clarke *et al* 2010, 97 Fig. 7.8) and by the mid-14th century (Clarke *et al* 2010, 56 Fig. III.1) postulate that the line of the waterfront at that time had not quite reached its present position, at that time largely following the present-day northern line of Strand Street.

3.1.11 Little is known of the physical make-up of the early waterfront, although the archaeological investigations on sites close by at Aynsley Court and Strand Street (see Section 4.7) have identified traces of successive waterfront revetments (Clarke *et al* 2010, 115), suggesting a similar scenario is likely at 30 Strand Street/Dolphin Quay.

3.1.12 Nos. 32-34 Strand Street, adjacent to Dolphin Quay, is listed as being of 16th century date, thus the waterfront must have been located beyond its footprint by this this date. Historical references to the property (No. 32) date to 1642 (Dover-Kent.com website) at which time it was known as The Dolphin and served as one of the many public houses in the town. Later in its history it became the Bricklayers Arms (*ibid.*), before reverting to The Dolphin and latterly becoming a residential dwelling.

3.1.13 Historic mapping from the late 18th century onwards shows the waterfront in its present position (Clarke *et al* 2010, 113 Fig. 8.1). A plan of Sandwich Quay drawn by Foord in 1833 (Fig. 4) shows the waterfront to have been formed by a series of revetments with some areas apparently being shown without any form of structure. The stretch of waterfront forming this section of the site is shown with a revetment extending continuously from the north-west end of the site, south-eastwards as far as St Mary's Gate. Although the detail of individual property boundaries is not shown on this map, the plots adjacent to the river are shown as built-up, with the narrow strip of land immediately adjacent to the river unoccupied as it is now. No. 32 is identified as 'Star', although this is presumably a mistake as the Star public house is known to have been situated elsewhere in the town.

3.1.14 The Ordnance Survey Town Plan of 1872 (Fig. 5) shows the site in a useful level of detail. The section of river frontage forming the site must have been formed by a vertical structure by this point, as it is shown as a solid line (which is different to the section immediately to the north-west which is shown with a dashed line and presumably formed open foreshore). The plots adjacent to the river are shown almost entirely occupied by buildings, with structures extending as far as the north-eastern plot boundaries.

3.1.15 Subsequent mapping shows little significant change to the site until 1956 (Fig. 6) when a structure previously seen occupying the north-eastern third of the plot to No. 30 is shown to have been removed, leaving the rear of the plot open as a yard/garden.

Description

3.1.16 The recorded section of wall extends for a distance of approximately 18m and comprises two distinct elements corresponding with the present-day property boundaries (Fig. 8; Plates 1 & 2). The north-western portion (*c.* 11.5m) to the rear of Nos. 32-34 (Dolphin Quay) comprises neatly coursed stone blocks (Plate 1). The wall curves inwards slightly at the north-west end to meet the boundary of the adjacent property (as reflected on the 1872 Ordnance Survey map; Fig. 5), beyond which the river wall is constructed in stonework of much smaller dimensions which is laid in regular courses. This stonework appears to abut the listed section of river wall thus suggesting that it is later. The

walling is reinforced at intervals by a series of tie-rods with iron cross-shaped tie-plates and a mooring-ring is attached towards the north-west end. The stonework terminates at ground level, at which point there is a concrete ledge.

3.1.17 To the south-east, to the rear of No. 30, the wall face is formed by a timber revetment (Plate 2). This comprises a series of horizontal planks held in place by a series of slender uprights and a continuous horizontal member. Further support is offered by several substantial inclined timbers. The form of this revetment bears resemblance to that known to date to *c.* 1900 bordering the riverfront at King's Lodging (Williamson 2013b). At the north-west end it is clear that the timber revetment stands in front of the stonework (Plate 3), although it is not apparent the extent to which the stonework continues behind. Beyond the site boundary to the south-east, the underlying structure of the wall is obscured by modern concrete and sheet-piling.

3.1.18 Above ground level a modern stretcher-bonded brick wall with bull-nosed capping bricks stands to a height of 1.5m. At the north-west end this wall terminates at the neighbouring property boundary; while to the south-west it continues beyond the site boundary.

3.1.19 In front of the section of stone walling there is a series of modern timber posts which are each secured by a single iron loop to the modern brickwork wall above. The timber-revetted section has similarly been reinforced by steel poles.

Discussion

3.1.20 A review of the literature pertaining to the historic development of the waterfront at Sandwich allows the basic northwards progression of the river frontage during the late-medieval and post-medieval periods to be charted; however, within the confines of the site itself its exact position and physical form at specific points in time remains uncertain and this may only be resolved through archaeological investigation.

3.1.21 It is worth noting here that the list description for Dolphin Quay, which notes the stone walling to be of medieval date, specifies that the wall extends for a distance of approximately 60 feet (*c.* 18m). However, the visible extent of the stonework extends for only *c.* 11.5m – the whole length of the site itself in fact extending a little over 18m; as such, it is not entirely clear whether the listing was intended to cover the stone-walled section only, or the timber-revetted section as well.

3.1.22 The list description implies that the stone walling of the existing frontage is of 14th century date, although the basis for this judgement is not clear. The frontage is known to have been in this exact location by the time the 1872 map was produced and the late 18th and early 19th century sources also appear to reflect this position; however, it is quite possible given the 16th century date ascribed to Nos. 32-34 that the stone-walling substantially predates these sources.

3.1.23 In terms of the timber-revetted section, it is similarly difficult to ascribe an accurate date by means of basic visual inspection. On the basis that it overlaps the stone walling at its north-west end, it can be reasoned that it is of later date, though by quite how much it is difficult to gauge. Its form of construction bears resemblance to that which is known survive behind later work at nearby King's Lodging (Williamson 2013b), for which a *c.* 1900 date is documented, although given that the structure at King's Lodging is now largely concealed it is not possible to undertake detailed comparison. It also appears similar to part of the quayside revetment which is visible at low tide to the north-west of Toll Bridge (see Section 3.1.35), though here too, limited visibility makes comparison difficult and ascription of a confident date problematic.

Reaches 4 & 5: river wall (Section 2) to the immediate west of Toll Bridge, bollards and water pump.

Site specific historical background

3.1.24 Toll Bridge forms the main access route into Sandwich from the north. According to the list description, the bridge was constructed of Portland stone in 1773, with the central section being adapted in 1892 to incorporate an iron swing bridge. The bridge replaced a ferry to Stonar and Thanet, which since the 11th century berthed at Davis Gate at the north end of the High Street (Clarke *et al* 2010, 117). Davis Quay, which seems to have been the common quay, probably extended along the riverbank from Davis Gate to the royal land to the east (*ibid.*).

3.1.25 The gatehouse (Barbican), which stands directly south of the bridge was built in the late 1460s (Clarke *et al* 2010, 135) and thus marks the advancement of the river at least as far as this point by that date.

3.1.26 The date of the walling to either side of the bridge itself is not certain. Clarke *et al* (2010, 215) state that the wharf in front of the gatehouse must have been built when the present gatehouse was built, and cite a document held at the Kent archives that tells us it was paved with stone and the side facing the water reinforced with timber and bricks. It is also known from documentary sources that historically it demanded frequent attention, with several instances of repair being known from the early 16th century (Clarke *et al* 2010, 159 and 215).

3.1.27 Whatever the case, the river frontage was certainly in its present location from 1773 onwards when the existing bridge was built, although its exact form at this point is uncertain. Historic mapping from the late 18th century onwards (Clarke *et al* 2010, 113 Fig. 8.1) shows the newly-constructed bridge. On either side of it, the river wall is shown to articulate to form a recess.

3.1.28 Foord's 1833 plan of Sandwich Quay (Fig. 4) depicts the river wall to the west of the bridge as a dashed line, which apparently represents some sort of structure. The 1872 Ordnance Survey Town Plan (Fig. 5) provides a clearer representation, showing the articulated form of the bridge's south terminus, which has a lamp post depicted on either side. The map shows a slight change in plane in the river wall a short distance to the west of the bridge.

3.1.29 The 1897 Ordnance Survey map (Fig. 6) depicts the site similarly, although is the first map to identify the water pump situated to the immediate west of the bridge. If the pump had been present in 1872 it would no doubt have been depicted on the map of that date (which is drawn at a larger scale), and thus it can be inferred that it dates to between 1872 and 1897.

3.1.30 It is not clear as to precisely what date the bollards were installed on either side of the bridge, although it was presumably around this sort of time. Those on the west side are statutorily listed separately to those on the east side (see Appendix 1), although the listing for each ascribes a date of 1860. It is certainly the case that there were two or three bollards in place on the east side of the bridge by 1894 (Plate 4) and it is likely that these were matched on the west side. The 1894 photo also shows a straight flight of steps leading down to the river positioned against the east side of the bridge. By 1920 there were at least three bollards on the west side (Plate 5; Kent Archives). The form of the river wall appears consistent with that visible today.

3.1.31 Between the time of the production of the 1937 Ordnance Survey map (not reproduced) and the 1956 Ordnance Survey map (Fig. 7) the river wall on the east side of the bridge appears to have been reworked to accommodate a series of steps running parallel with the wall. The existing bollards may have been repositioned at this point, and new bollards added. A photograph of 1955 (Plate 6) shows the steps and bollards in place.

Description of river wall

3.1.32 The section of walling recorded extends westwards from the bridge for a distance of 25m, beyond which the underlying construction is masked by modern sheet piling and shuttered concrete (Plate 7). This section of the river wall is predominantly formed of brickwork, although a 4m section immediately adjacent to the bridge is constructed of stonework of similar nature to that used in the construction of the bridge (Plate 8). At low tide, approximately 1.5m of stonework is visible, between a minimum of 1.6m and a maximum of 3.1m below ground level. It is formed of large ashlar blocks, apparently of limestone, laid in regular courses and incorporates a chamfered offset *c.* 1.4m below ground level. Above, the remainder of this section of the river wall appears to be formed of brickwork, although it is indistinct owing to adherence of vegetation.

3.1.33 To the west of the stonework, the wall changes plane slightly, extending outwards at a slight angle for *c.* 4m (see Section 3.1.28), before resuming its former alignment. This section is formed of brickwork, although the brick fabric and bonding pattern are largely indistinct on account of general built up of dirt/river deposits; in a few discrete locations English bond seems apparent. This walling appears largely to be based on a foundation of concrete, beneath which the make-up of the wall is uncertain.

3.1.34 The brickwork is reinforced at intervals by a series of six tie-rods with cross-shaped plates. Two circular tie plates are also visible towards the west end. Further features include a small drain outlet with hinged flap, located within

the angled section of the wall, three iron/steel-rung ladders allowing access to mooring positions, and eleven strings of tyres acting as buffers to boats.

3.1.35 Standing in front of the brickwork are the remains of a timber revetment, formed of a jumble of relatively slender uprights which support horizontally-laid planks behind (Plate 9). The majority of this structure stands at least 2m below ground level, and as such is only substantially visible at low tide. The form of this revetment appears broadly similar to that fronting 30 Strand Street which in turn has been noted (Section 3.1.23) as bearing resemblance to that known to date to *c.* 1900 bordering the riverfront at King's Lodging (Williamson 2013b).

Description of bollards and water pump – Reach 4

3.1.36 Within Reach 4, the river is guarded by a brick wall which diminishes in height as it approaches the bridge on account of a rise in ground level. At this point the river edge is guarded by a rail carried by a series of three cast iron bollards which are set within the top of the wall (Plate 10). The wall is of mottled grey brickwork with a pink/purple hue laid in stretcher bond, with a bull-nosed brick coping and is apparently of 20th century date. The bollards are of similar columnar form: Nos. 1 and 3 each have a fluted and slightly tapered shaft with torus-moulded base atop a square stylobate, torus moulded capital enhanced by a shallow fillet, plain frieze and a slightly pointed bun finial. No. 2 is similar but has a flatter bun finial and is embellished at frieze level by a small rosette. The three bollards are linked by a tubular iron guard rail which pierces the bollard at frieze level. The frieze of No. 2 has an integral, slightly projecting housing for the rail.

3.1.37 At the east end the rail terminates at a cast iron water pump (Plates 10 & 11). This is of simple columnar form, with plain shaft and torus moulding defining the frieze. Its spout has been removed, but the handle remains.

Description of bollards – Reach 5

3.1.38 To the east of the bridge within Reach 5, there is a series of ten bollards with linking rail guarding the river edge (Plate 12); this is at variance with the list description (see Appendix 1), which states eight. These are all set at ground level within concrete; Nos. 4-6 intrude upon stone setts of 19th/20th century date. Nos. 4-6 are of similar form to Nos. 1-3 but appear to be of later date; they have a slightly straighter shaft, flattish bun finial, and a plain frieze with integral projecting housing for the tubular rail, which on this side of the bridge appears to be of steel. The rail continues for a short distance beyond No. 6 before being interrupted by modern signage advertising river trips.

3.1.39 At this point the series of steps which date to between 1937 and 1955 lead down to a ledge which serves as a landing stage. The entrance to the steps is framed by a pair of matching bollards (Nos. 7 & 8) which appear almost identical to No. 2. The remainder follow suit, with the exception of No. 13 at the easternmost end, which being without a rosette to its frieze and having a slightly more pointed finial is more akin to Nos. 1 and 3.

Discussion

3.1.40 While it is clear that the walling to the west of the bridge is of more than one construction phase, the date of the individual phases is uncertain. The short section of stonework to the immediate west of the bridge appears sufficiently similar to that of the bridge, making it probable that this relates to the construction of the bridge in the 18th century. The brickwork to the west of this is certainly not earlier than this date and probably dates to either the 19th or 20th century. Although the timber revetment seems similar to that bordering 30 Strand Street and that known to have bordered King's Lodging to which a *c.* 1900 date can be assigned, there is presently insufficient evidence to enable it to be more precisely dated.

3.1.41 In relation to the bollards, although broadly similar in appearance, there are subtle differences in their styling, with three distinct types being identified overall. The date of 1860 ascribed in the list descriptions may not be far off for most of them (with the notable exception of Nos. 4-6), although most, if not all, appear to have been repositioned in relation to later work to the river wall/quayside, namely, the introduction of the low wall on the west side of the bridge, into which the bollards on this side are set, and the introduction of the steps down to the landing stage on the east side.

3.2 Reach 7

Historical Background

3.2.1 The following background information is derived from an article entitled *Rails to Sandwich Bay: The Sandwich Steam Tramway and the Guilford Tramway* (Burnham n.d.).

3.2.2 Owing to the distance of Sandwich from the sea, the town never prospered as a seaside resort in the same way as neighbouring towns such as Ramsgate and Deal. In the late 19th century, it was recognised that the sandy dunes separating Sandwich from its coastline would be the ideal location for a golf course and as a result the St. George's Golf Club was set up. By 1895 the club had 500 members and was one of the most famous in the country.

3.2.3 In the late 19th century proposals were put forward to encourage the development of Sandwich as a seaside resort by the introduction of a tramway over the sandy dunes, via the golf course to the sea shore. It was intended that the tramway would be used to carry building materials to facilitate development by the shore. Land for this purpose was acquired from the Earl of Guilford.

In

3.2.4 It was not until the early 20th century that a decision was finally made, and plans were put into action to develop Sandwich Bay Building Estate. Construction of a 3ft 6inch gauge tramway to transport the building materials over the sands commenced in 1903, with a wharf which was named Guilford Wharf, located on the River Stour at Black Sluice. The wharf had a 250ft long timber-faced quay equipped with a steam crane, sidings, a weighbridge and a locomotive shed with inspection pit. Its layout is recorded on the

Ordnance Survey map of 1907 (compare Figs. 9 & 10). The tramway ran south-east from the wharf, close to the golf club and on to Sandwich Bay. Although the tramway was never extended to Sandwich itself, and it never seems to have officially carried passenger traffic, golfers are said to have used the tramway from time to time.

3.2.5 During the First World War the tramway remained in occasional use, although troops stationed nearby are said to have at times resorted to using some of its sleepers as a means to reinforce their earthworks. Construction activity in Sandwich Bay resumed after the war, albeit at a slower pace. By this point the tramway was in a run-down condition and traffic had lessened due mostly to the improved condition of roads to the Estate and the move away from using sailing barges as a means of transporting raw materials. The tramway seems to have been last used in about 1929-30.

3.2.6 Very few remains of the tramway now exist and by 1938 the tramway and most of its related features appear to have been dismantled as they are no longer depicted on the Ordnance Survey map of that date (Fig. 11). The line of the tramway itself is easily traceable, although few features remain visible at Guilford Wharf. When the article (Burnham n.d.) was written, it was said that the inspection pit and foundations of the engine shed could be traced until recent years, but the area behind the wharf had been altered by modern drainage works.

Description

3.2.7 The area was surveyed on two occasions: in July 2013, when vegetation covering the area had been part-cleared by strimming (Figs. 3 & 13), and in April 2014 when strimming of the area surrounding the site for ecological reasons, afforded safe passage around and into the majority of the survey area.

3.2.8 The area of the wharf forms a rough triangle of land on the northern bank of a stretch of the River Stour known as Bowling Green Reach. It covers an area of approximately 200m west – east, by a maximum of 65m north – south. The area surveyed measures a little over 100m x 30m and is located within the south-eastern portion of the wharf area. The wharf is bounded on its south side by the River Stour and along its northern edge by an earthen flood bank.

3.2.9 The most prominent feature within the site is The Black Sluice, which enters the site from the east (Plate 13). It is identified on Ordnance Survey mapping in 1872 (not reproduced) and 1897 (Fig. 9), prior to the installation of the wharf. Its flow is controlled by a winch mechanism comprising a pulley system suspended from an iron I-girder; close inspection of this was not possible owing to health and safety precautions. The visible sluice superstructure is formed of shuttered concrete, with the surrounding retaining walls being formed of a mixture of sheet-piling and concrete. All appear to be of 20th century date, the Ordnance Survey mapping providing a date range of between 1938 and 1956-8, during which period the position of the sluice was moved eastwards. The area is guarded by a modern steel fencing.

3.2.10 A further, less significant outlet is aligned north-east – south-west at the centre of the site (Plate 14). This too is shown on early Ordnance Survey mapping (Fig. 9). It was previously controlled by a small sluice mechanism located just to the south side of the earthen bank (outside the survey area). The sluice outlet has been infilled, although it retains a small winch mechanism above (Plate 15). The date of the sluice is uncertain.

3.2.11 Of the wharf itself, the only upstanding remains noted within the survey area are represented by the timber quay, which survives along the southern boundary within the western portion of the survey area. Close inspection was not possible owing to health and safety precautions, although limited visibility was achieved from within the survey area (Plate 16), and a distant view was obtained by walking along the footpath which heads southwards from the site (Plate 17). A photograph taken from the river was also viewed online (Kent History Forum). The wharf comprises a series of heavy upright timbers, with vertical timber planks behind, and faced with horizontal planks between. Some of the upright timbers retain protruding iron bolts.

3.2.12 There was no sign of any upstanding remains of the tramway itself, although an area within the western portion of the site which featured sparser vegetation overgrowth may correlate with the course of one of the tram-lines leading to the quay (compare Figs. 10 and 13; Plate 18).

Discussion

3.2.13 Guilford Wharf was constructed in the opening years of the 20th century and by 1930 had already gone out of use. This is borne out in the Ordnance Survey mapping for the period. The fact that the 1938 map ceases to show wharf-related features from this date onwards, implies the tramway and the majority of its associated structures were intentionally dismantled following its demise. As such, there is now scant evidence above ground of the former wharf, with the exception of the timber quay, with slight differences in vegetation growth seemingly corresponding with the course of the tramway through the site.

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Plate 1: Section 1 of the river wall showing stone walling to the rear of Dolphin Quay

Plate 2: Timber-revetted section of wall to the rear of No. 30

Plate 3: View showing the timber structure overlying the earlier stone walling

Plate 4: Photograph of 1894 showing bollards on east side of bridge (francisfrith.com)

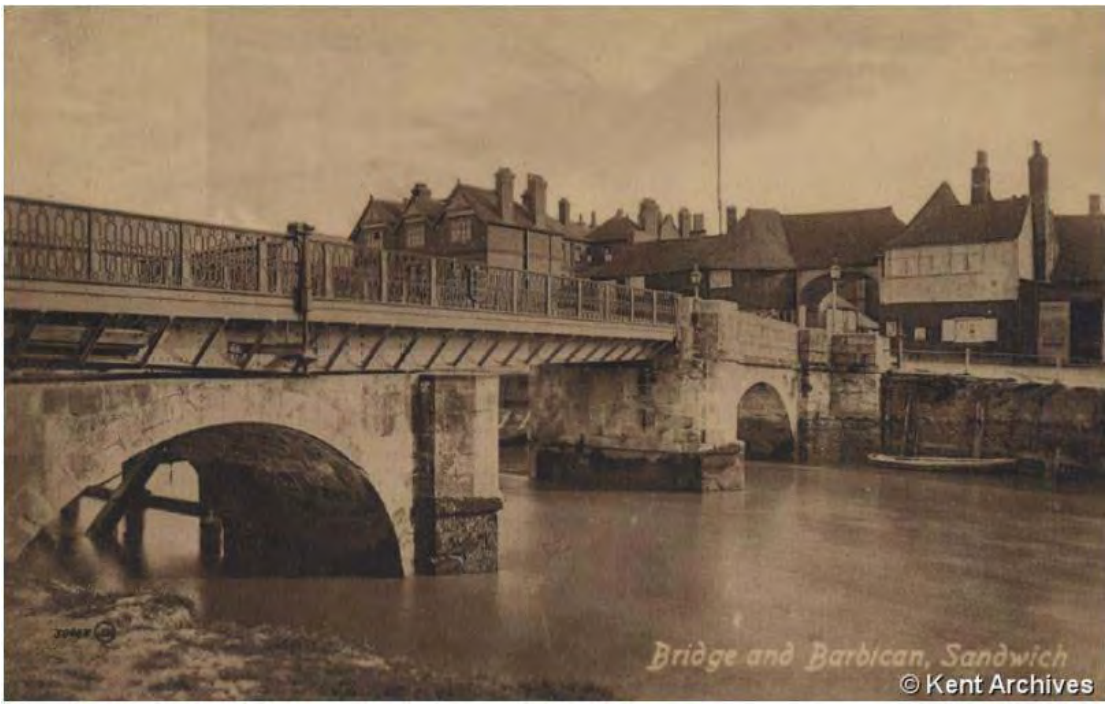


Plate 5: Photograph of 1920 showing bollards and pump on west side of bridge (Kent Archives)

Plate 6: Photograph of 1955 showing reconfiguration of river wall on east side of bridge and additional bollards (francisfrith.com)

Plate 7: Section 2 of the river wall, showing extent of recorded area

Plate 8: Stonework to the west of the bridge

Plate 9: Timber revetment visible at low tide

Plate 10: Bollards and water pump located to the west side of the bridge (Bollard No. 1 to left-hand side)

Plate 11: Water pump located to the west side of the bridge

Plate 12: Bollards located to the east side of the bridge (Bollard No. 13 located to right-hand side)

Plate 13: The Black Sluice, view to the east

Plate 14: Watercourse at the centre of the site, controlled by sluice at its north end

Plate 15: Winch mechanism for sluice

Plate 16: Upstanding wharf structure as viewed from the site

Plate 17: Wharf structure viewed from footpath

Plate 18: Area of less-dense vegetation growth which may correlate with location of former tram-line

Appendix 1 Relevant Statutory List Descriptions

Dolphin Quay

Name: WALLING OF DOLPHIN QUAY

List entry Number: 1069548

Location
WALLING OF DOLPHIN QUAY, STRAND STREET

Grade: II

Date first listed: 23-Apr-1976

1. 5275 STRAND STREET (North Side) Walling of Dolphin Quay TR 3358 1/375A

II GV

2. The Dolphin Quay itself is another section of the mediaeval quayside extended out to this position about the C14. Consists of large stone of this date. Length approximately 60'0".

Nos 30 to 34 (even) and Dolphins Quay House, Walling
, Gas Lamp and Bollards form a group.

Listing NGR: TR3308858349

30 Strand Street

Name: No name for this Entry

List entry Number: 1069547

Location
30, STRAND STREET

Grade: II

Date first listed: 19-May-1950

1. 5275 STRAND STREET (North Side) No 30 TR 3358 1/54 19.5.50.

II GV

2. Early C19 building. 3 storeys. 3 windows. Red brick. Brick stringcourse above ground and 1st floors. Wooden dentilled eaves cornice. Tiled roof. Glazing bars intact in windows. Recessed doorway with modern pilasters and pediment.

Nos 30 to 34 (even) and Dolphins Quay House, Walling, Gas Lamp and Bollards form a group.

