

**Archaeological Survey, Monitoring and Excavation
at
RSPB Shorne Marshes, Gravesend, Kent**

NGR: 569319,174681

Planning Ref: 20130446

Site Code: SHG13

**ASE Project No: 8053
ASE Report No: 2014056
OASIS id: 170687**



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**E. Heppell
With contributions by
L. Barber, E. Raemen and J. Russell**

April 2013

**Archaeology South-East
The Old Magistrates Court
79 South Street
Braintree
Essex
CM7 3YQ**

**Tel: 01376 331470
Email: fau@ucl.ac.uk
Web: www.archaeologyse.co.uk**

Abstract

Archaeology South-East undertook a programme of archaeological monitoring and survey at RSPB Shorne Marshes during the excavation of a 950m long security ditch in the vicinity of Shornemead Fort. The western end the security ditch crossed shooting butts associated with the mid to late 19th century Milton Rifle Ranges.

The security ditch was excavated to a depth of 2m from the present surface level and exposed a geological sequence typical of the Thameside marshes; topsoil and turf, clays, an organic peat deposit and underlying clays which were probably deposited in anaerobic conditions.

At the western end of the security ditch the remains of a shooting butt were visible as a low mound and the top of a concrete wall. These butts opened in 1859/60 and were disused by the late 19th century when they were replaced by those at the adjacent Milton Ranges. These, and associated features such as ditches and borrow pits, were levelled/infilled by the 1960s. Further alteration of the landscape took place in the 1970s when the sea defences were remodelled.

A section through the butt was recorded during excavation of the security ditch, recording levelling layers, the remains of the bullet stop/catcher, the concrete wall and demolition layers.

Other identified features comprised field ditches, all of which were illustrated on historic Ordnance Survey mapping and infilled in the 1970s. These ditches, still extant in the grazing marsh to the south, represent two phases; the sinuous natural field drainage system and the straight field system imposed in the area to the west of Shornemead Fort which is probably associated with military activity in the area.

CONTENTS

1.0	Introduction
2.0	Archaeological Background
3.0	Archaeological Methodology
4.0	Results
5.0	Finds
6.0	Discussion and Conclusions

Bibliography
Acknowledgements

HER Summary Sheet
OASIS Form

FIGURES

Front Cover:	Working view along the security ditch looking west
Figure 1:	Site location
Figure 2:	Site location showing main historic features
Figure 3:	Site location overlaid on OS 2 nd Edition 6" map
Figure 4:	Example of geological strata
Figure 5:	Example of geological strata
Figure 6:	Extant wall [43]
Figure 7:	Extant wall [43]
Figure 8:	South facing section across shooting butt
Figure 9:	Plan of features in the vicinity of the shooting butt
Figure 10:	Brick wall [29]
Figure 11:	Chalk layer [31]
Figure 12:	Wall foundation [37] and wall [26]
Figure 13:	Chalk wall base [36]
Figure 14:	Backfilled ditches along the security ditch
Figure 15:	Backfilled ditches along the security ditch

TABLES

Table 1:	Quantification of site archive
Table 2:	Natural deposit sequence
Table 3:	Context list; Shooting butt and associated features
Table 4:	Context list; Other features
Table 5:	Quantification of finds

1.0 INTRODUCTION

1.1 Site Background

1.1.1 Archaeology South-East (ASE), the contracting division of the Centre for Applied Archaeology (CAA), Institute of Archaeology (IoA), University College London (UCL) was commissioned by the Royal Society for the Protection of Birds (RSPB) to undertake a programme of archaeological survey, monitoring and recording during groundworks associated with development at RSPB Shorne Marsh, Gravesend, Kent (NGR: 569319,174681; Fig 1). The development comprised the excavation of a security ditch, the construction of embankments and the erection of a security fence to the rear of the extant sea-wall.

1.1.2 The new security ditch runs for 950m and is c. 7m wide and 2m deep with a V shaped profile. Shallow stepped areas, c. 0.30m deep, extend to the north and south of the main ditch for 1-2m. The excavated material was placed against the extant sea defence bank to the north and to create a low bund to the south.

1.2 Geology and Topography

1.2.1 The works comprising a new security ditch and associated structures, are located along the extensive grazing marshes found to the east of Gravesend and south of the River Thames (Fig 1). The ditch line runs along a grassed area (Fig 2) between the extensive sea defences to the north and grazing marsh to the south.

1.2.2 The sea defences in this area (Fig 2) have undergone significant modification in the 1970s (RSPB 2013) and are now set back from their earlier position (Fig 2) as shown on historic Ordnance Survey mapping. The modern defences comprise a substantial embankment, c.20m wide, with a wide embanked area to it's rear (Fig 2) which then slopes down to the grazing marsh. To the south of this is the grassed area (Fig 2), at c. approximately 1.9m-2.25mAOD, which is separated from the grazing marsh to the south by a barbed wire stock fence.

1.2.3 The eastern end of the security ditch lies close to a modern gas compound and in the vicinity of the 19th century Shornemead Fort (KHER TQ 67 SE 63, 1194 and 1995). Shorne Marshes are part of the Milton Rifle Ranges, which were established in 1859/60 and are now operated by the Metropolitan Police. The main area of the existing range (the firing points, mantlet/operations gallery, targets and butts) is located on the marshes to the west of the new security ditch which lies within the 'overshoot' area, a safety zone to the rear of the shooting butts. The original shooting butts (see section 2 below), as depicted on early editions of the Ordnance Survey, were situated further to the east, crossing the route of the new security ditch. A low mound, c.11m wide and 0.4m high was noted as being present in the vicinity of these butts, along with the top or base of a concrete wall, 5.10m long x 0.40m wide.