Listing NGR: TR3308658328

32 & 34 Strand Street (Dolphins Quay House)

Name: No name for this Entry

List entry Number: 1121991

Location
32 AND 34, STRAND STREET

Grade: II

Date first listed: 23-Apr-1976

1. 5275 STRAND STREET (North Side) Nos 32 & 34 TR 3358 1/55

II GV

2. C16 timber framed building, altered in the C18 and refaced later, but preserving the overhang of its 1st floor on bressummer (modernised) and brackets (renewed). 3 storeys. 2 windows. Ground floor red brick above brown roughcast. Roof in 2 hips. Sash windows with glazing bars intact. Original red brick gable at the rear of the building. Tiled main roof, pantiled catslide roof at rear.

Nos 30 to 34 (even) and Dolphins Quay House, Walling, Gas Lamp and Bollards form a group.

Listing NGR: TR3307158330

Three bollards to south-west of Toll Bridge

List Entry Number: 1343810

Grade: II

Date first listed: 23-Apr-1976

1.
5275 THE QUAY

3 bollards to south-west
of Toll Bridge
TR 3358 1/209D

II

2.
Bollards of cast iron fluted columns with taurus mould upon a square base. 1860.

Listing NGR: TR3317958274

Eight bollards to south-east side of Toll Bridge

List Entry Number: 1069560

Grade: II

Date first listed: 23-Apr-1976

1.
5275 THE QUAY

8 bollards to south-east
side of Toll Bridge
TR 3358 1/209C

II

2.
Bollards of cast iron fluted columns with taurus mould upon a square base.
1860.

Listing NGR: TR3320258261

The Toll Bridge

List Entry Number: 1343735

Grade: II

Date first listed: 23-Apr-1976

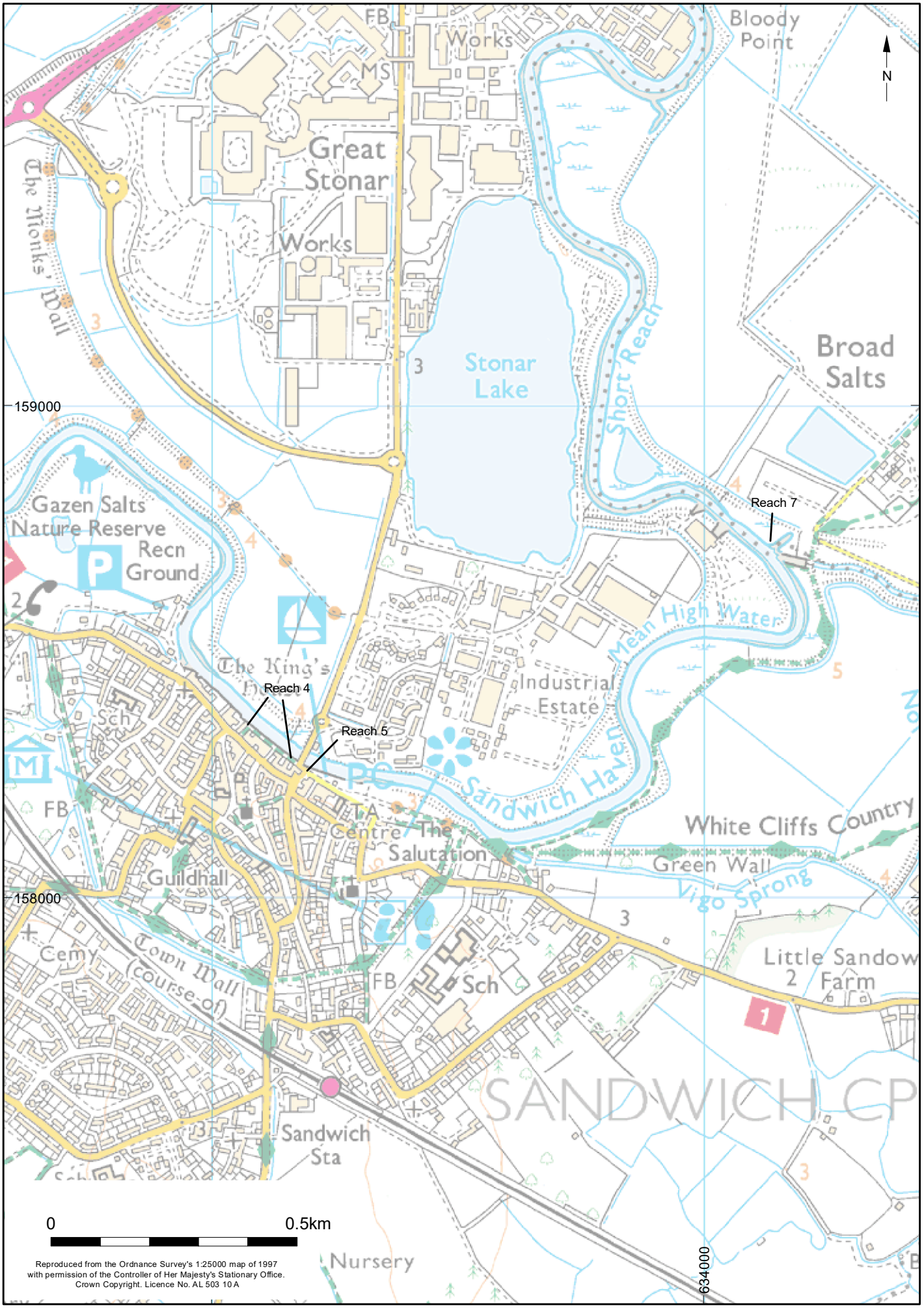
1.
5275 HIGH STREET
(West Side)

The Toll Bridge
TR 3358 1/129A

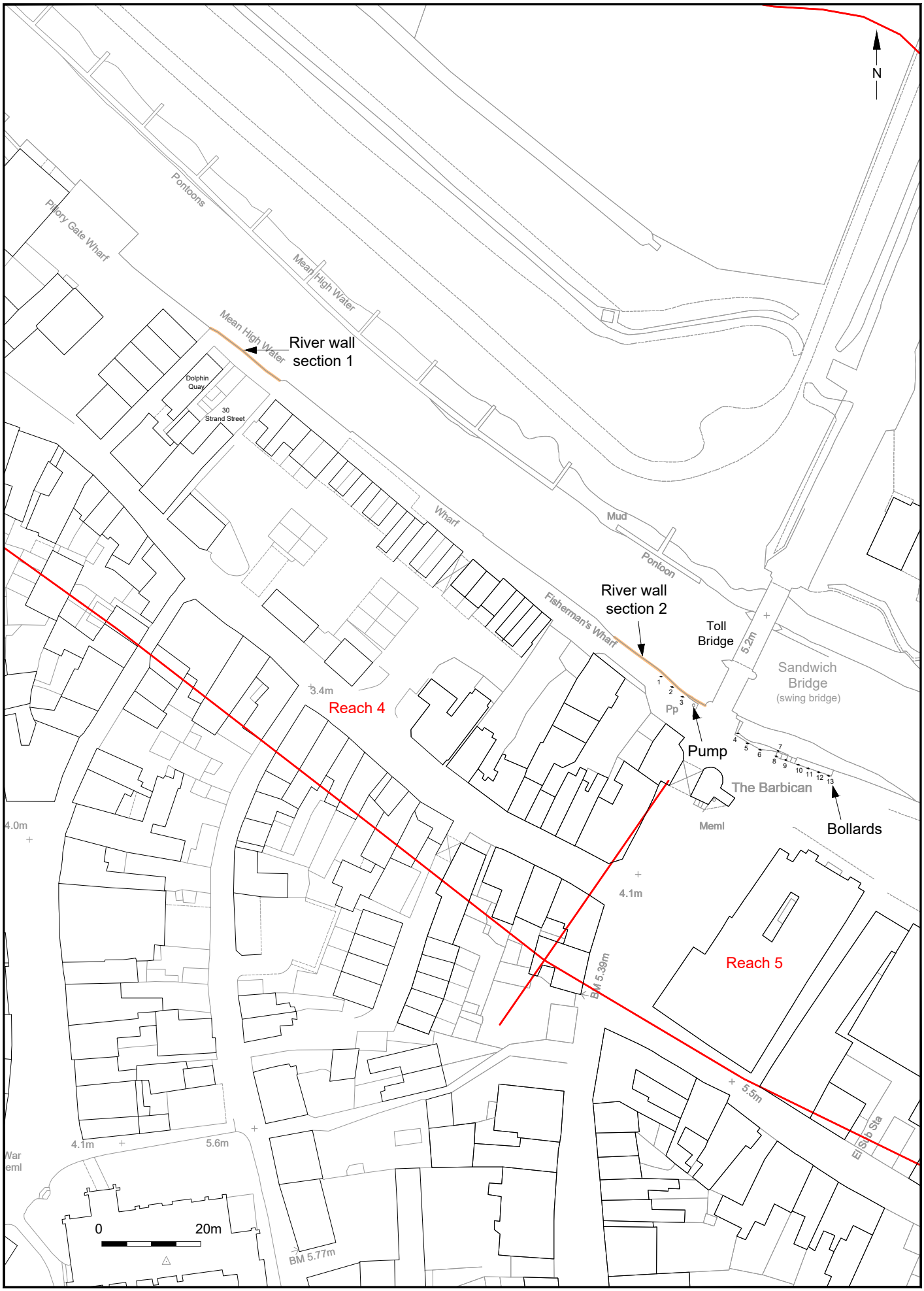
II

2.
Built in 1773 of Portland stone having centre portion dated 1892 to open as iron swing bridge, and upon the south and north ends stone arches. Central portion probably Dutch type timber raised platform before C19 replacement.

Listing NGR: TR3319258284



© **Archaeology South-East**		Sandwich Town Tidal Defences Scheme	Fig. 1
Project Ref: 5514	June 2014	Location of work within Reaches 4, 5 and 7	
Report Ref: 2014176	Drawn by: AW		



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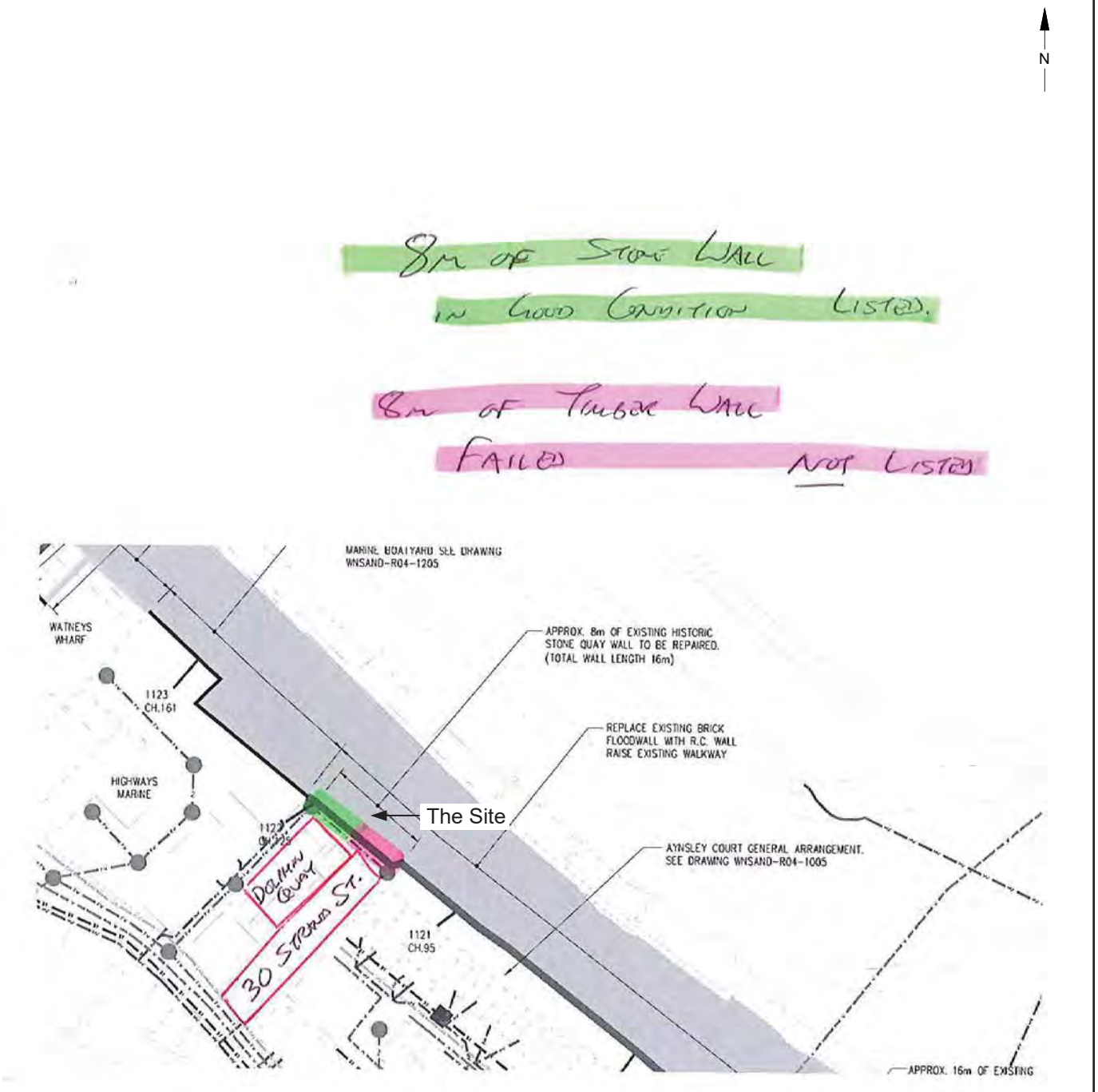
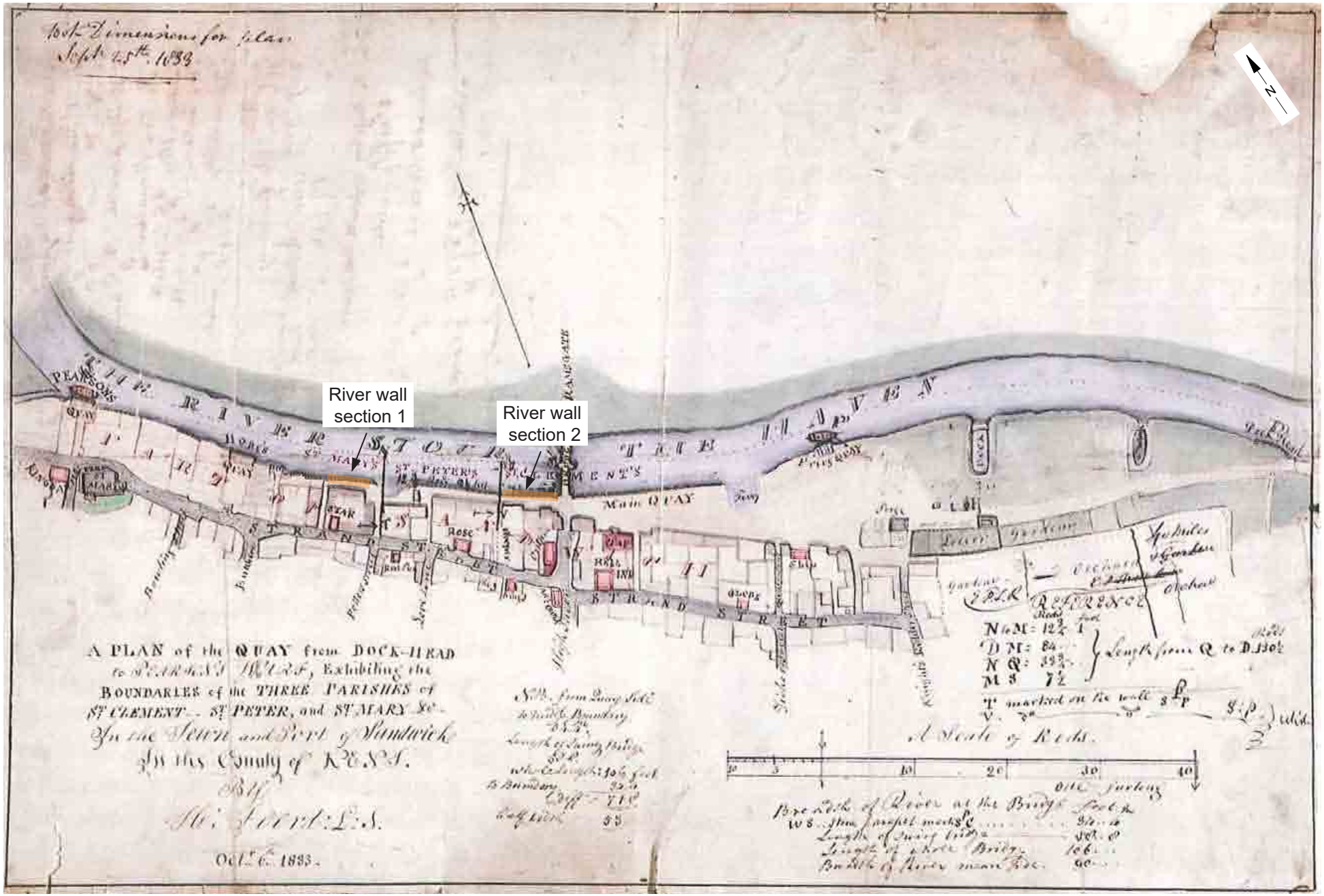
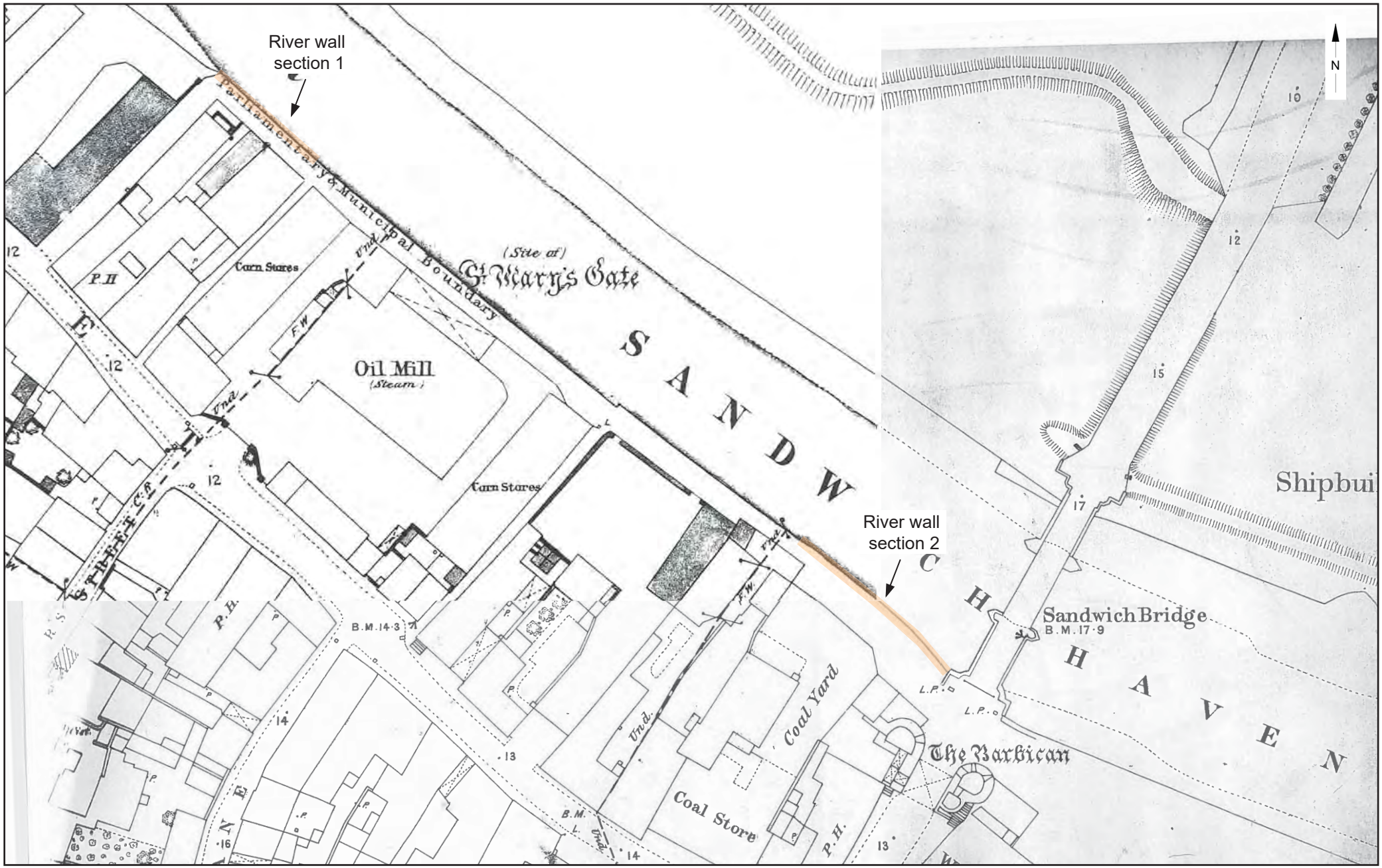
Report Ref: 2014176	Drawn by: AW		



© **Archaeology South-East**		Proposed Tidal Defence Works at 30 Strand Street and Dolphin Quay	Fig. 3
Project Ref: 5514	Jan 2014	Proposed flood defence works	
Report Ref: 2013333	Drawn by: AW		



© Archaeology South-East		Sandwich Town Tidal Defences Scheme	Fig. 4
Project Ref: 5514	June 2014	Reaches 4 & 5: Plan of Sandwich quay by Foord, 1833	
Report Ref: 2014176	Drawn by: AW		



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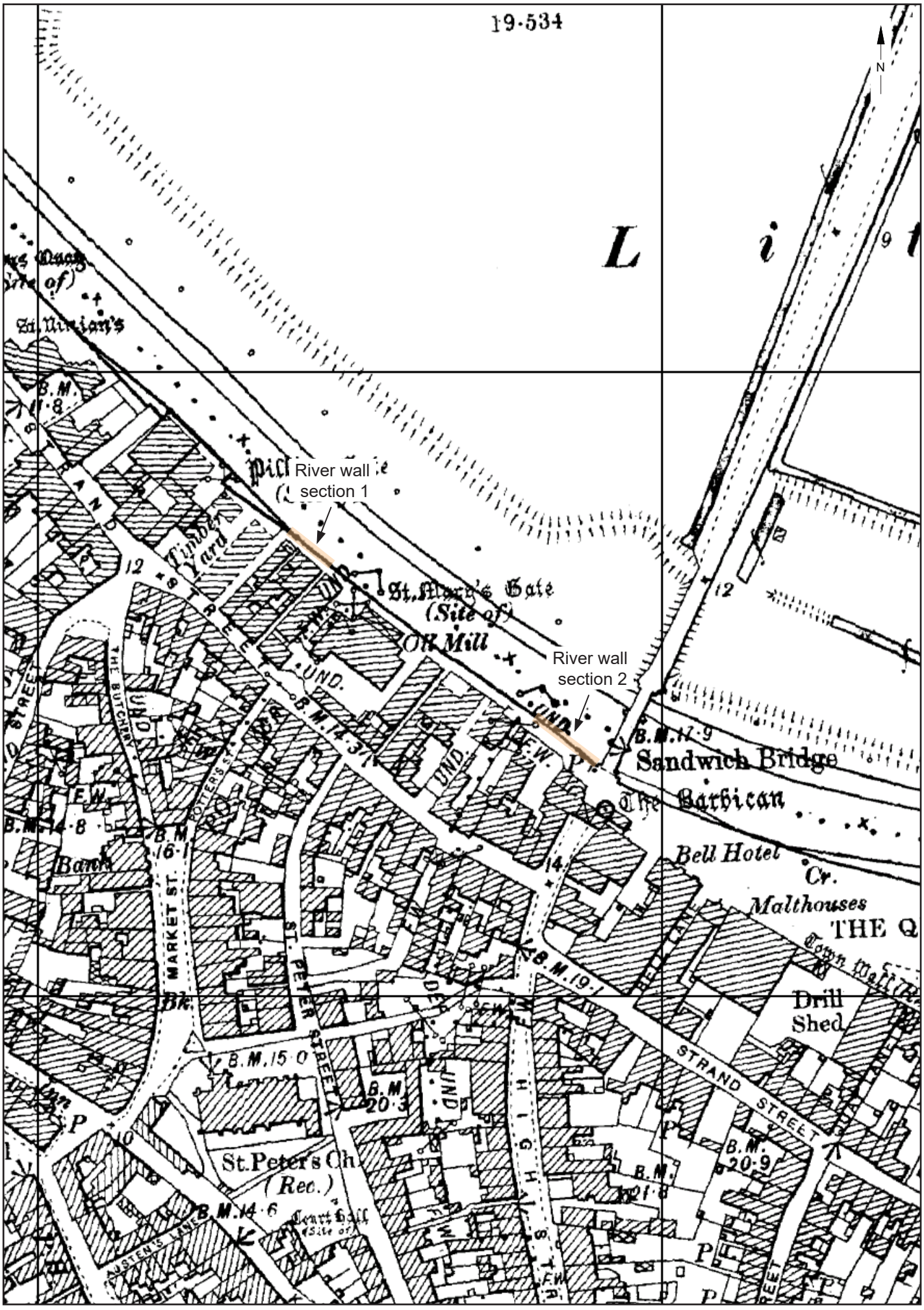

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Project Ref: 5514	June 2014	Reaches 4 & 5: Ordnance Survey map, 1897	
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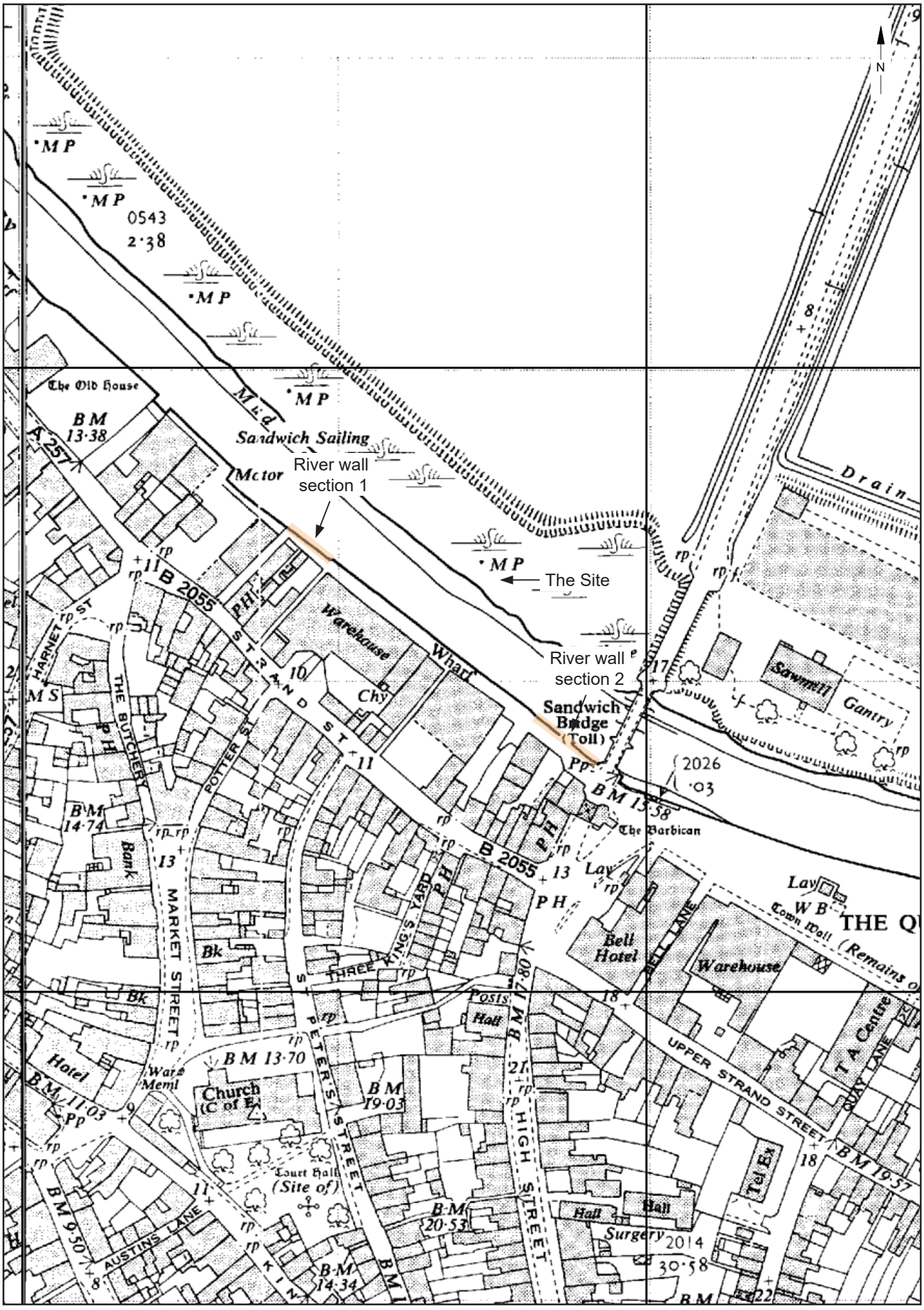

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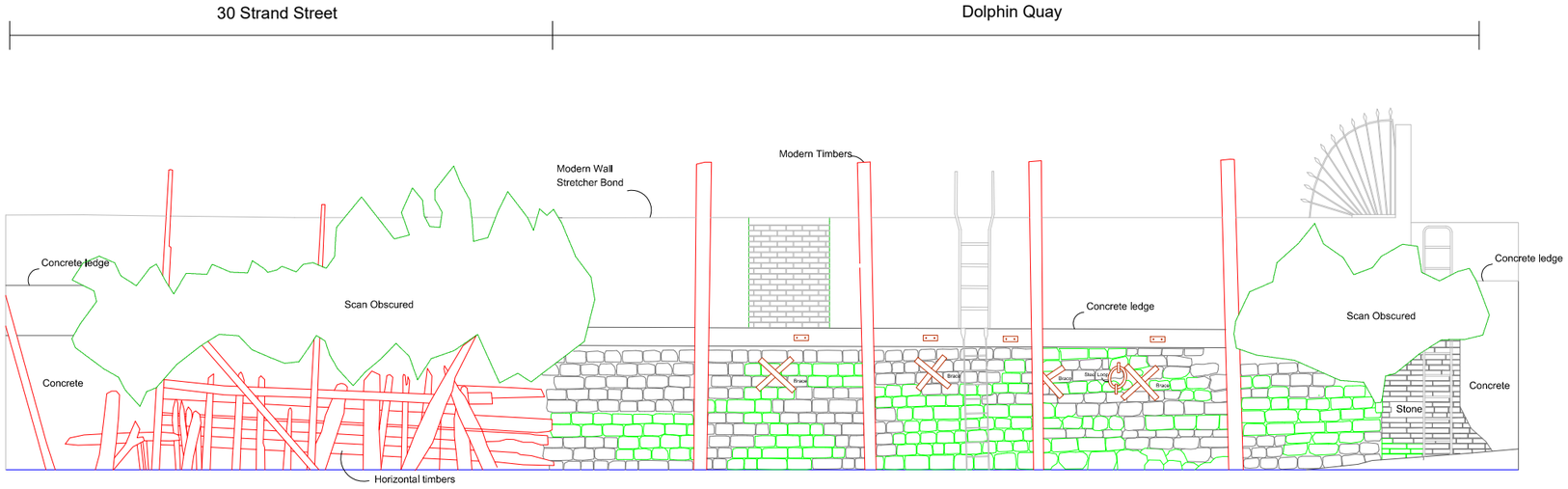
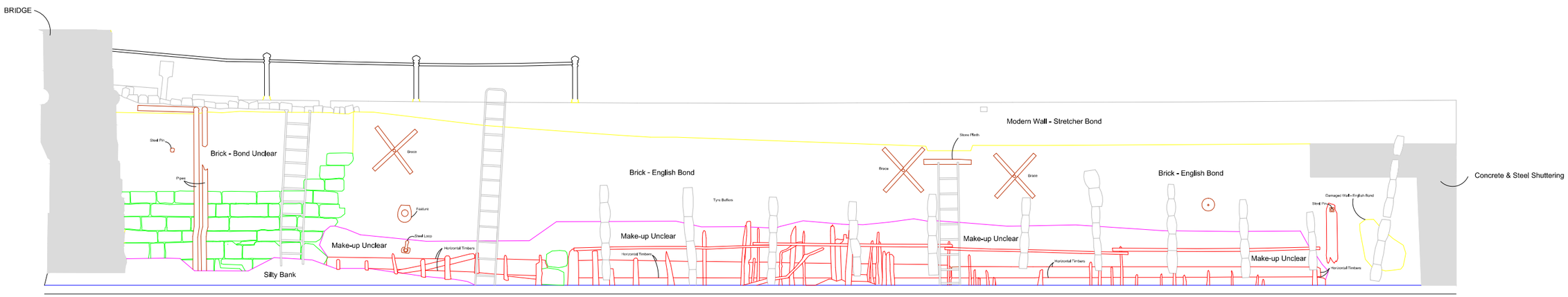


SECTION 1



SECTION 2

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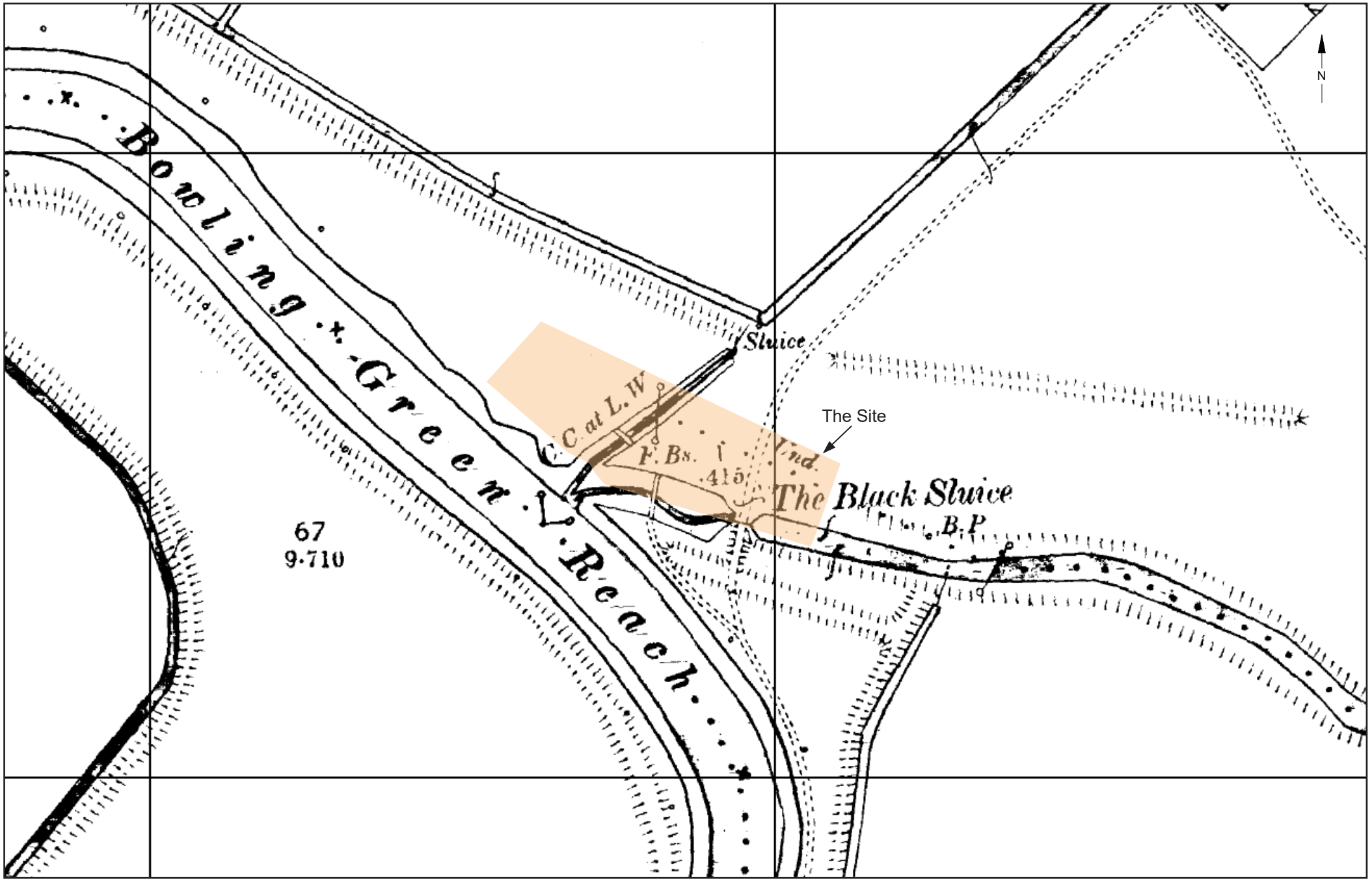
Report Ref: 2014176	Drawn by: AW		



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Project Ref: 5514	June 2014	Reach 7 (Guilford Wharf): Ordnance Survey map, 1897	
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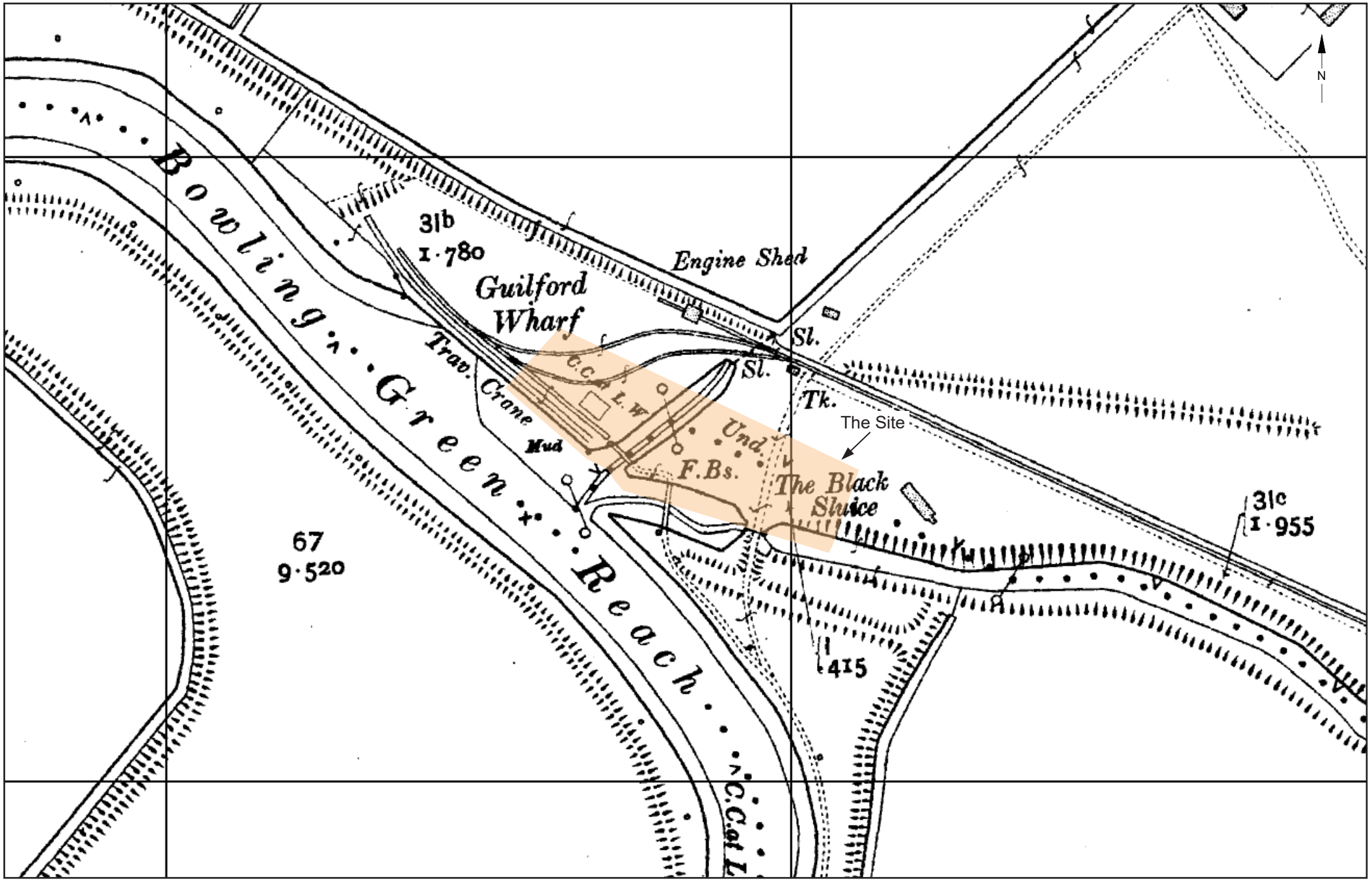

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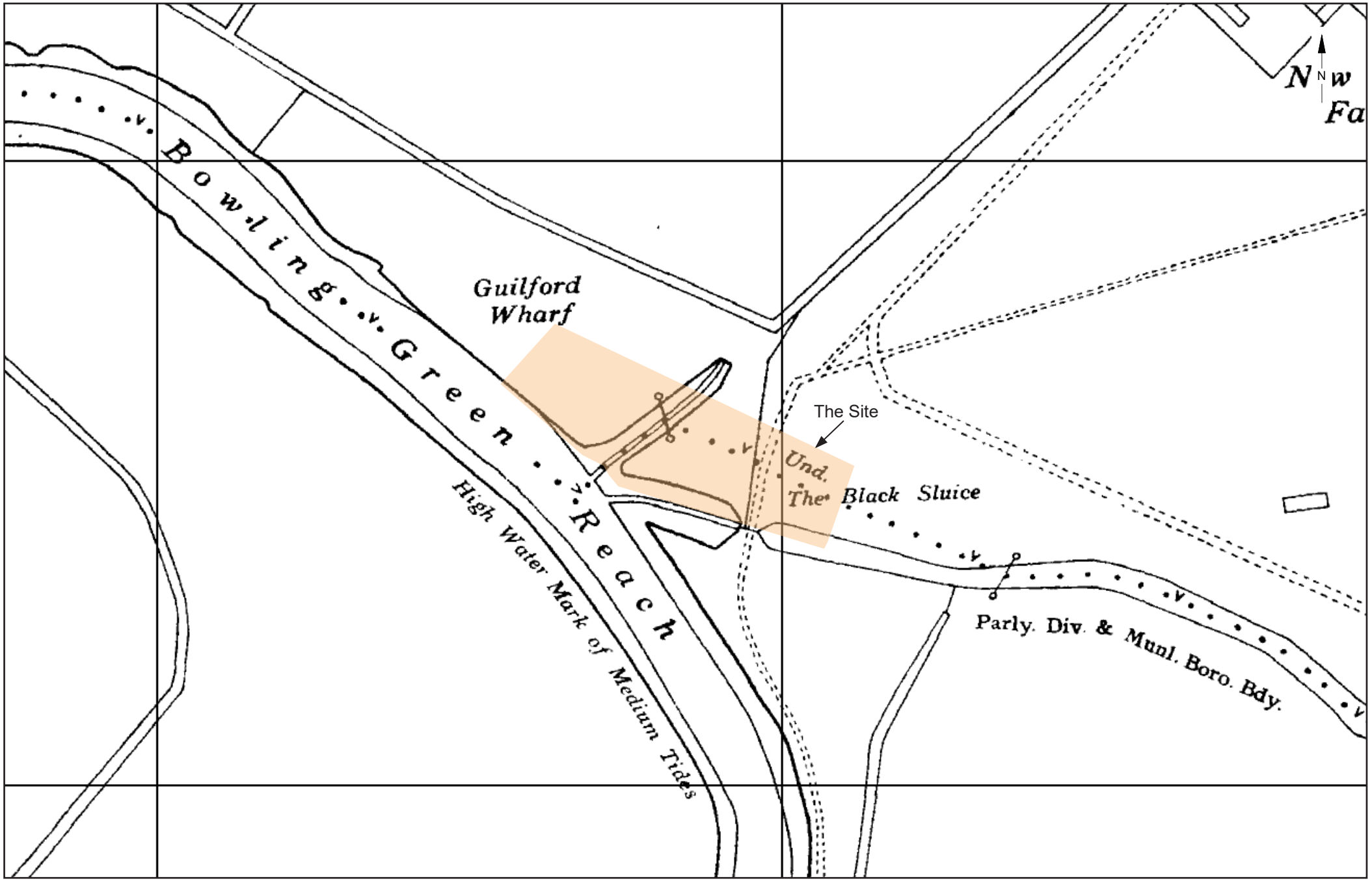

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Project Ref: 5514	June 2014	Reach 7 (Guilford Wharf): Ordnance Survey map, 1938	
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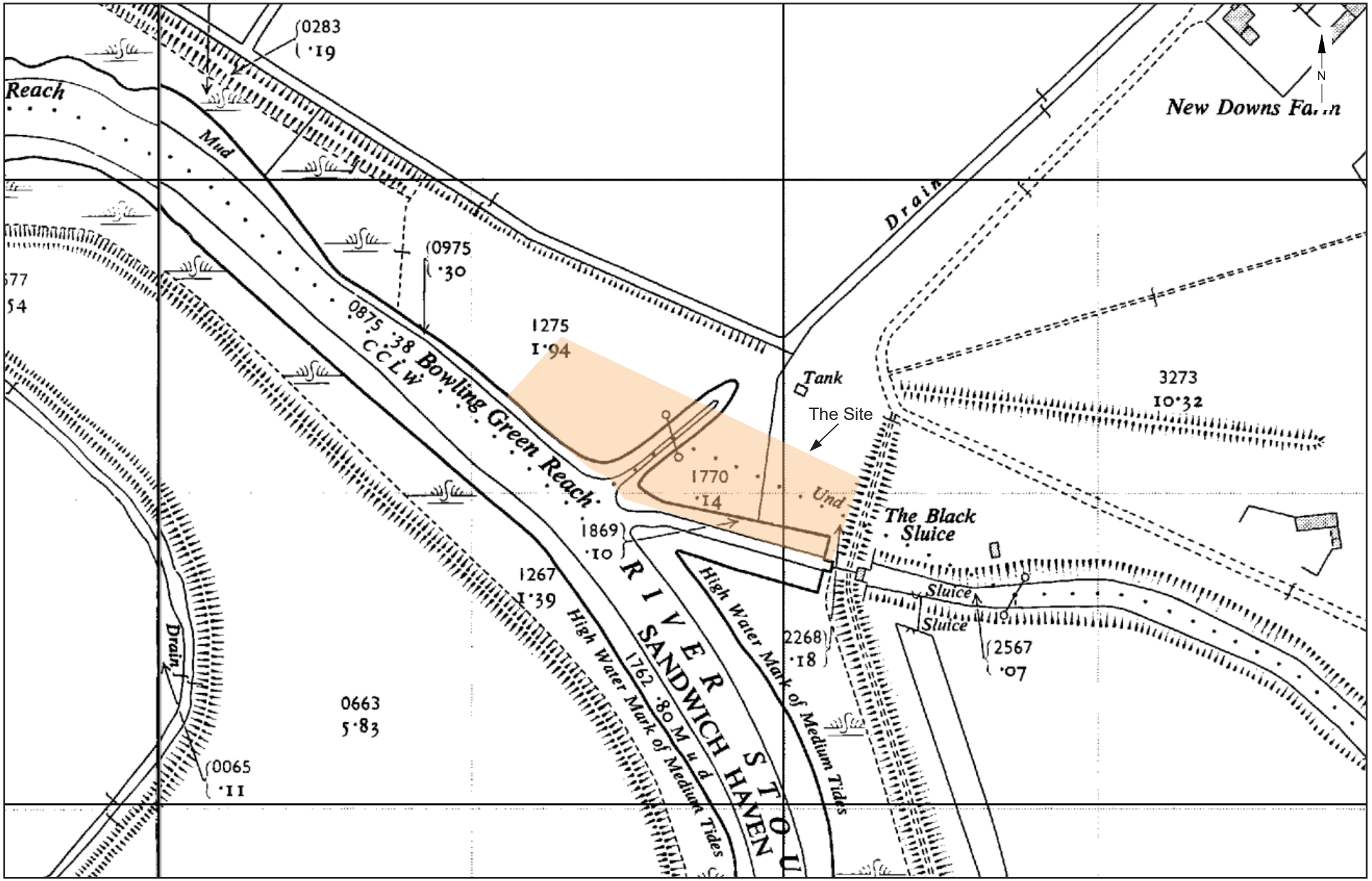

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Project Ref: 5514	June 2014	Reach 7 (Guilford Wharf): Ordnance Survey map, 1956-8	
Report Ref: 2014176	Drawn by: AW		

© **Archaeology South-East**		Sandwich Town Tidal Defences Scheme	Fig. 13
Project Ref: 5514	June 2014	Reach 7 (Guilford Wharf): Google maps image	
Report Ref: 2014176	Drawn by: AW		

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Appendix 17: Sandwich Town Tidal Defences. Inerim report on the topographical survey and record of 'The Monks Wall

Archaeology South-East

ASE

Sandwich Town Tidal Defences, Reach 12

Interim Report on the Topographical Survey and Record of the 'Monks Wall'

Planning Reference: DOV/12/00656

NGR: 632828, 158905 (centred)

ASE Project no. 5514

SITE CODE: TDS 13

Prepared by
Richard James and John Cook

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Abstract

A Topographical Survey and a Written and Photographic Record were undertaken by ASE at the 'Monks Wall', Reach 12, Sandwich Town Tidal Defences, Sandwich, Kent on 14th January 2014.

The 'Monks Wall' comprises an 800m long, 0.75-1.5m high by 7-10m wide sea wall, now grassed, constructed before 1280AD. The top of the bank forms a track, currently in use, which descends to its north western side. Changes in form along its length may relate to different lengths constructed at different times or by different work gangs, or subsequent modifications, rebuilds etc.

1.0 Introduction

1.1 The Monk's Wall (KHER TR35NW8) is a sea wall, constructed of sand and stone, of medieval date and situated along the northern bank of the River Stour to the north of Sandwich (Fig. 1). It was constructed by the Abbey of St Augustine in Canterbury during a period of reclamation (inning) of the Stour valley to create agricultural land from former saltmarsh. It is first recorded in a document of 1280, and forms part of an extensive landscape of reclamation carried out around the coast of Kent by monastic landowners during the 12th and 13th centuries. This reclamation process was indiscriminate in nature, often causing friction with neighbouring landowners.

2.0 Methodology

2.1 The archaeological survey comprised two elements: a detailed topographic survey and a written record, broadly conforming to an English Heritage Level 3 landscape survey. The monument was categorised into a series of character areas (A-E on Figs 2 & 3; plates on Fig. 4), identified on site by changes in the morphology of the surviving historic fabric. A pro-forma record sheet was created for each character area, and a digital photograph taken.

2.2 Survey data for the topographical survey was collected along approximate 2m transects with a spacing of 0.5m, where possible, using a Leica Viva GPS using Virtual Reference Stations (VRS). The GPS receiver collects satellite data to determine its position and uses the mobile phone networks to receive Corrections to provide a sub centimetre Ordnance Survey position and height. Each surveyed point has an Ordnance Survey position. The topographical survey was concentrated on features identified within the walkover survey with a much closer spacing of between 0.5m and 2m where possible.

3.0 Description

3.1 Character Area A (Fig. 1, Plate 1)
NGR 633160 158681 – 633050 158796

This area comprises a slightly raised and heavily rutted vehicle track along the edge of an arable field, 3.5m wide, bounded to the west by a fence with a wide water-filled ditch beyond. Historic mapping suggests that the Monk's Wall did not run through this area, but turned to the north-east at its junction with Character Area B. However, the alignment of this stretch continues that of the main monument to the west, suggesting that this may originally have been the line of the sea-wall, subsequently destroyed.

3.2 Character Area B (Fig. 2, Plates 2 & 3)
NGR 633050 158796 – 632863 158966

This area comprises a prominent length of grassy bank, c.1m high and c.10m wide, with a 4m wide flat top used as a track (and heavily rutted in places). The western edge slopes down to an abrupt edge, marking the former plough-line. A flanking ditch is evident on the western side (adjacent to the southernmost 45 m), up to 1.5m wide and 0.5m deep. The southern end of the ditch stops abruptly at a modern vehicle causeway running along the boundary hedge, but it may have originally continued into the drain beyond. A slight berm visible between the ditch and the bank may be caused by slumping. The eastern side of the bank is bounded by a fence with a deep water-filled ditch beyond, much of it obscured by scrub. The western edge of the bank is lined by five well-spaced maple/sycamore trees. The junction with character Areas C and D is eroded by vehicles and stock passing through the gate.

3.3 Character Area C (Figs 2 & 3, Plate 4)
NGR 632863 158966 – 632839 158931

This area comprises a flat-topped grassy bank, up to 0.75m high and 8m wide at its northern end, narrowing to 7m to the south. Its eastern edge is steep and abrupt. The north-east end is disturbed where it joins Character Area B, with severe localised poaching around a cattle trough. The south-western end is cut by a wet ditch, crossed by a causeway giving access on to the adjacent river bank. The western boundary is a hedge and fence with a deep wet ditch beyond.

3.4 Character Area D (Fig. 3, Plate 5)
NGR 632863 158966 – 632684 159288

This area comprises a grassy bank 7-10m wide and up to 1.3m high, with a flatter 4m wide track running along the top. Its western slope is more gradual than that in Character Area B, while the eastern side continues the fence and ditch. The junctions with Character Areas B/C and E are both eroded and damaged by vehicle and stock traffic.

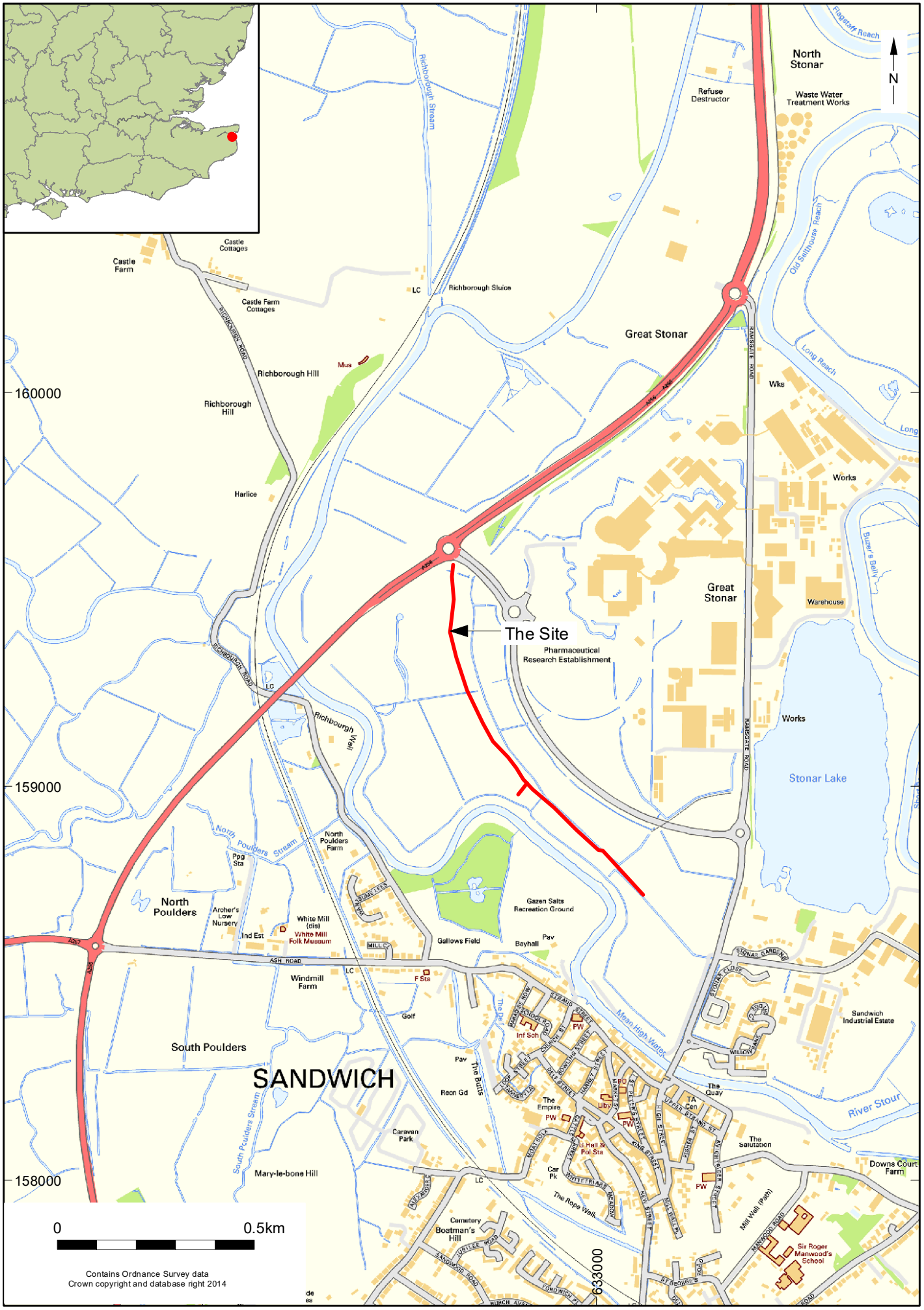
3.5 Character Area E (Fig. 3, Plates 6 & 7)
NGR 632684 159288 – 632675 159522

This area comprises a flat-topped grassy bank up to 10m wide with a 5m wide track on top, and up to 1.5m high. The track descends the western side of the bank at the northern end, forming a 3m wide diagonal terrace up to 20m in length and cut into the bank to a depth of c1m. The northern end of the bank is heavily overgrown with scrub and eventually (beyond the site) cut by the modern road. A smaller bank

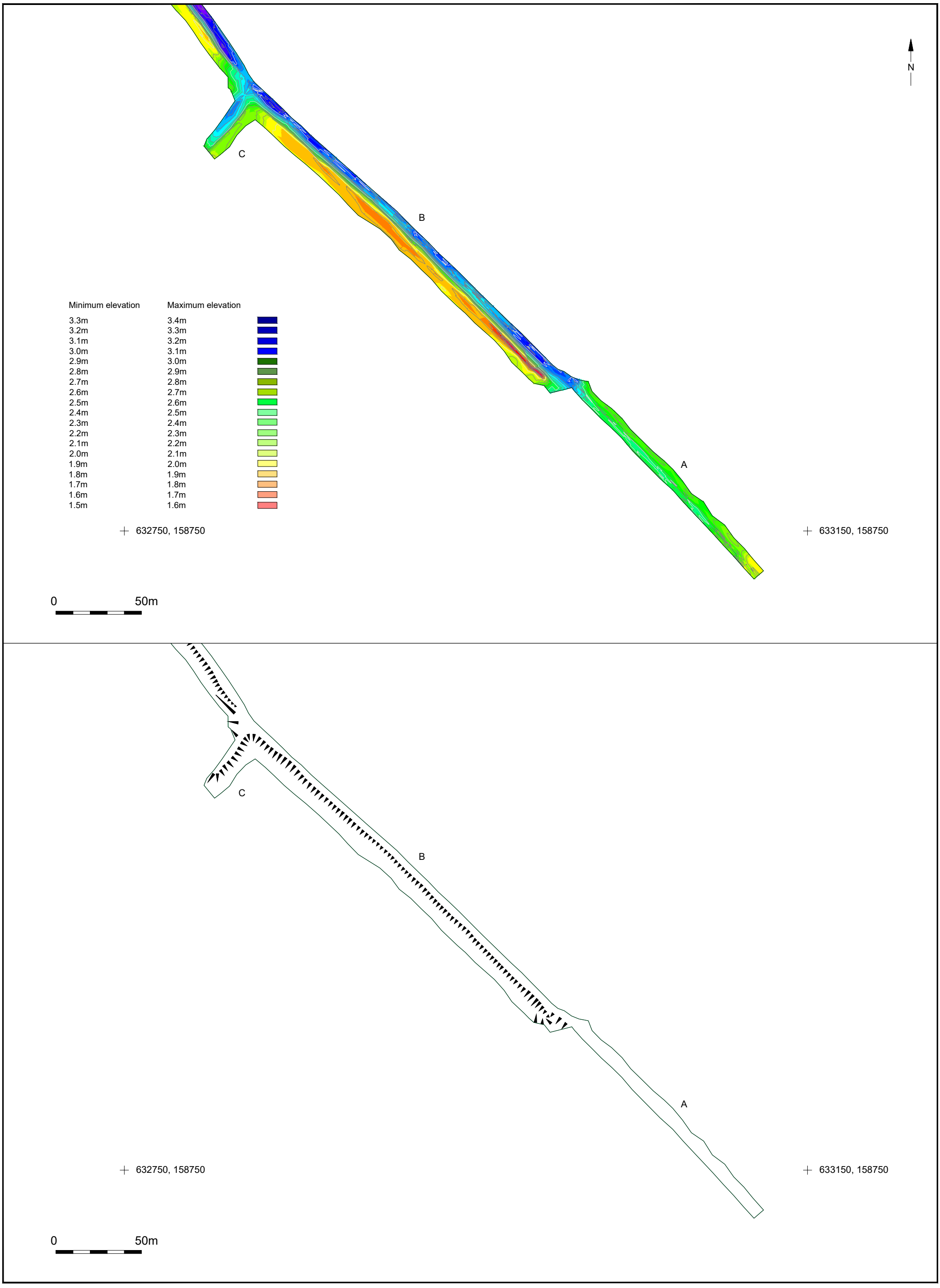
curves round from its northern end towards the north-west, although it is largely inaccessible due to scrub.

4.0 Conclusion

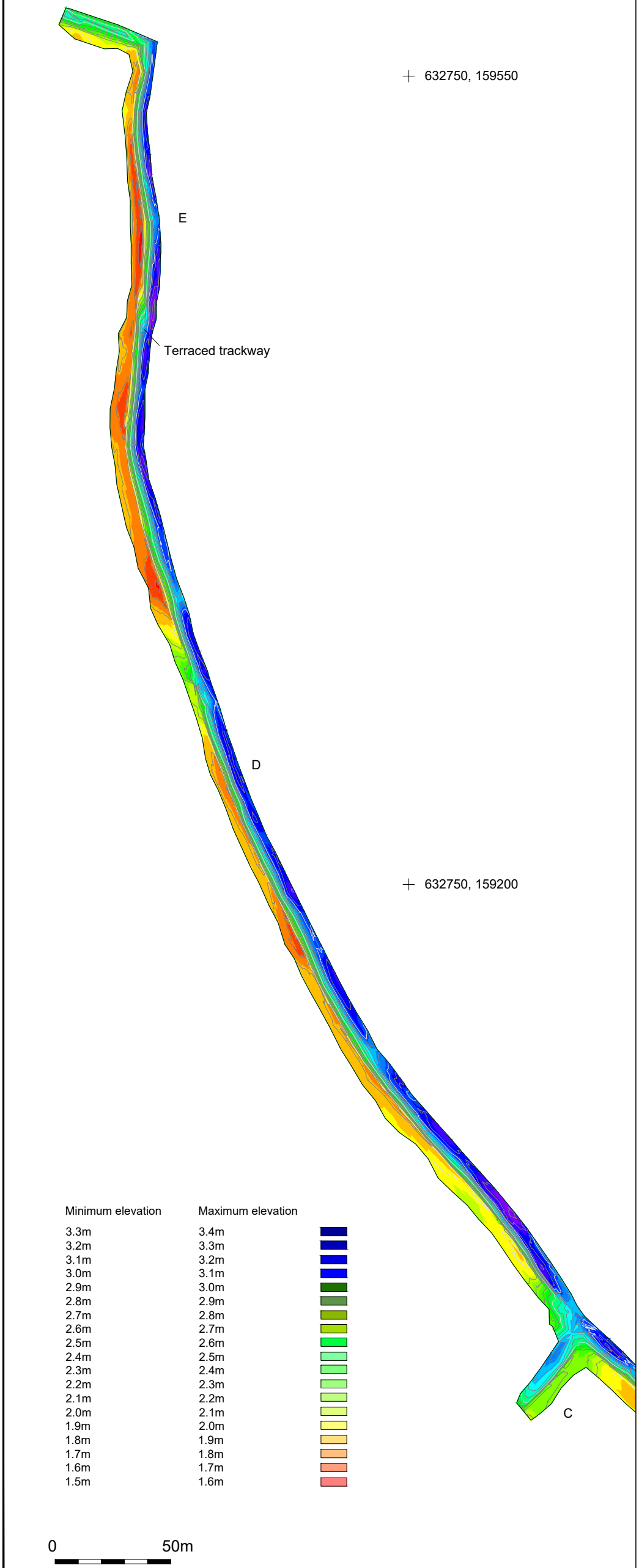
4.1 The survey work indicated that , while the earthwork is ostens ibly a simple linear bank, there are subtle differences across the identified character areas. These may be due to orig inal variations at the time of construction, such as different lengths constructed at different times or by different work gangs, or they ma y reflect subsequent modifications, rebuilds etc. Either wa y, the monument may contain further evidence for its historical dev elopment within its physical fabric. It is essential, therefore, that any works affecting the monument are carried out under archaeological supervision.

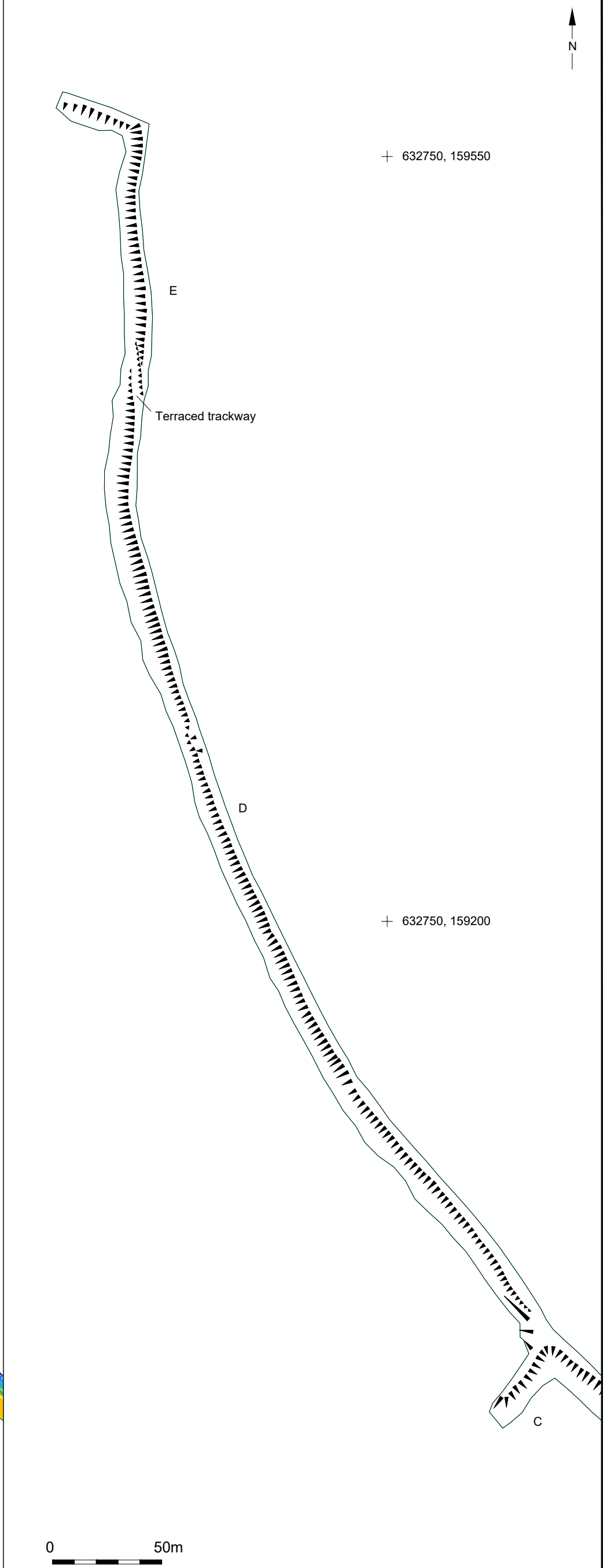


© Archaeology South-East		Monks Wall, Sandwich	Fig. 1
Project Ref: 5514	Feb 2014	Site location	
Report Ref:	Drawn by: JLR		



© **Archaeology South-East**		Monks Wall, Sandwich	Fig. 2
Project Ref: 5514	Feb 2014	Topographic survey - south	
Report Ref:	Drawn by: JLR		





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Project Ref: 5514	Feb 2014	Topographic survey - north	
Report Ref:	Drawn by: JLR		

Plate 1: A, looking north-west

Plate 2: Southern end of B, looking north-west

Plate 3: Northern end of B, looking north-west

Plate 4: C, looking south-west

Plate 5: D, looking north

Plate 6: E, looking north

Plate 7: Trackway in E, looking south-east

© **Archaeology South-East**		Monks Wall, Sandwich	Fig. 4
Project Ref: 5514	Feb 2014	Plates	
Report Ref:	Drawn by: JLR		

HER Summary

HER enquiry no.						
Site code	TDS 13					
Project code	5514					
Planning reference	DOV/12/00656					
Site address	Sandwich Town Tidal Defence Scheme, Sandwich, Kent.					
District/Borough						
NGR (12 figures)	TR 632565 160300 to TR 634241 161532					
Geology						
Fieldwork type	**Eval**	**Excav**	**WB**	**HBR**	**Survey**	Other
Date of fieldwork	March 2013-December 2015					
Sponsor/client	Environment Agency					
Project manager	Jon Sygrave					
Project supervisor	Chris Russel, Geoff Morley					
Period summary	Palaeolithic	Mesolithic	Neolithic	Bronze Age	Iron Age	
	Roman	Anglo-Saxon	Medieval	**Post-Medieval**	Other	
Project summary **(100 word max)**	Archaeological monitoring of the Sandwich Town Tidal Defence Scheme revealed residual prehistoric and Roman artefacts but the majority of the evidence uncovered dated from the Post Medieval period. A wooden structure was excavated in Sandwich town and many of the associated recovered artefacts originated in The Netherlands. Evidence of 20th Century military activity in the town was also observed. Excavations into the upstanding monument known as Monks Wall found that the earthwork was built in two stages but failed to recover any dateable finds.					
Museum/Accession No.	TBC					

Finds summary

Find type	Material	Period	Quantity
Bulk	Pot	Roman/Post Med	436
Bulk	CBM	Roman/Post Med	2836
Bulk	Animal Bone	Unknown	276
Bulk	Shell	Unknown	39
Bulk	Worked Flint	Prehistoric	9
Bulk	FCF	Unknown	4
Bulk	Stone	Unknown	29
Bulk	Fe	Unknown	91
Bulk	Cu Alloy	Post Med	2
Bulk	Glass	Post Med	63
Bulk	CTP	Post Med	65
Bulk	Slag	Unknown	23
Bulk	Coal	Post Med	6
Bulk	Wood	Unknown	3
Bulk	Coconut Shell	Unknown	1
Bulk	Architectural Frag	Unknown	1
Bulk	Mortar	Post Med	5
Bulk	Bullet	Post Med	1
Registered	Cassette	Post Med	1
Registered	Toy	Post Med	1
Registered	Mortar Part	Post Med	1
Registered	Bullet	Post Med	50
Registered	Whistle	Post Med	1
Registered	Badge	Post Med	1
Registered	Coin	Post Med	1
Registered	Leather	Post Med	8

OASIS Form

OASIS ID: archaeol6-279453

Project details

Project name	Sandwich Town Tidal Defence Scheme
Short description of the project	Archaeology South-East (ASE) was commissioned by The Environment Agency to undertake an archaeological watching brief as well a series of targeted investigations during the Sandwich Town Tidal Defence Scheme in and around the town of Sandwich, Kent. The scheme was designed to protect homes and businesses in the town and consisted of the construction of 14 Km of floodwalls and embankments along the River Stour from Richborough north-west of Sandwich to Broad Salts in the north-east. Here, a system of ditches and ponds were constructed for flood relief. The work took place between March 2013 and December 2015. Alongside the general archaeological monitoring of works on the scheme trial trenches were dug in Gallows Field (Reach 3) and into the earthwork known as Monks Wall (Reach 12). Monks Wall was also subject to topographic and walkover surveys prior to the alteration of the monument. Historic building recording of features in Reaches 4, 5 and 7 also took place.
Project dates	Start: 01-03-2013 End: 01-12-2015
Previous/future work	Yes / Not known
Any associated project reference codes	TDS13 - Sitecode
Type of project	Recording project
Site status	None
Current Land use	Coastland 2 - Inter-tidal
Current Land use	Coastland 6 - Other
Current Land use	Cultivated Land 1 - Minimal cultivation
Current Land use	Other 11 - Thoroughfare
Current Land use	Other 15 - Other
Monument type	RIVER FRONTAGE Post Medieval
Monument type	MILITARY REMAINS Modern
Monument type	FLOOD DEFENCE Medieval
Significant Finds	FLINTWORK Early Prehistoric
Significant Finds	POTTERY Roman
Significant Finds	CBM Roman

Significant Finds	CBM Medieval
Significant Finds	WORKED WOOD Post Medieval
Significant Finds	POTTERY Post Medieval
Significant Finds	CBM Post Medieval
Significant Finds	CTP Post Medieval
Significant Finds	ORDNANCE Modern
Investigation type	"Field observation","Full excavation","Part Survey","Watching Brief"
Prompt	Planning condition

Project location

Country	England
Site location	KENT DOVER SANDWICH Sandwich Town Tidal Defences
Postcode	CT13 XXX
Study area	14 Kilometres
Site coordinates	TR 632565 160300 50.882887077744 1.743227941037 50 52 58 N 001 44 35 E Line
Site coordinates	TR 634241 161532 50.883915710381 1.74569437908 50 53 02 N 001 44 44 E Line
Lat/Long Datum	Unknown
Height OD / Depth	Min: 1m Max: 6m

Project creators

Name of Organisation	Archaeology South East
Project brief originator	Halcrow Group Limited
Project design originator	ASE
Project director/manager	Jon Sygrave
Project supervisor	Chris Russel
Type of sponsor/funding body	Environment Agency
Name of sponsor/funding body	Environment Agency

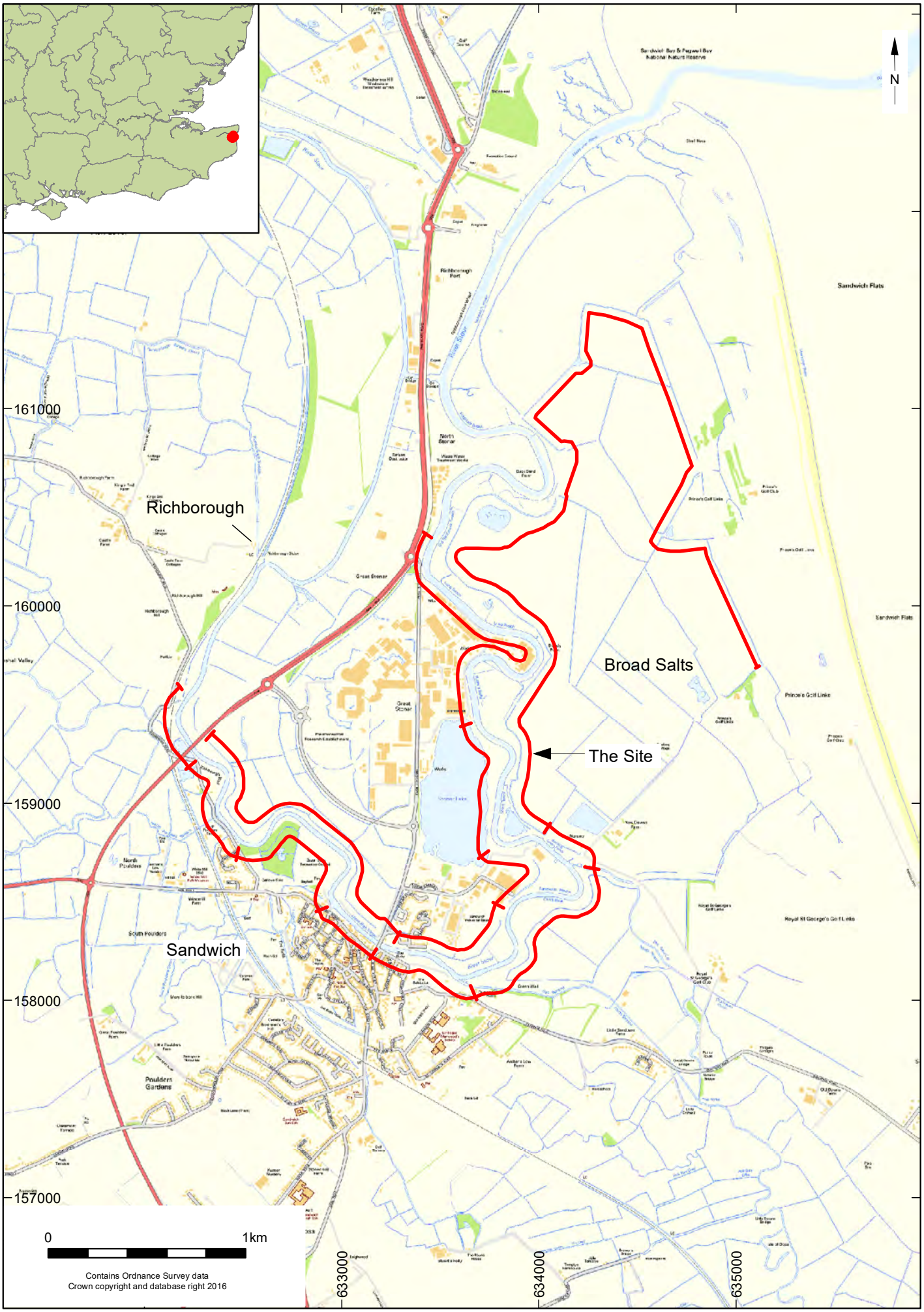
Project archives

Physical Archive Exists?	No
Digital Archive Exists?	No
Paper Archive Exists?	No

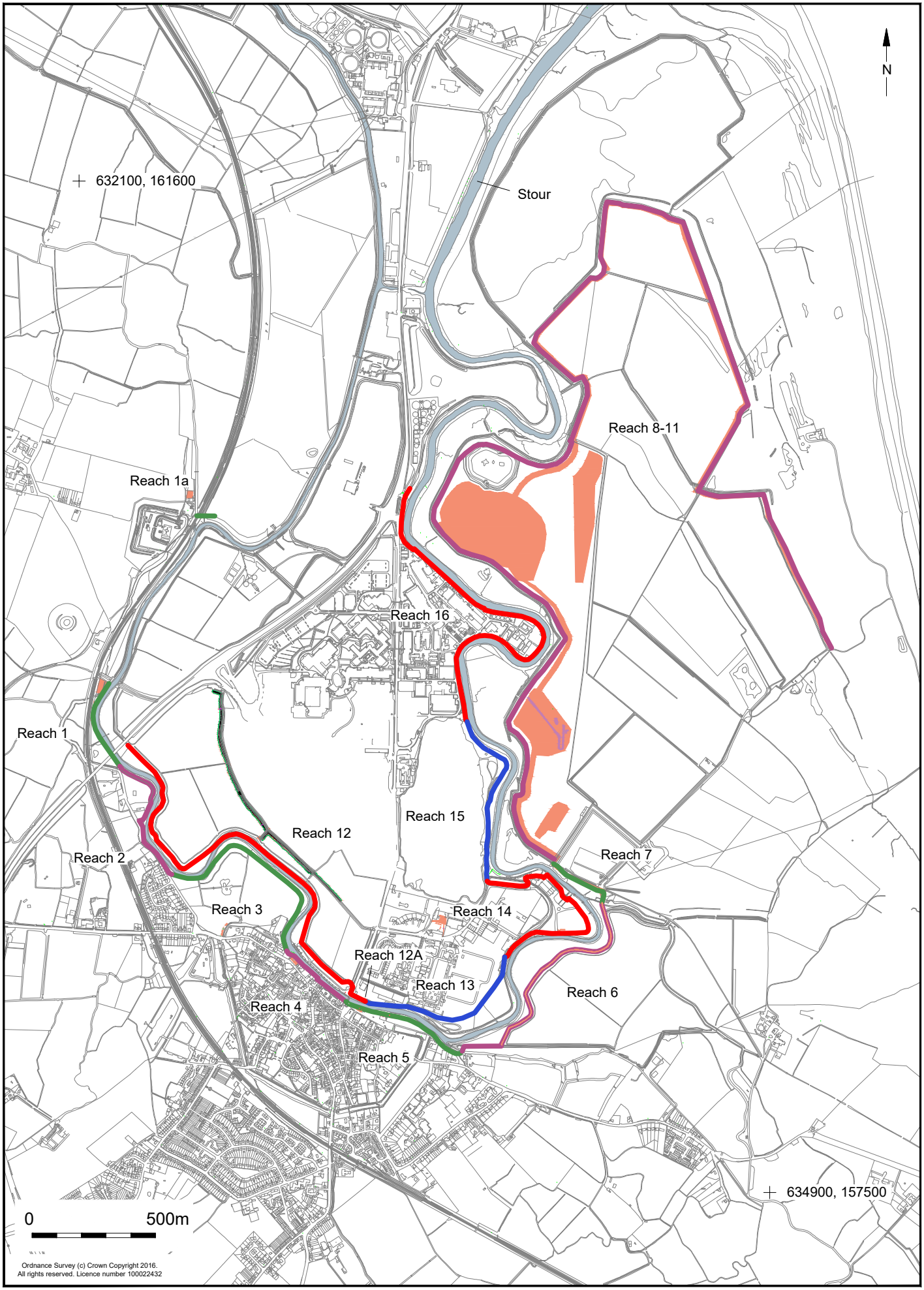
Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	ARCHAEOLOGICAL INVESTIGATIONS AT SANDWICH TOWN TIDAL DEFENCE SCHEME. A POST-EXCAVATION ASSESSMENT AND UPDATED PROJECT DESIGN REPORT
Author(s)/Editor(s)	Russel, C.
Other bibliographic details	ASE Report No: 2016296
Date	2017
Issuer or publisher	Archaeology South-East
Place of issue or publication	Portslade
Description	PXA Report

Entered by	andy margetts (a.margetts@ucl.ac.uk)
Entered on	16 March 2017



© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 1
Project Ref: 5514	Feb 2017	Site location	
Report Ref: 2016296	Drawn by: JLR		



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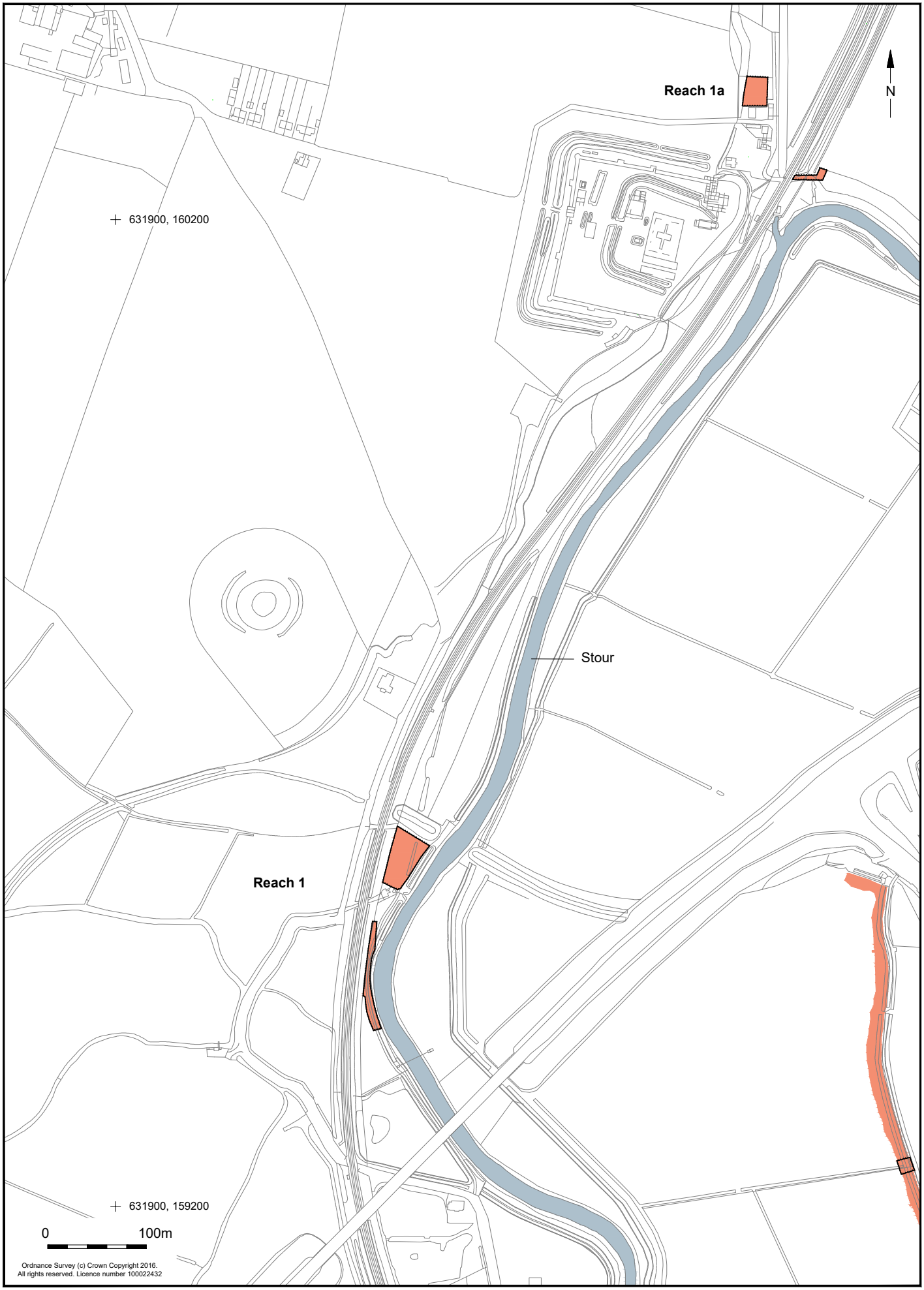
Project Ref: 5514	Feb 2017	Plan showing location of Reach 1-16	
Report Ref: 2016296	Drawn by: JLR		



© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 3
Project Ref: 5514	Feb 2017	Reach 1 and 1a	
Report Ref: 2016296	Drawn by: JLR		

Topsoil strip of compound

Topsoil strip east of railway

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Project Ref: 5514	Feb 2017	Reach 1a plan and photographs	
Report Ref: 2016296	Drawn by: JLR		

West facing sample section

West facing sample section

General site view

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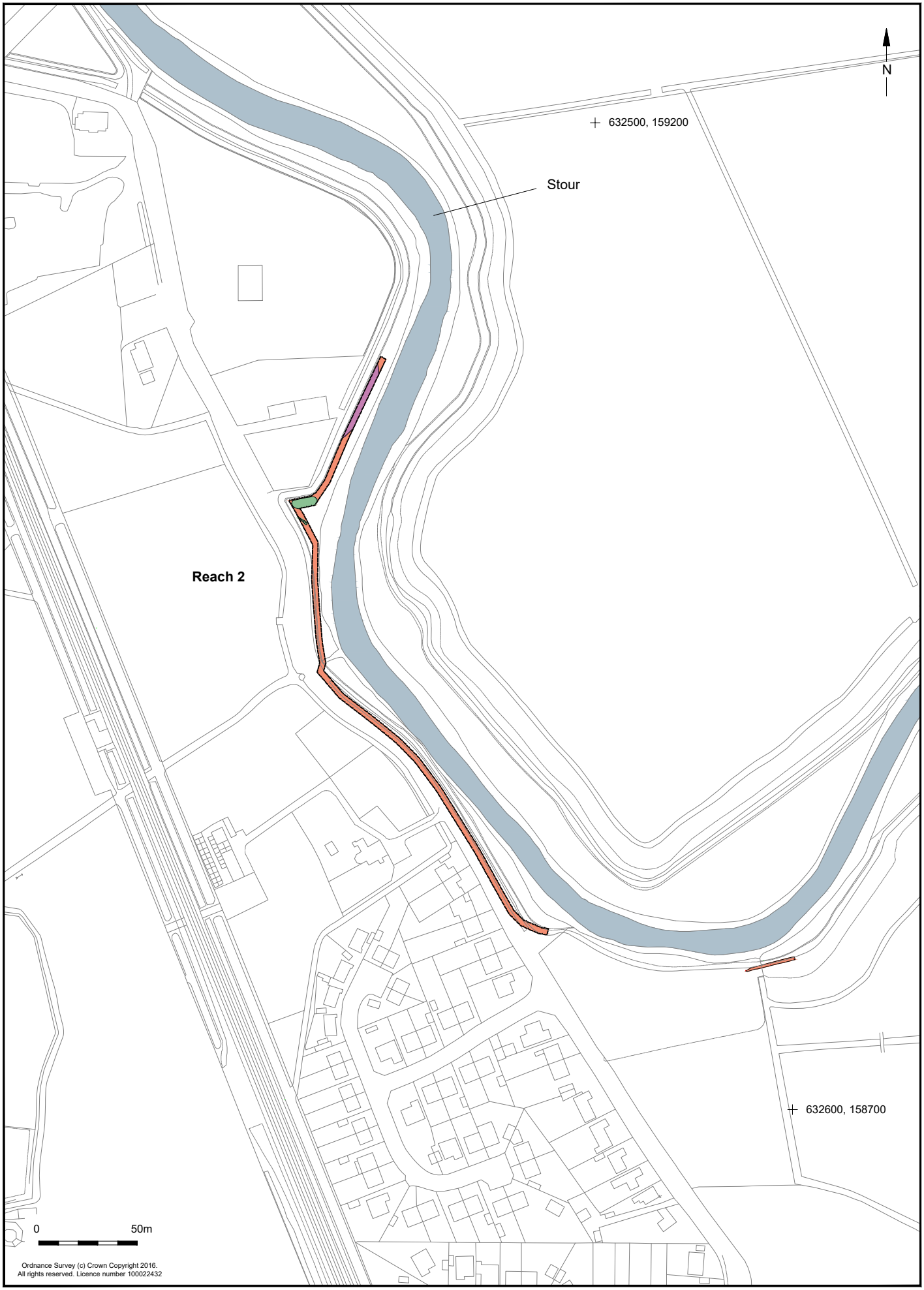
Project Ref: 5514	Feb 2017	Reach 1 detail	
Report Ref: 2016296	Drawn by: JLR		



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Project Ref: 5514	Feb 2017	Reach 2	
Report Ref: 2016296	Drawn by: JLR		

N

632340, 159070

046

023

019

Stour

632340, 158930

Phase 2
Phase 3

0 10m

Anti-tank blocks removed during sheet piling work

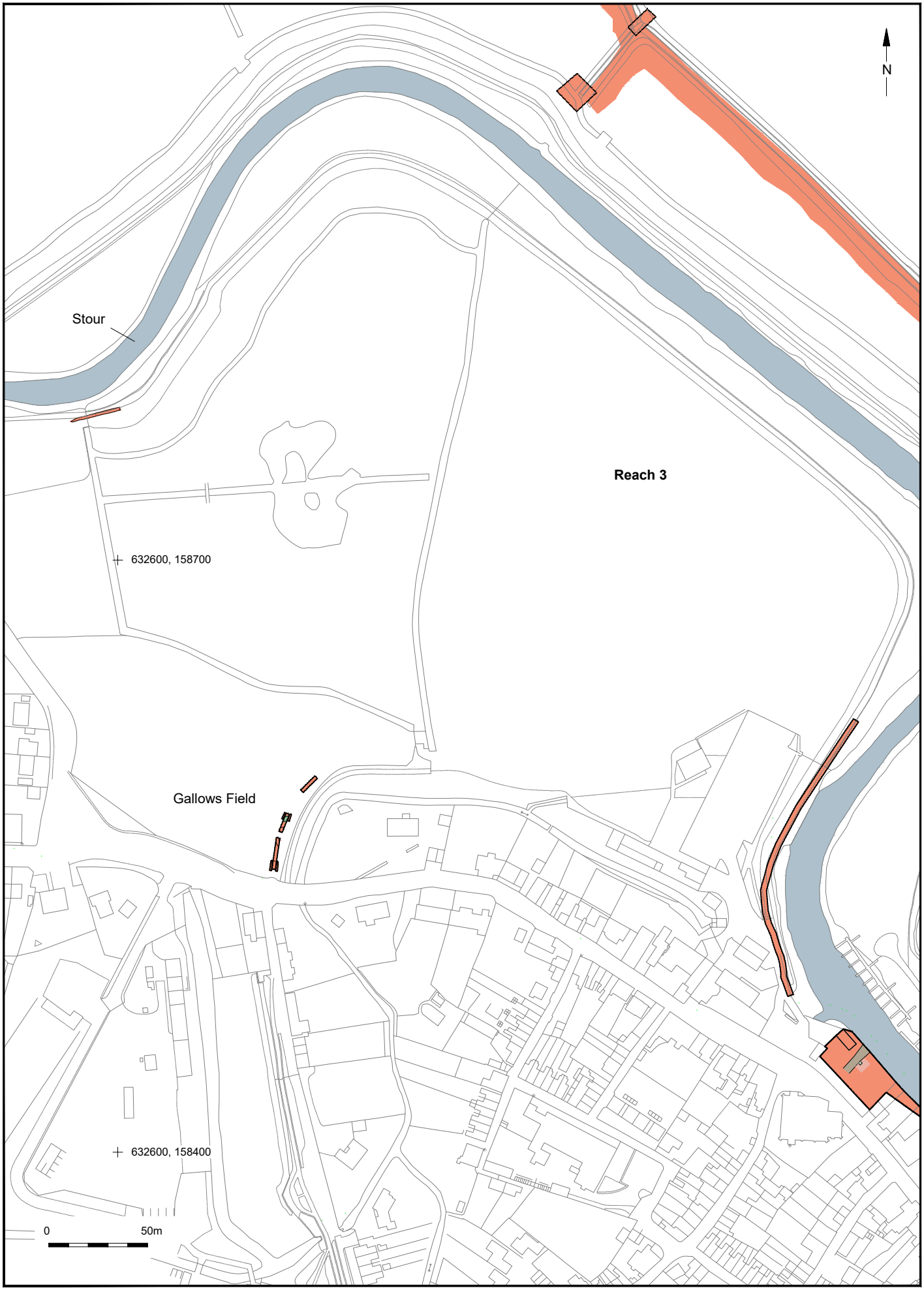
South facing sample section of flood wall trench

Construction of new flood wall

Flood wall construction trench adjacent to Richborough Road

North-west facing section of pit 019

© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 7
Project Ref: 5514	Feb 2017	Reach 2 detail	
Report Ref: 2016296	Drawn by: JLR		



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Project Ref: 5514	Feb 2017	Reach 3	
Report Ref: 2016296	Drawn by: JLR		

N

632680, 158590

Trench 3

2/014

Trench 2

Section 1

2/012

632700, 158560

Section 2

1/019

Trench 1

Phase 2

0 5m

Trench 2 looking north-east

1/019 looking north

Trench 1 looking south

Trench 3 looking south-west

2/014 looking north-west

Section 1

S N

1.56mOD

2/010

2/017

2/012

2/013

2/013

2/012

2/015

2/014

2/017

Section 2

W E

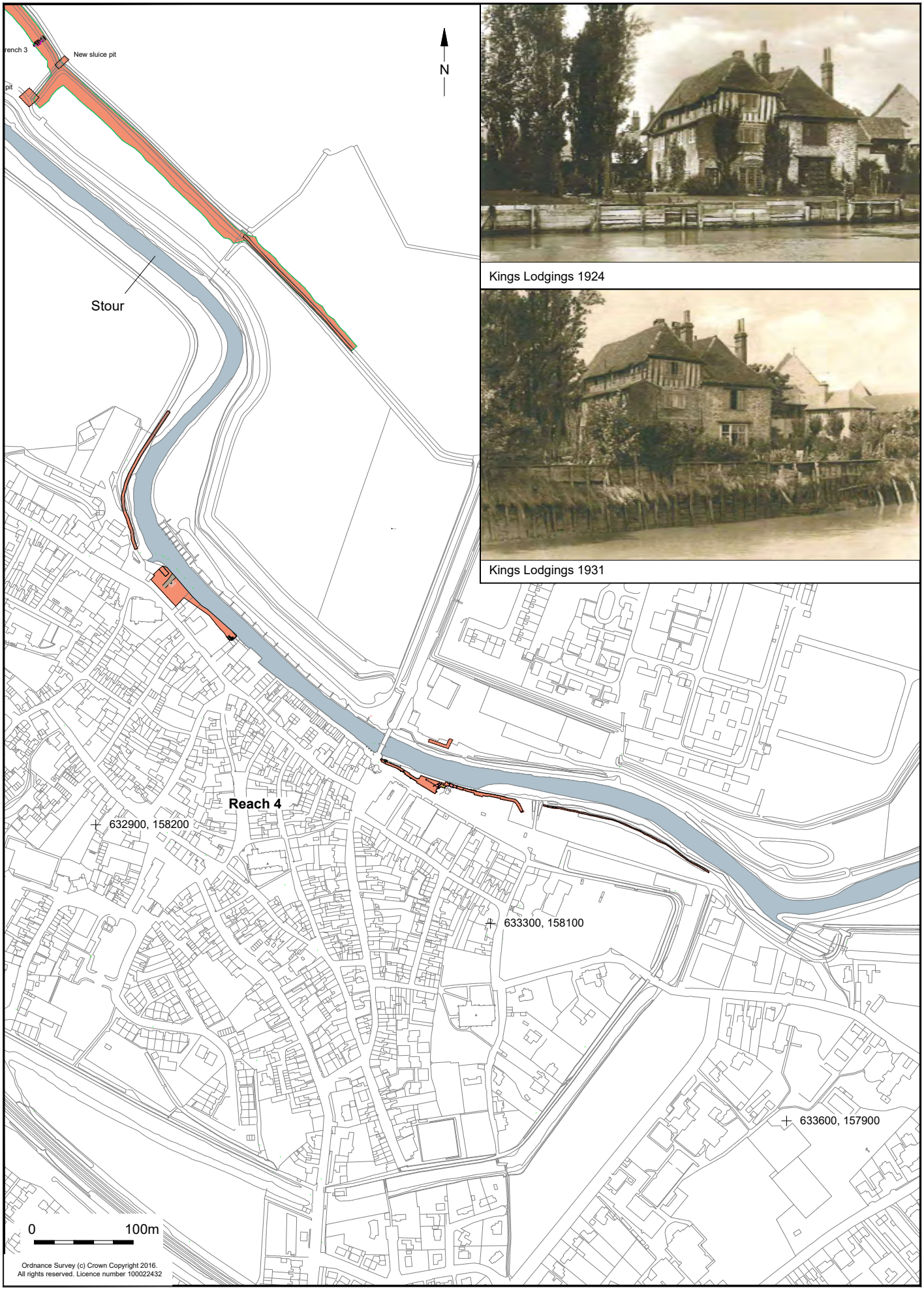
1.35mOD

1/020

1/019

0 1m

© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 9
Project Ref: 5514	Feb 2017	Reach 3 Gallows Field evaluation	
Report Ref: 2016296	Drawn by: JLR		



Kings Lodgings 1924

Kings Lodgings 1931

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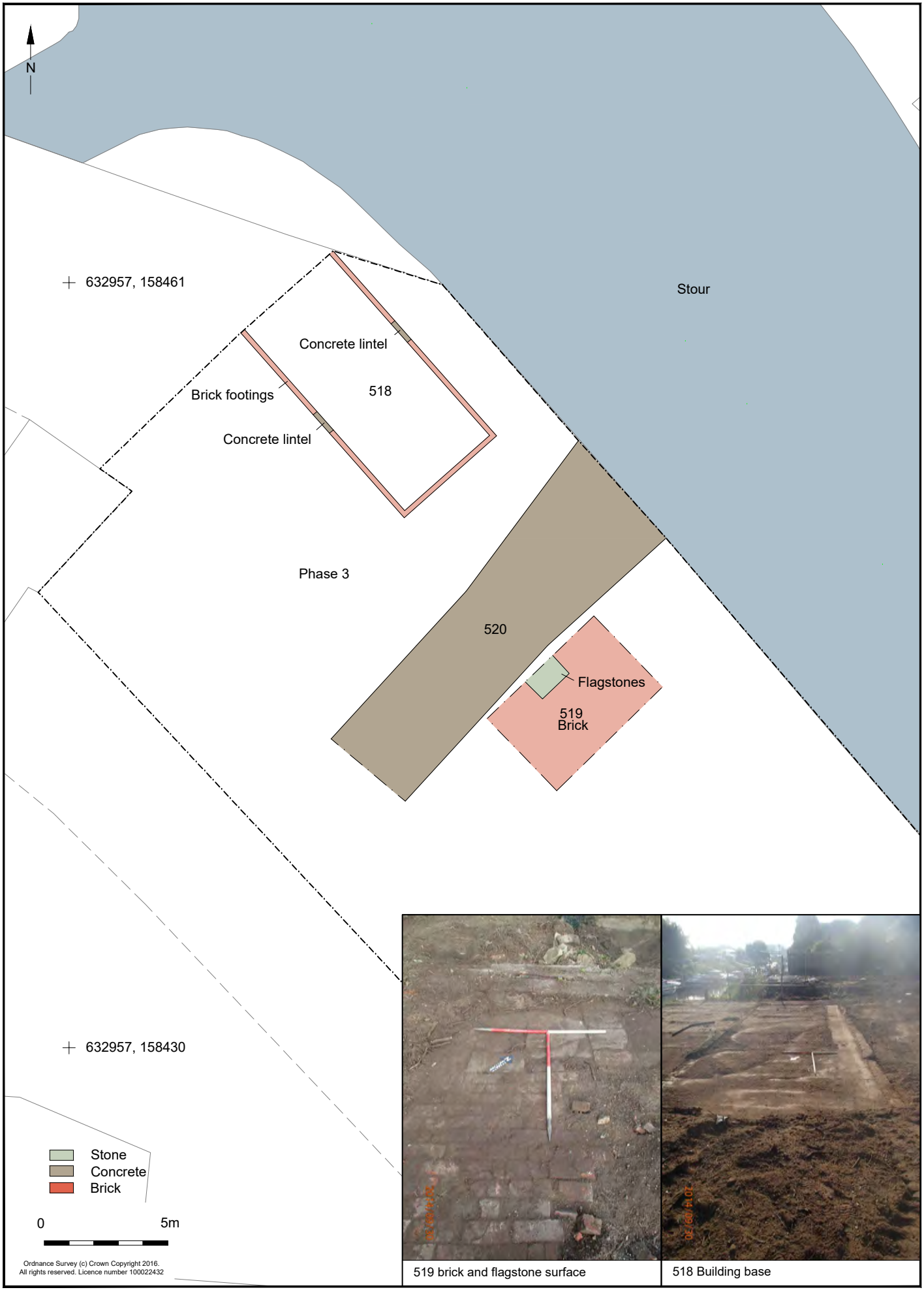
Project Ref: 5514	Feb 2017	Reach 4	
Report Ref: 2016296	Drawn by: JLR		



519 brick and flagstone surface

518 Building base

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Project Ref: 5514	Feb 2017	Reach 4: Plan of structures in Jesus Quay	
Report Ref: 2016296	Drawn by: JLR		

N

Elevation 1 and 2

Elevation 3

Elevations 4, 5 and 6

Elevation 10

Elevation 7

Elevation 8 and 9

623

632

764

633032, 158387

633040, 158387

WF1
WF2
WF3
Masonry

0 0.5m

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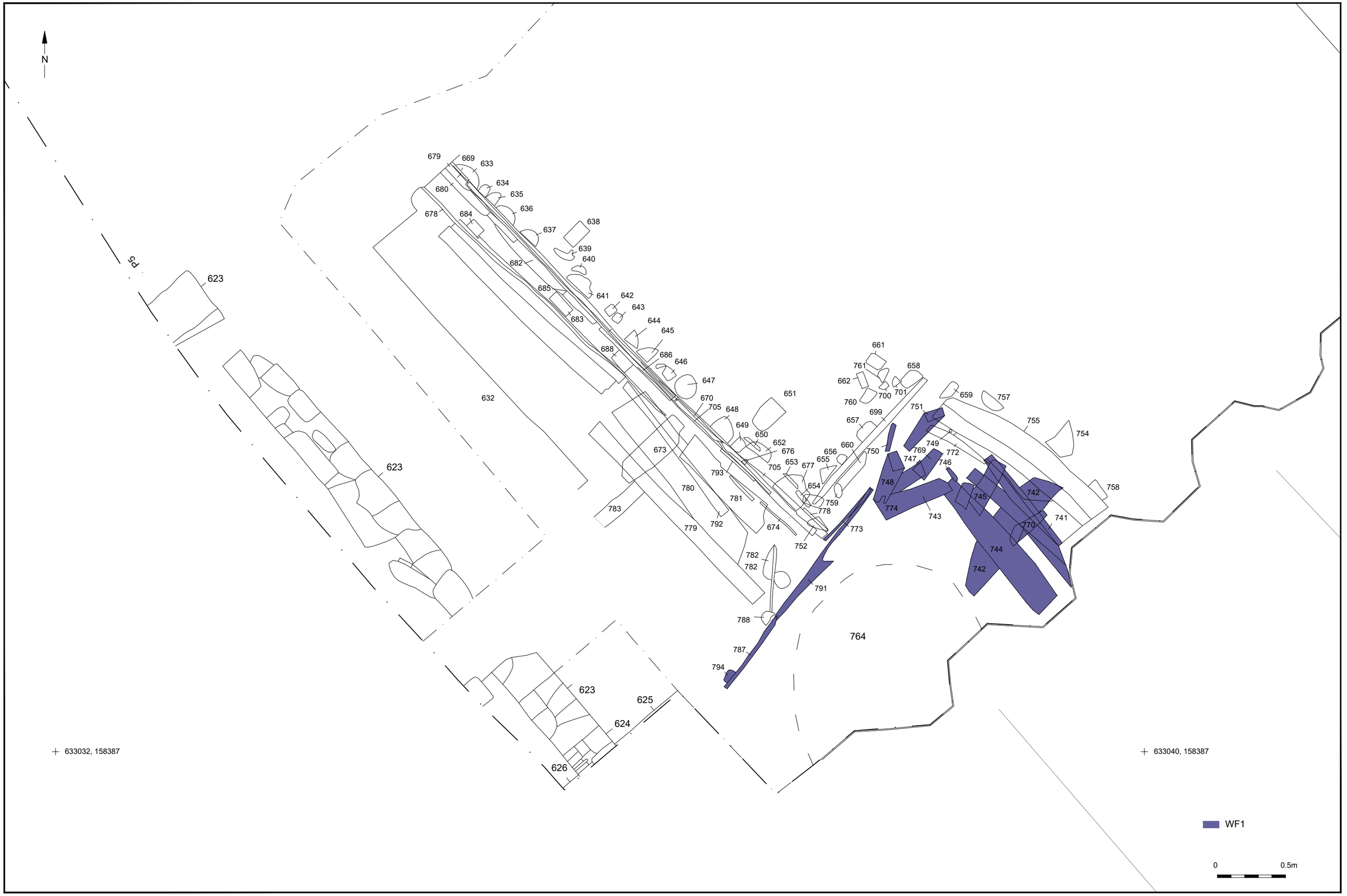
Project Ref: 5514	Feb 2017	Reach 4 plan of timber structure	
Report Ref: 2016296	Drawn by: JLR		



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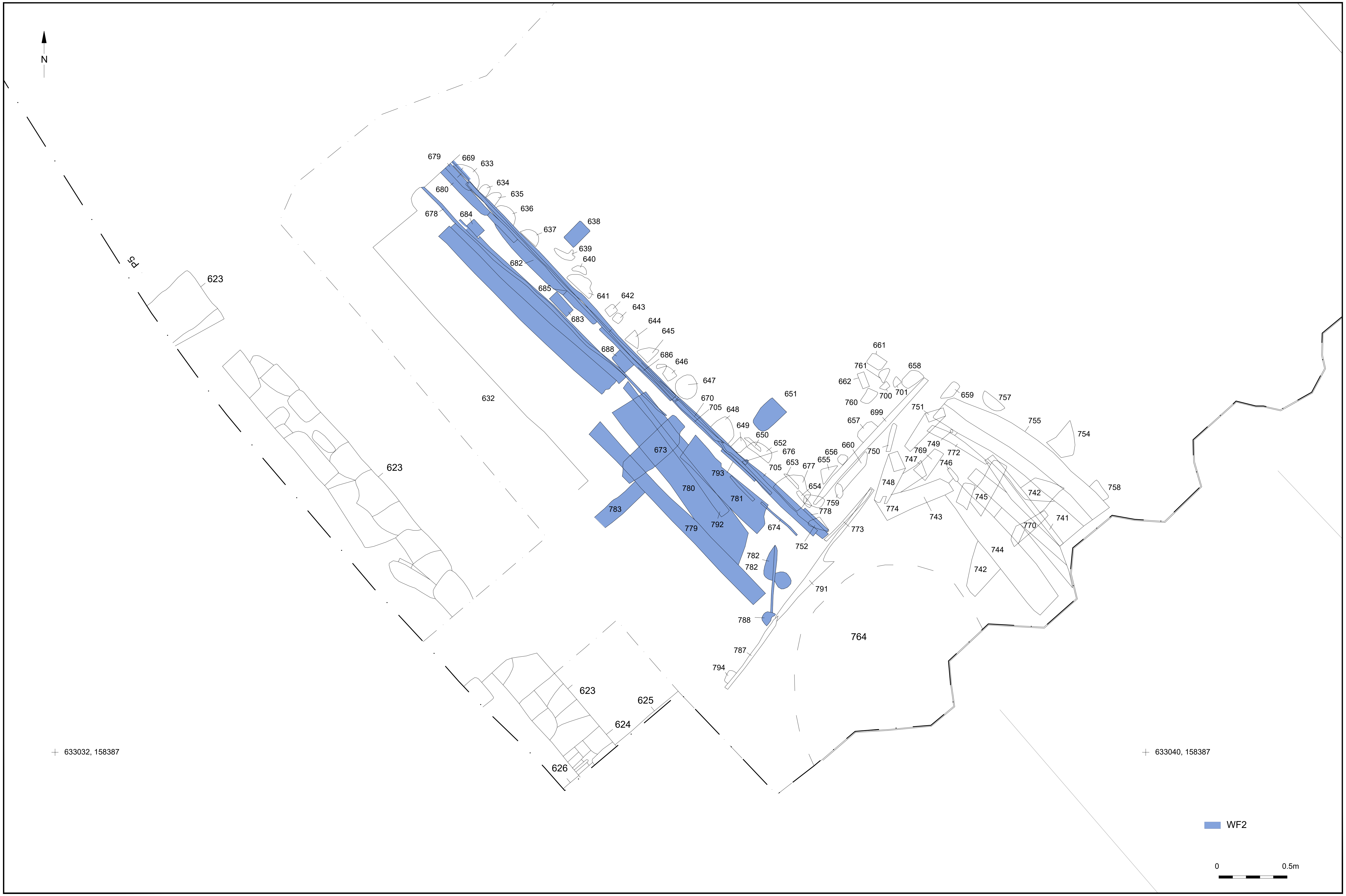
Report Ref: 2016296	Drawn by: JLR		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624
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626
633032, 158387
633040, 158387
WF2
0
0.5m

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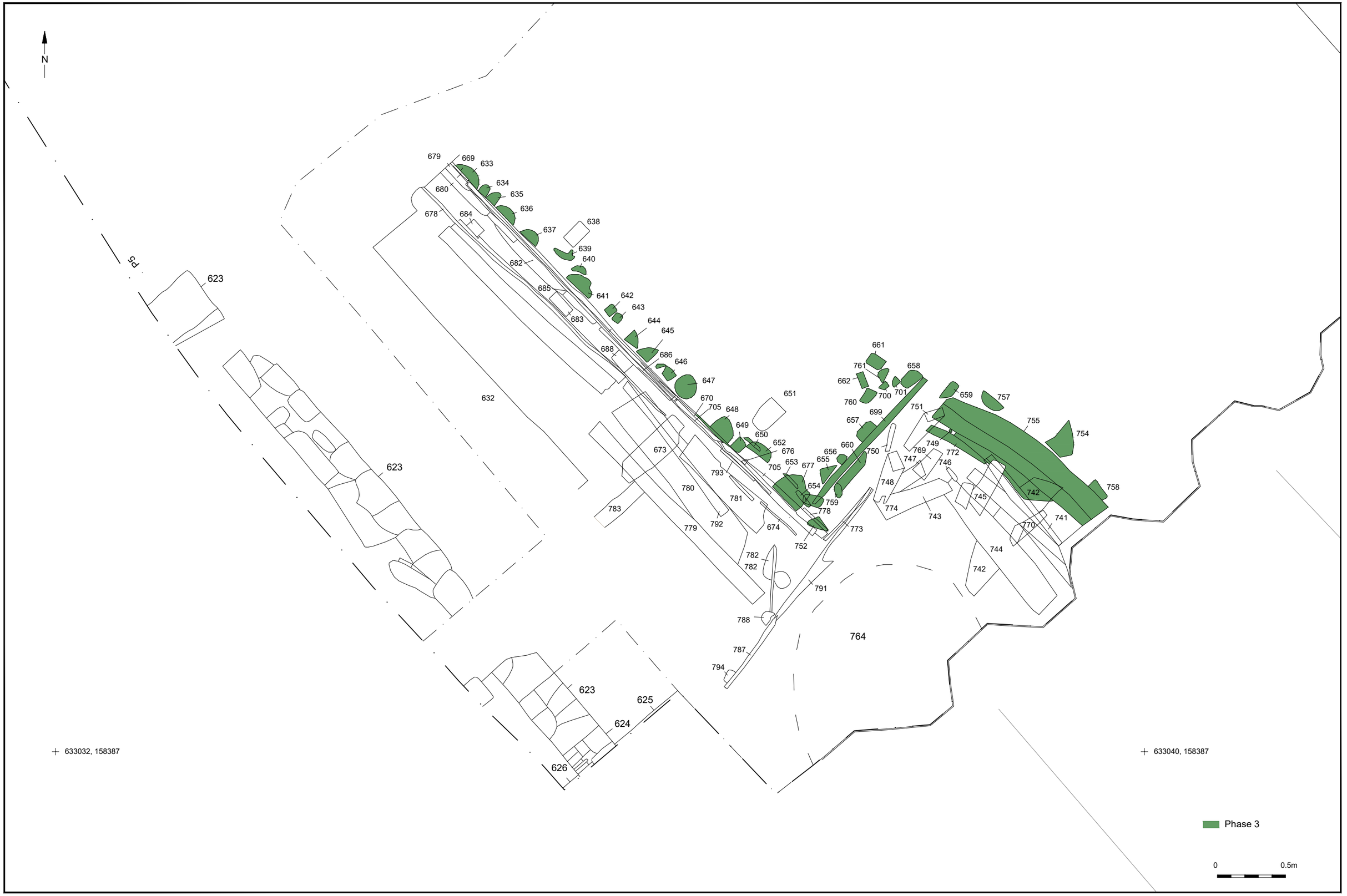
Project Ref: 5514	Feb 2017	Reach 4 WF2	
Report Ref: 2016296	Drawn by: JLR		



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Project Ref: 5514	Feb 2017	Reach 4 phase 3	
Report Ref: 2016296	Drawn by: JLR		

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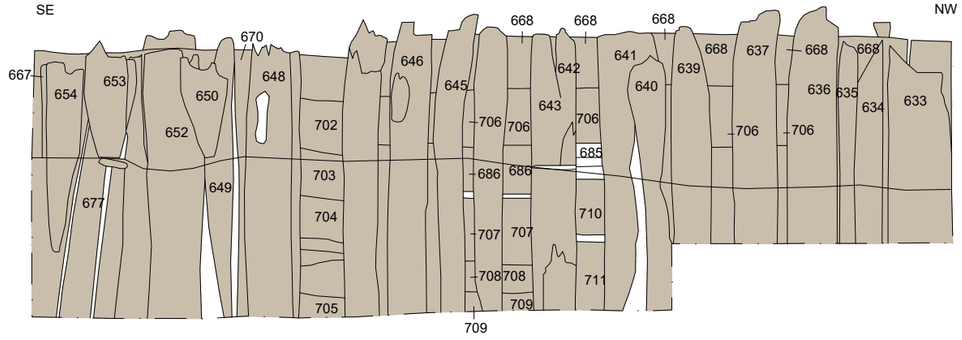
Project Ref: 5514	Feb 2017	Reach 4 plan of timber types	
Report Ref: 2016296	Drawn by: JLR		

Elevation 1



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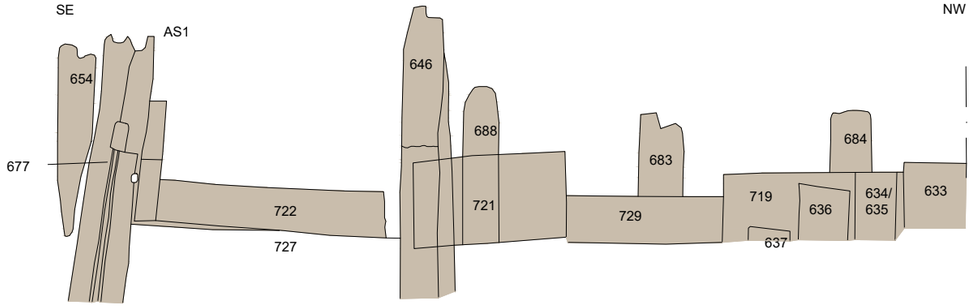

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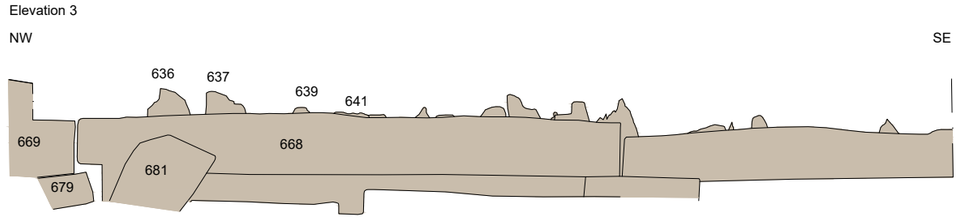

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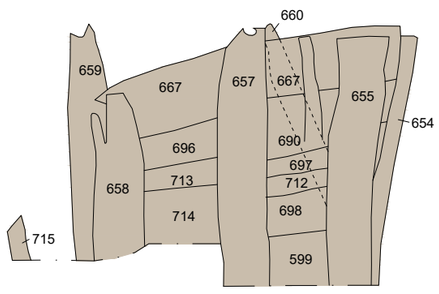

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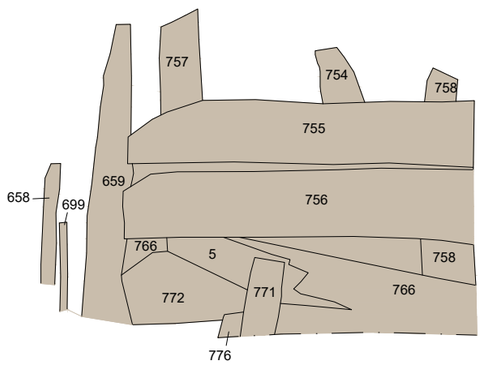
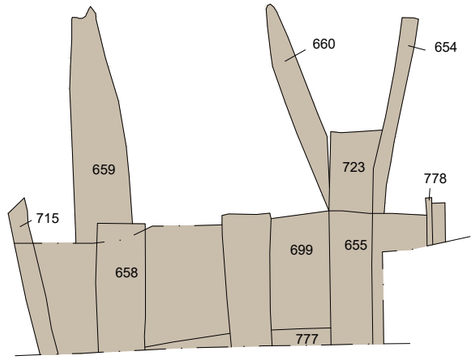


Elevation 6



Timber

0 0.5m

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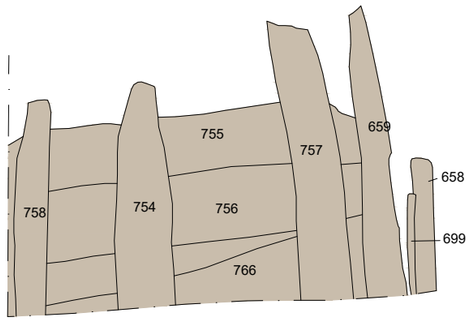
Project Ref: 5514	Feb 2017	Reach 4 elevations	
Report Ref: 2016296	Drawn by: JLR		

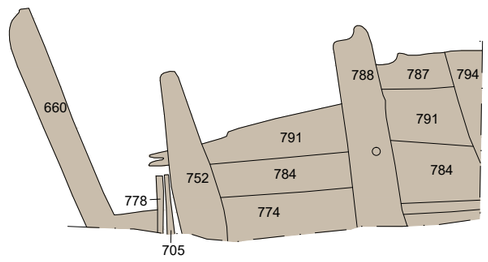
Elevation 7

SE NW



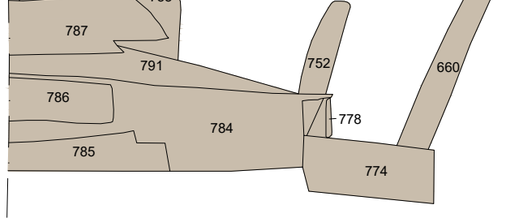
Elevation 8

NE SW



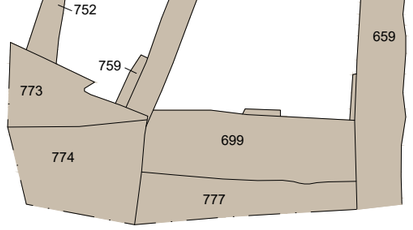
Elevation 9

NE SW



Elevation 10

NE SW



Timber

0 0.5m

Structure 675 under excavation

Structure 675 under excavation

South-west facing elevation of 675 under excavation

675 under excavation

675 north-west facing elevation

675 fully excavated

740 fully excavated

740 fully excavated

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Project Ref: 5514	Feb 2017	Reach 4 elevations	
Report Ref: 2016296	Drawn by: JLR		

N

Reach 12a

Stour

Reach 5

633200, 158150

633450, 158150

0 20m

Sample sections, showing truncation

North-east facing sample section

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Project Ref: 5514	Feb 2017	Reach 5	
Report Ref: 2016296	Drawn by: JLR		

Stour

N

Bollards recorded in HBR report

213

633200, 158250

332

Bollard

Mooring ring

Concrete base

223

Iron ties

224

826

280

282

Concrete footing beams

633240, 158230

Detail of 332

Angle irons

332

Bollard

Corrugated iron

Iron

0 0.5m

Section

Section

N S

332

0 0.5m

Phase 2

Phase 3

0 5m

332 looking south

Land tie

826 and 282 looking south

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Project Ref: 5514	Feb 2017	Reach 5	
Report Ref: 2016296	Drawn by: JLR		

Stour

N

296
298
297
299

358
361
364

633290, 158200

633360, 158200

Phase 3

0 5m

Detail of 298

296
298
299
297

Brick

0 1m

Angle irons
Slit trench 3
358

Iron

0 1m

Detail of slit trenches 3, 4 and 5

Slit trench 4
Corrugated iron
Angle irons
361

Slit trench 5
364

Slit trench 4, looking south

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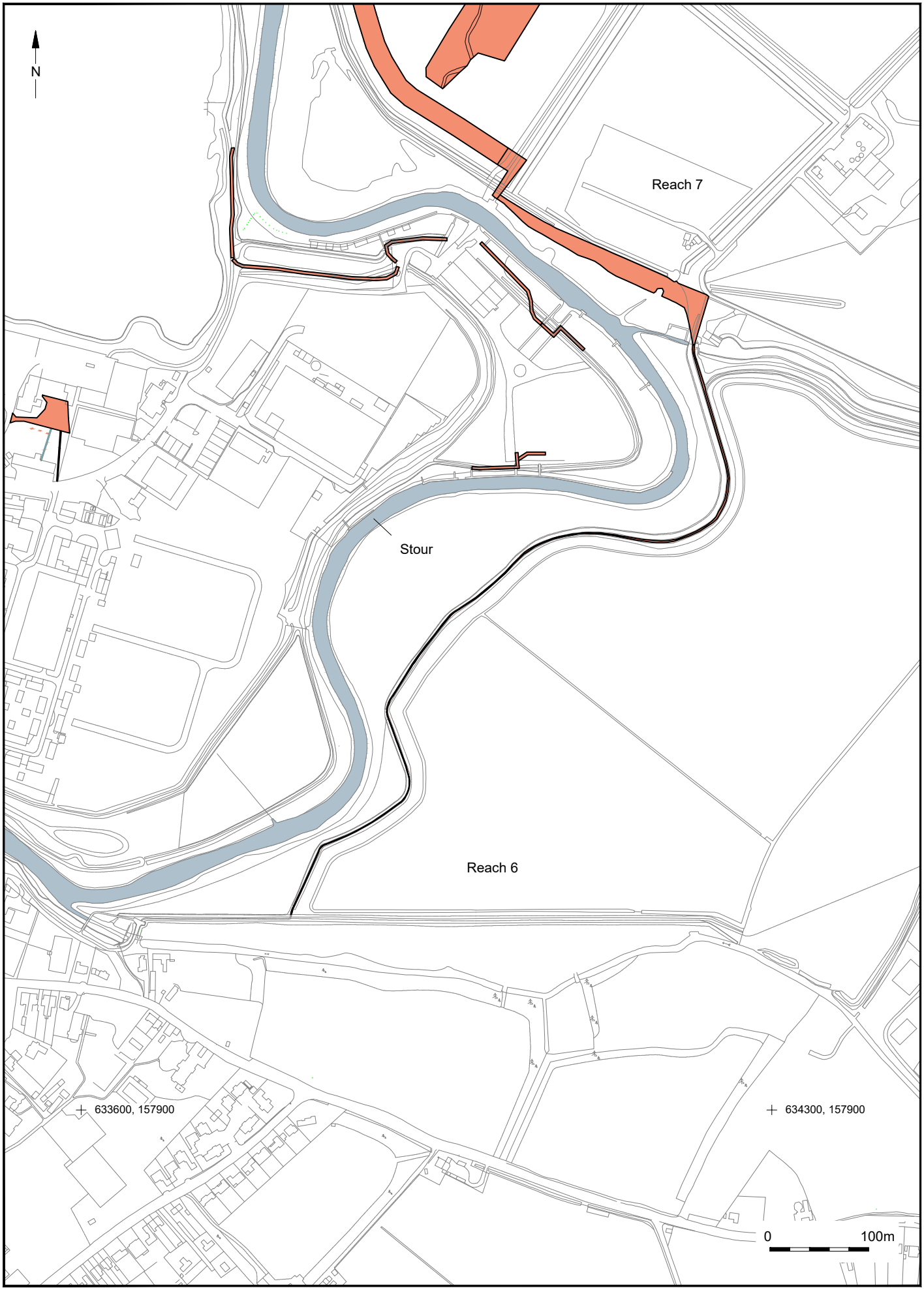
Project Ref: 5514	Feb 2017	Reach 5	
Report Ref: 2016296	Drawn by: JLR		



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Project Ref: 5514	Feb 2017	Reaches 6 and 7	
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General site view under excavation

General site view post excavation

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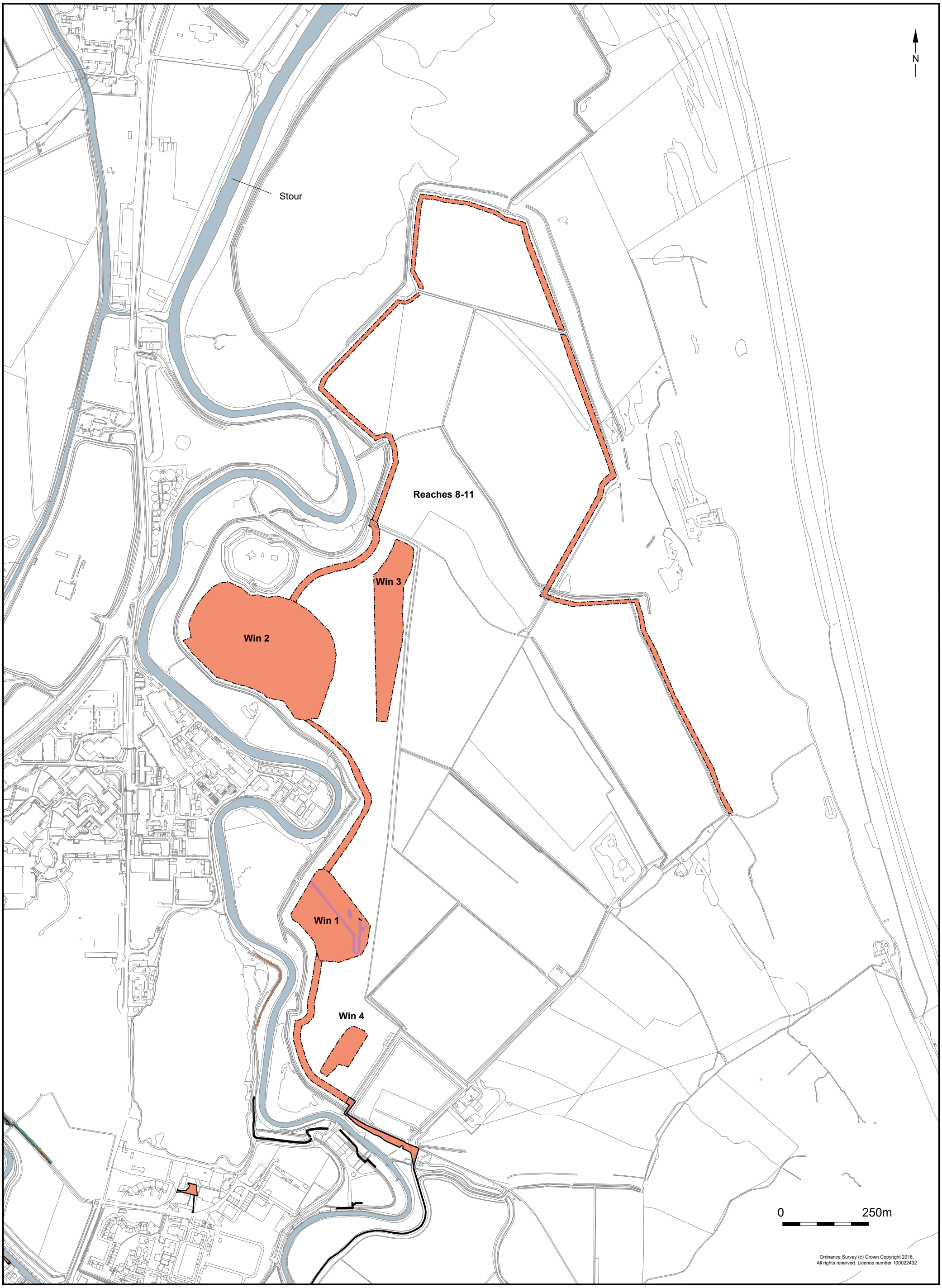
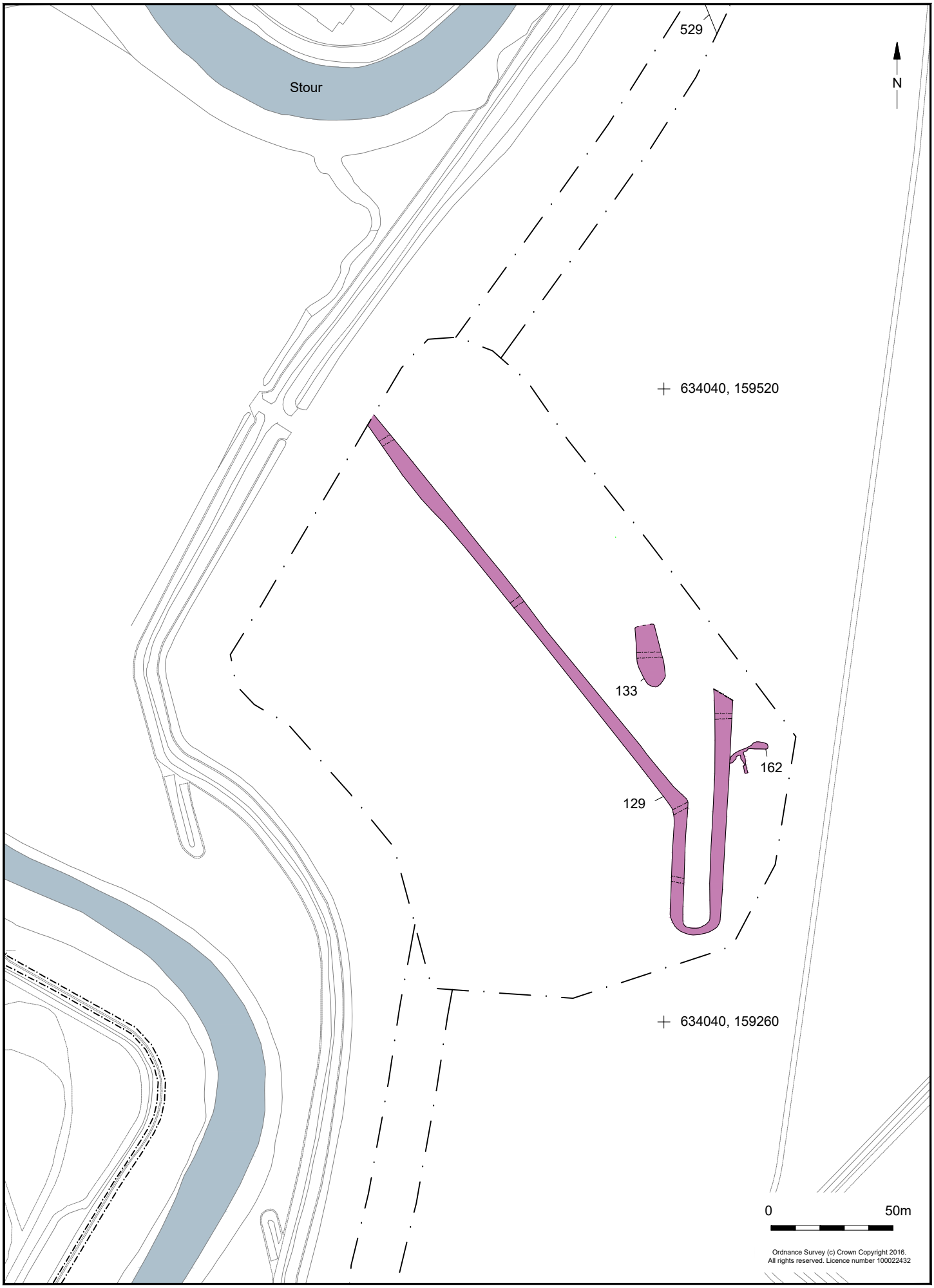
Project Ref: 5514	Feb 2017	Reach 7 detail	
Report Ref: 2016296	Drawn by: JLR		



© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 24
Project Ref: 5514	Feb 2017	Reaches 8-11	
Report Ref: 2016296	Drawn by: JLR		



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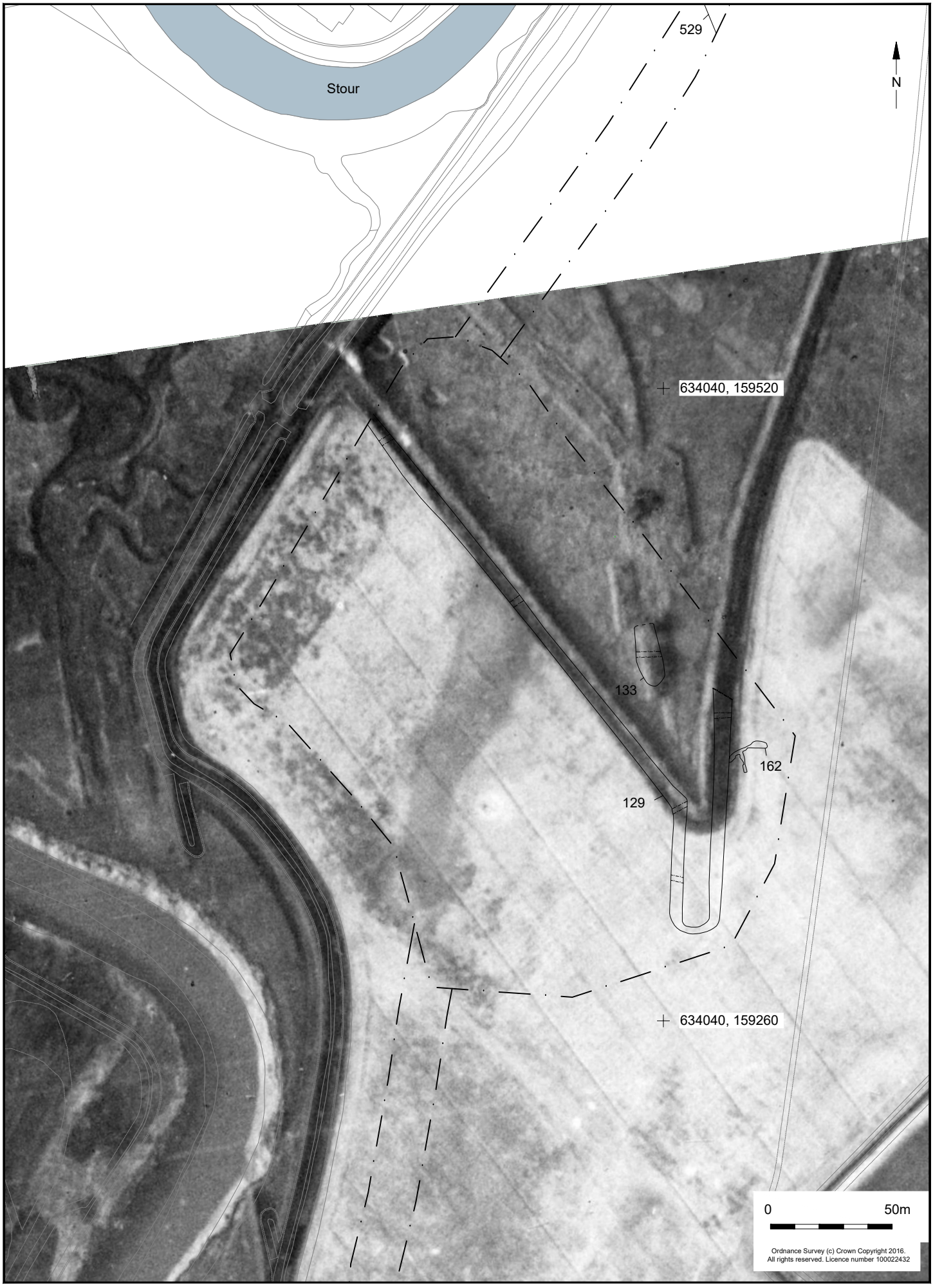
Project Ref: 5514	Feb 2017	Reaches 8-11 Win 1	
Report Ref: 2016296	Drawn by: JLR		



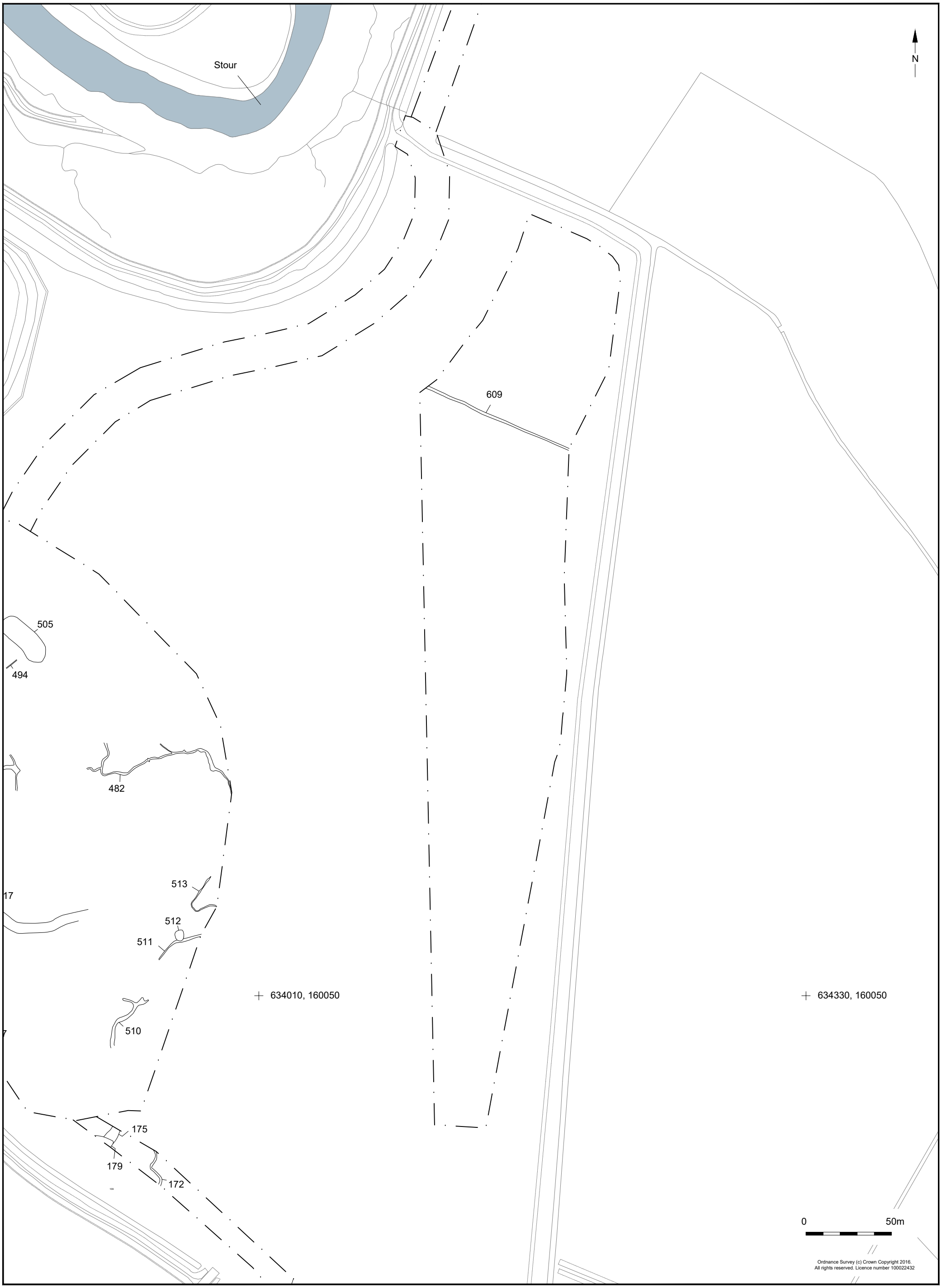
© **Archaeology South-East**		Sandwich Town Tidal Defences	Fig. 26
Project Ref: 5514	Feb 2017	Reaches 8-11 Win 1 and 1940 aerial photograph (Google Earth)	
Report Ref: 2016296	Drawn by: JLR		

N

818
820
181
822
185
187
496
505
492
494
815
156
810
812
808
805
802
800
797
480
478
482
183
117
513
512
511
633650, 160050
634010, 160050
177
510
175
179
172
Stour
151
105
531
527
529

0 50m

© **Archaeology South-East**		Sandwich Town Tidal Defences	Fig. 27
Project Ref: 5514	Feb 2017	Reaches 8-11 Win 2	
Report Ref: 2016296	Drawn by: JLR		



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Project Ref: 5514	Feb 2017	Reaches 8-11 Win 3	
Report Ref: 2016296	Drawn by: JLR		

N

Win 4

Sheep 599

633940, 159000

634070, 159000

597

598

0 20m

Sheep skeleton 599

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Project Ref: 5514	Feb 2017	Reaches 8-11 Win 4	
Report Ref: 2016296	Drawn by: JLR		

N

634000, 161400

461

433

Stour

459

635000, 160100

537

0 100m

459 looking south-west

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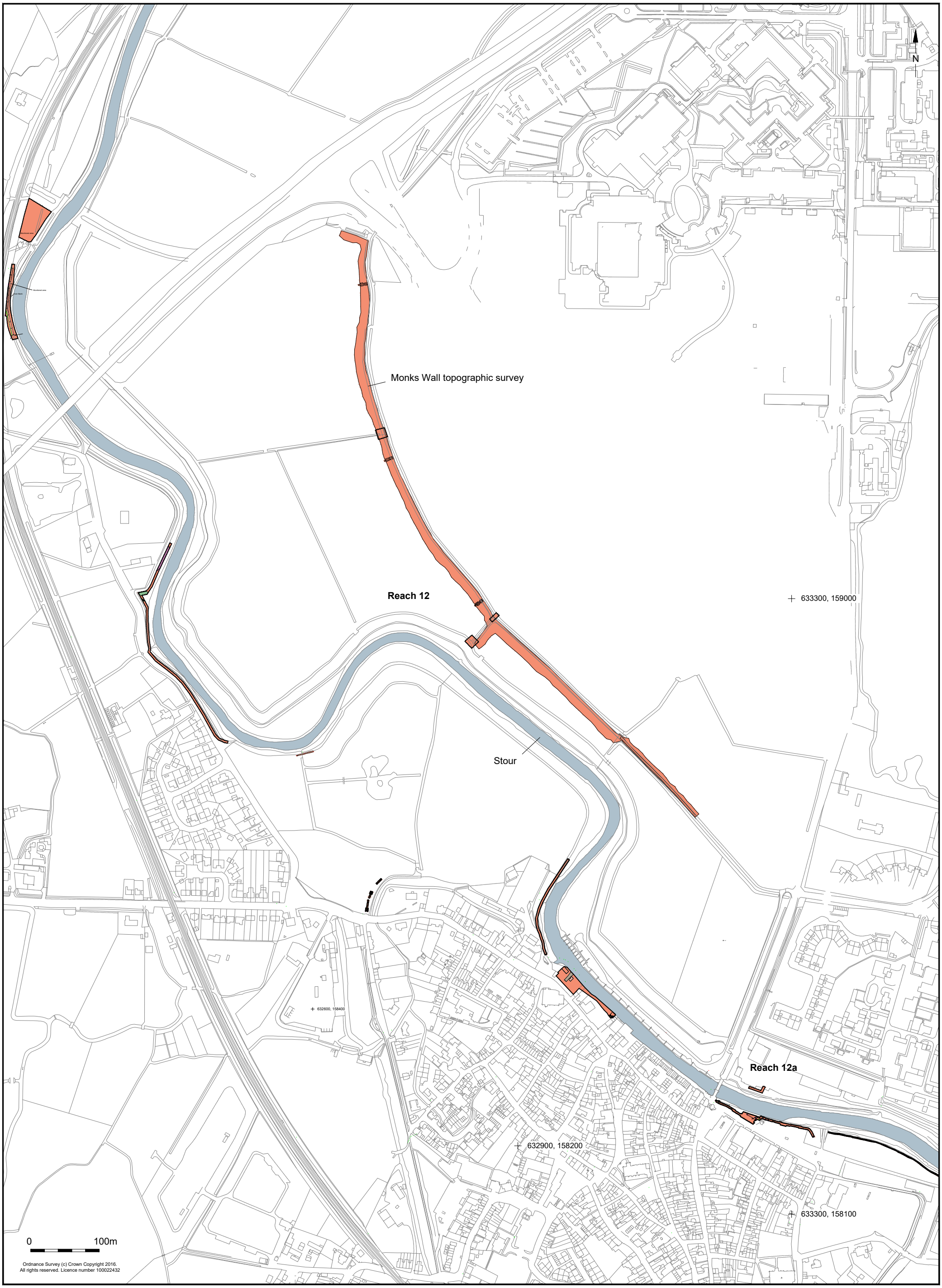
Project Ref: 5514	Feb 2017	Reaches 8-11	
Report Ref: 2016296	Drawn by: JLR		



© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 31
Project Ref: 5514	Feb 2017	Reach 12	
Report Ref: 2016296	Drawn by: JLR		

633220, 158290

633280, 158290

N

Section

Stour

0 5m

West facing section showing bank deposits

West facing section showing bank deposits

West facing section showing bank deposits

West facing section showing bank deposits

West facing section showing bank deposits

Section

N S

464 465 466 467 468 467 469 471 472 Alluvium 470

0 1m

West facing section showing bank deposits

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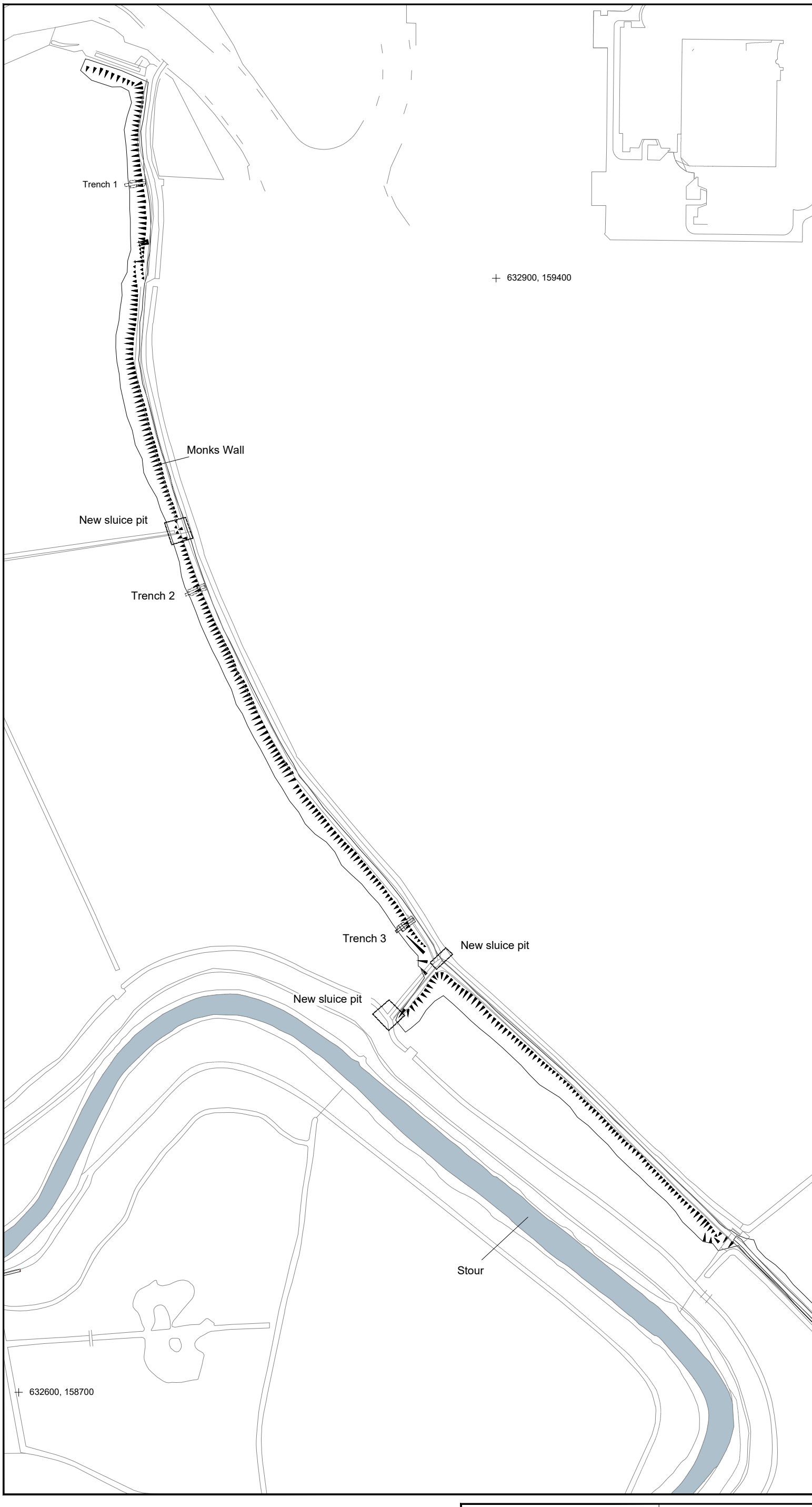
Project Ref: 5514	Feb 2017	Reach 12a	
Report Ref: 2016296	Drawn by: JLR		



Monks wall pre-construction in the region of trench 3

Monks wall post construction, in the region of trench 1

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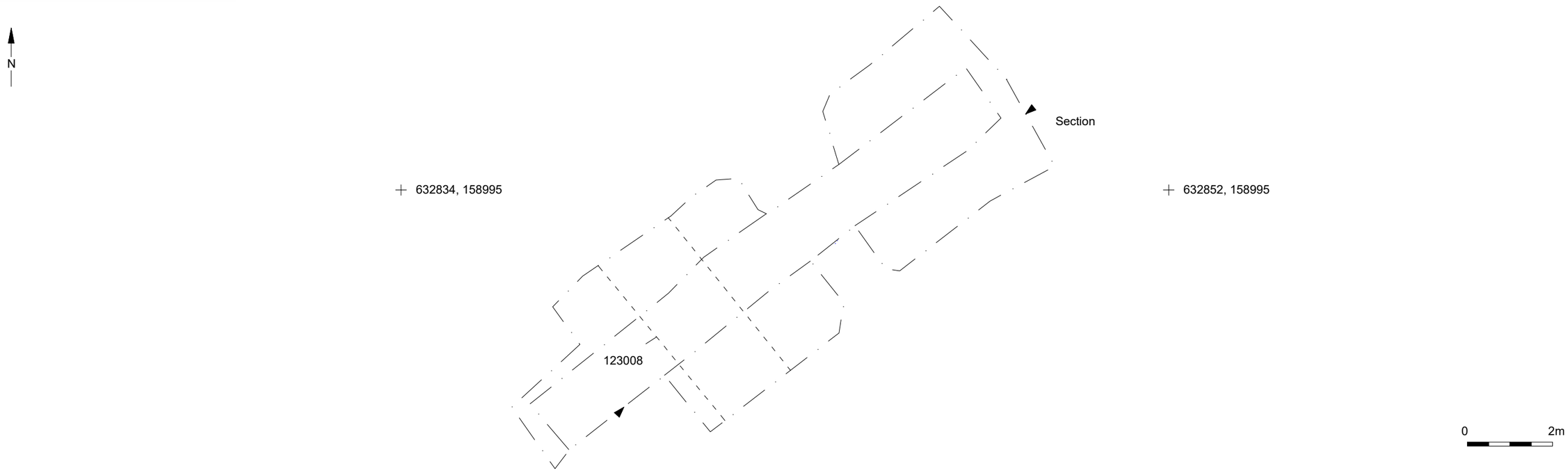
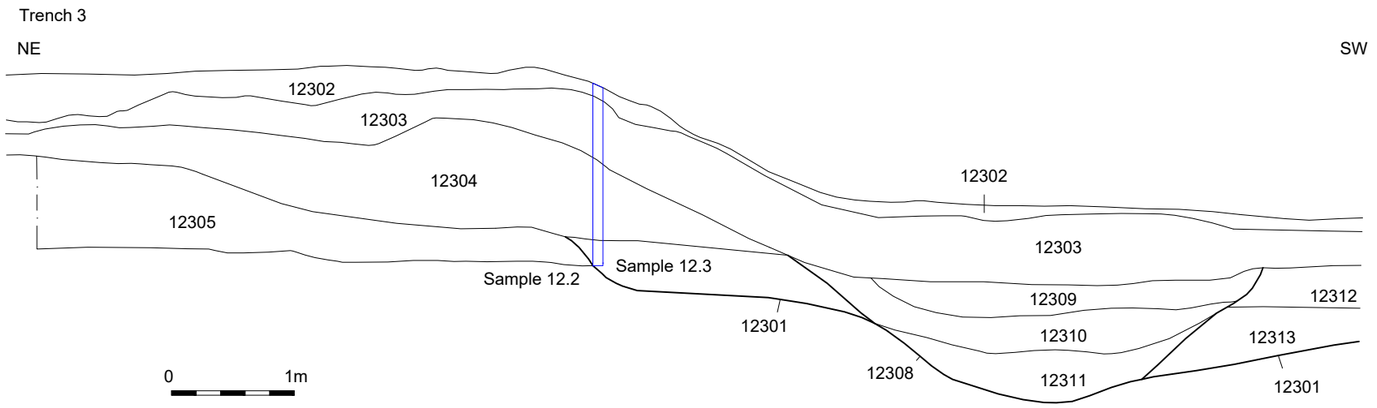
Project Ref: 5514	Feb 2017	Reach 12 Monks Wall hachure plan from topographic survey	
Report Ref: 2016296	Drawn by: JLR		



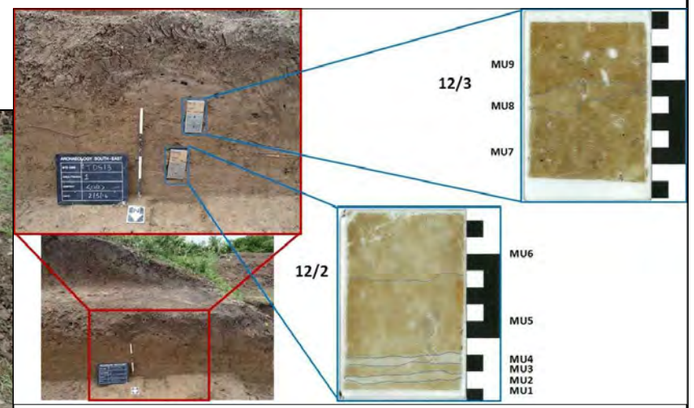



North-west facing section


North-west facing section


North-west facing section


North-west facing section



Scans of slides 1a and 1b annotated with microstratigraphic units, in relation to the location of micromorphology samples 12/2 and 12/3 on the photograph of the profile through Monks Wall

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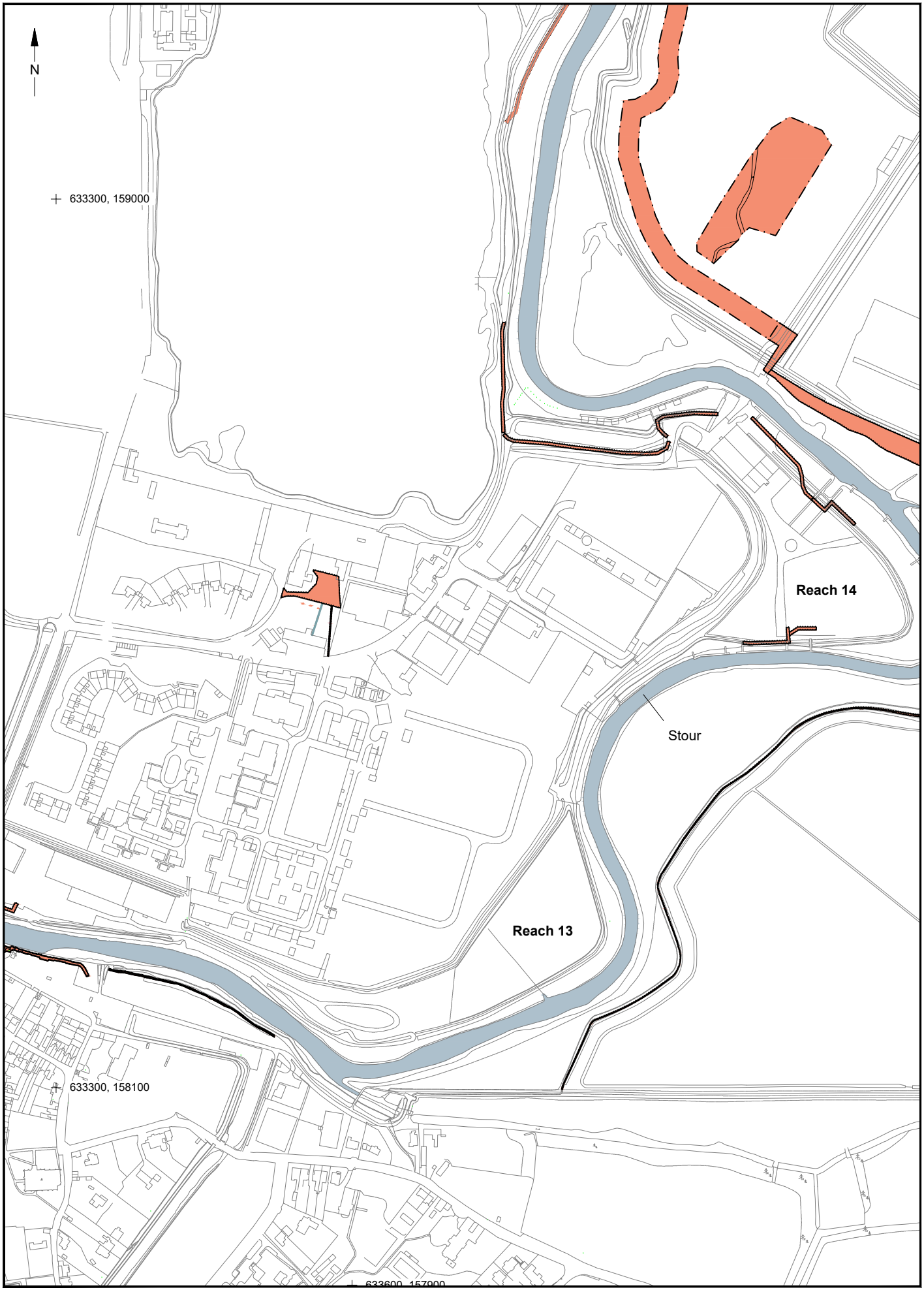
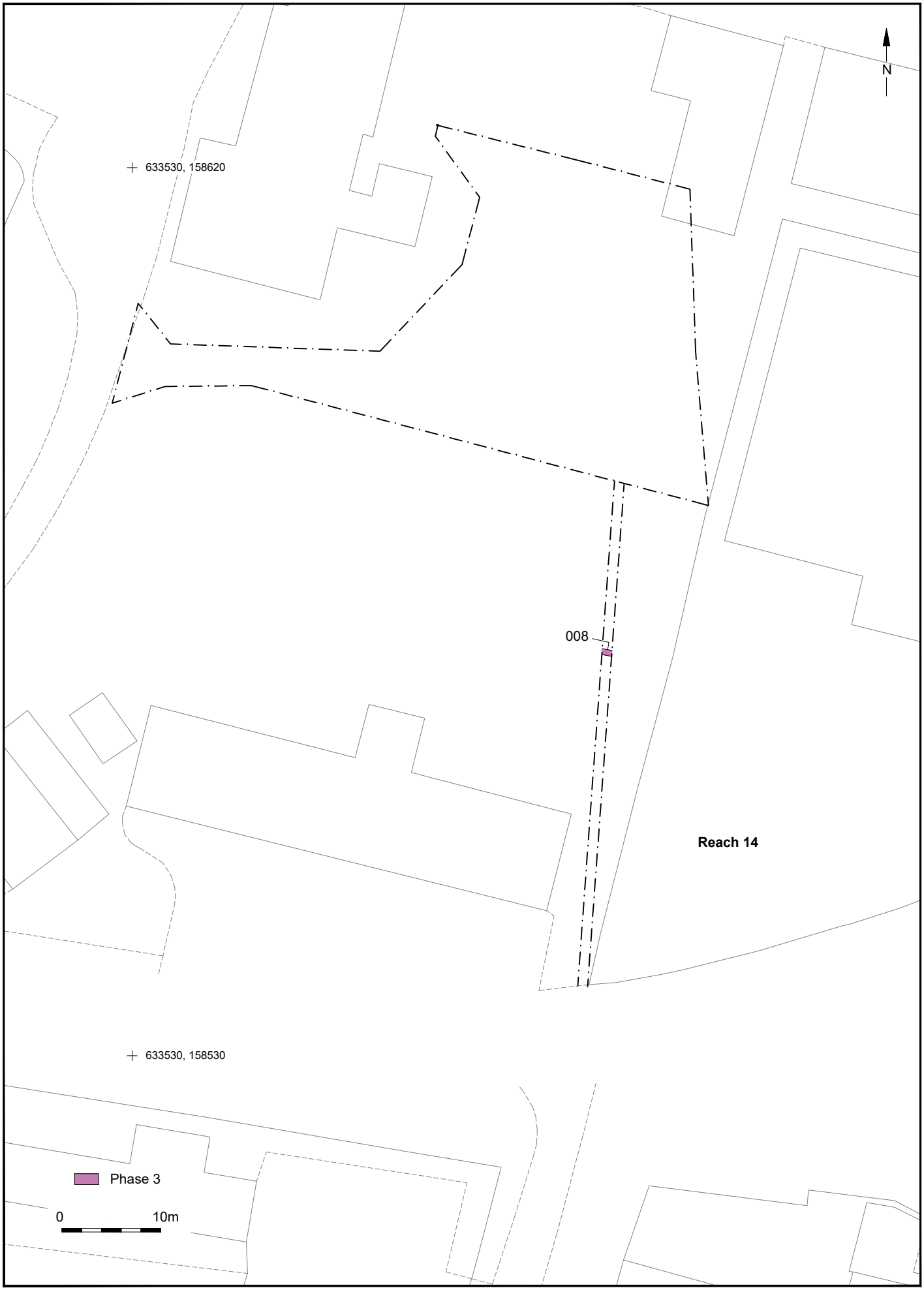
Project Ref: 5514	Feb 2017	Reach 12 Trench 3	
Report Ref: 2016296	Drawn by: JLR		



© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 35
Project Ref: 5514	Feb 2017	Reach 13, 14 and 15	
Report Ref: 2016296	Drawn by: JLR		



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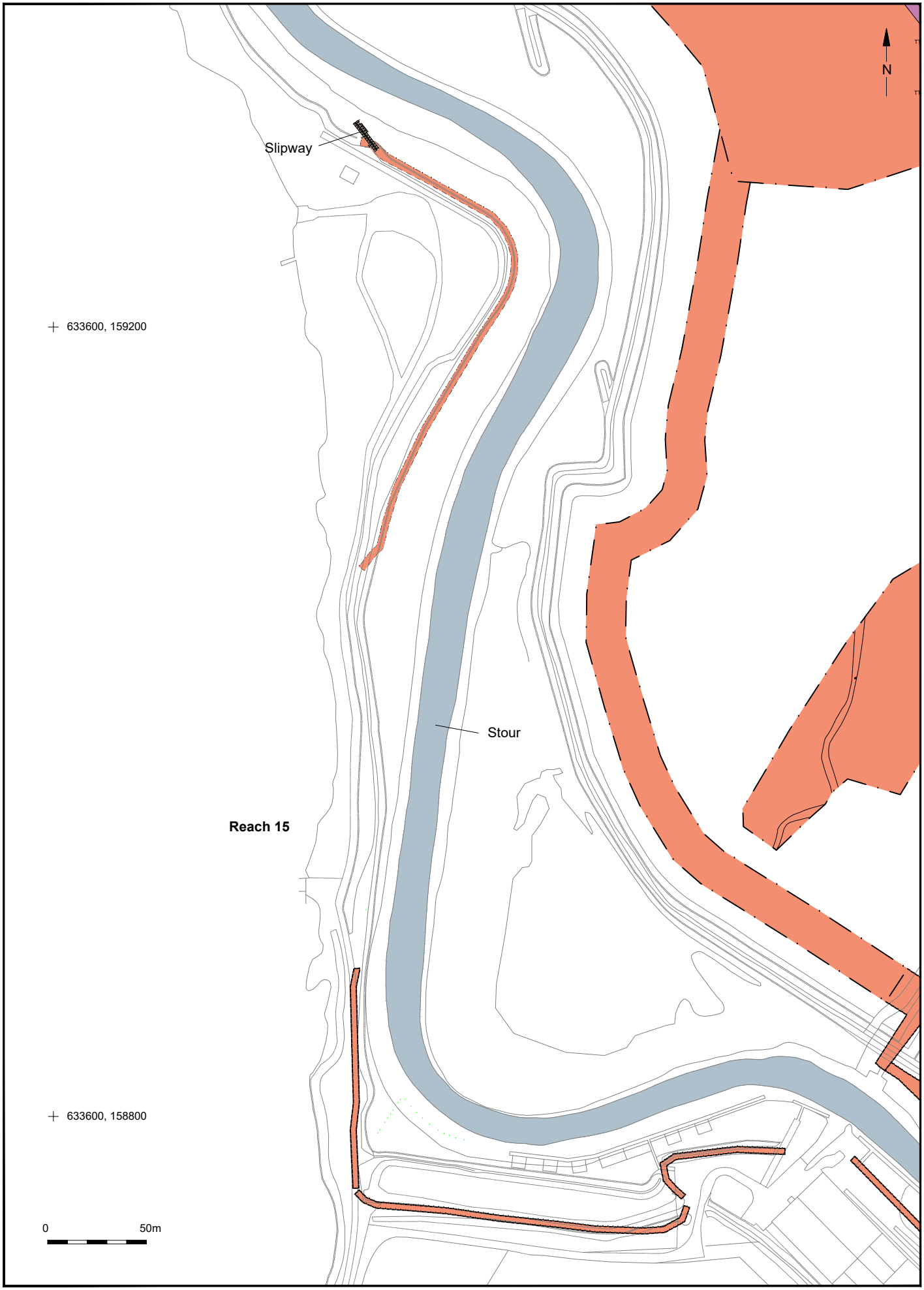
Project Ref: 5514	Feb 2017	Reach 14 detail	
Report Ref: 2016296	Drawn by: JLR		



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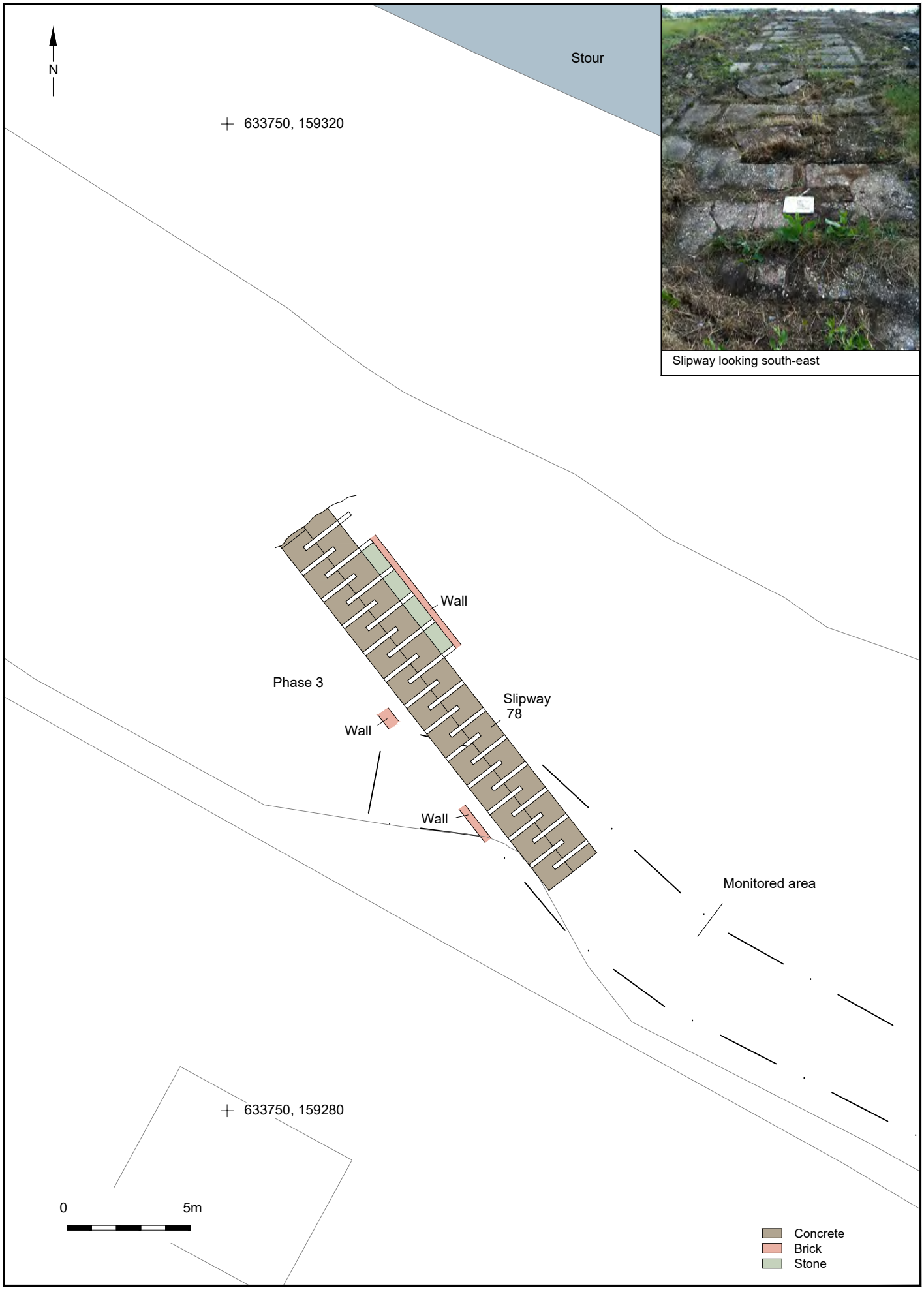
Project Ref: 5514	Feb 2017	Reach 15	
Report Ref: 2016296	Drawn by: JLR		



© Archaeology South-East		Sandwich Town Tidal Defences	Fig. 38
Project Ref: 5514	Feb 2017	Reach 15 detail	
Report Ref: 2016296	Drawn by: JLR		

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