- 1.2.4 The route of the security ditch crossed the route of a number of field boundaries which are shown on historic mapping and are visible on aerial photographs in 1946/7. These have subsequently been infilled, presumably during the construction of the modern sea defences in the 1970s. These former boundaries are visible on modern aerial photographs as cropmarks and as slight hollows on the ground.
- 1.2.5 The site lies within an area of alluvial geology which comprises the Thameside marshes (e.g. British Geological Survey map viewer – <http://www.bgs.ac.uk/>). The name alluvium, although meaning ‘river-laid deposit’, applies specifically to the valley bottom deposits, described by the BGS as ‘mainly silt and clay, locally peaty’ that have been laid down during the Holocene. In the lower Thames Estuary it has been formally termed the Tilbury Deposits/Alluvium (Gibbard, 1994, 1995). Locally it is a source of molluscan and plant fossils and post-Palaeolithic archaeology. It can be attributed, in the main, to overbank fluvial deposition (e.g. ECC and KCC 1999).

1.3 Planning Background

- 1.3.1 A planning application (Ref 20130446) for the creation of a security ditch was submitted to Gravesham Borough Council in May 2013. The security ditch is being constructed in order to prevent anti-social and illegal activities taking place on the reserve by providing a physical barrier. In addition it will provide an area for water storage that can be used in the event of dry conditions on the reserve and a habitat in its own right. Given that the proposed works lie in the vicinity of known historic environment assets KCC, in their capacity as archaeological advisors to the Borough Council, recommended that a full condition be attached to any grant of planning consent.
- 1.3.2 This recommendation is in accordance with guidance contained in the National Planning Policy Framework (DCLG 2012) and the condition that has been attached to the grant of consent states that:
No development shall take place until the applicant, or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written specification and timetable which has been submitted to and approved by the Local Planning Authority
Reason To ensure that features of archaeological interest and properly examined and recorded.
- 1.3.3 The RSPB archaeological team prepared a Heritage Statement (RSPB 2013) outlining the historic environment background of the site and the requirements for works. The methodology and standards were set out in a written scheme of investigation by ASE (ASE 2013), approved by Kent County Council prior to commencement.

1.4 Aims and Objectives

- 1.4.1 The aim of the archaeological works was to provide a record of the remains of the shooting butts which were known to be present and to determine the location, extent, date, character, condition and significance of any surviving remains and, if present, sufficiently excavate them to enable their preservation by record.
- 1.4.2 All significant discoveries were to be investigated and assessed in relation to relevant regional research questions presented in *An Archaeological Research Framework for the Greater Thames Estuary* (Williams and Brown 1999) and *The Greater Thames Estuary Historic Environment Research Framework 2010* (GTESC 2010).

1.5 Scope of Report

- 1.5.1 This report details the results of the archaeological survey and monitoring undertaken by E. Heppell and M. Germany in August 2013.

2.0 ARCHAEOLOGICAL BACKGROUND

2.1 Overview

- 2.1.1 The following archaeological background utilises the RSPB Heritage Statement, provided in support of the planning application, the Kent Historic Environment Record and historic Ordnance Survey mapping.

2.2 Period Summaries

- 2.2.1 The natural geology of the site comprises alluvial deposits which, in some locations along the estuary, are known to incorporate peat or peat-like deposits. The deposit sequences in the Thameside marshes, which generally comprise clays and silts interleaved with the organic material, represent the changing depositional environment in the estuary in relation to sea-level. Devoy (1979) identified a sequence of transgressions and regressions (rises and falls) in sea-level around the Thames estuary, focussed at Tilbury. The regressive phases were characterised by peat deposits. This model has been contested in recent years (e.g. Sidell 2003), particularly the drop in sea-level in the middle Holocene which may instead be a decrease in the rate of sea-level rise between 4000-1500 cal BC.
- 2.2.2 Peat deposits have been noted on the foreshore of the marshes at Higham to the east of the site (KHER TQ 77 NW 115 and TQ77 NW 1039). Archaeological and Geoarchaeological assessment undertaken at the RSPB reserve at Cliffe Pools, to the east of Higham, has also identified evidence of peat deposits (James 2007). A lower peat was noted during the excavation of clay pits at a depth of c. -5m OD which has been interpreted as being the equivalent to the Neolithic/Bronze Age peats found elsewhere in the estuary at, for example, Purfleet (e.g. Wilkinson and Murphy 1995). Further peat levels were noted at -0.5m to -1.7m OD, and are thought to correlate with the

Tilbury IV and V peats found elsewhere in the estuary, and dated to pre-c.620 BC and pre-c.230 AD respectively (Hutchings 1987, 376).

- 2.2.3 No archaeological remains of prehistoric date have previously been noted on the site or in its general vicinity. The geological evidence summarised above would suggest that such deposits are likely to be deeply buried.
- 2.2.4 Early Roman activity has been noted in the wider vicinity of Shorne and Higham Marshes. Finds of pottery and briquetage related to salt-making were made at Shorne Marshes in the 1970s, some 500m from the eastern section of the security ditch, during the digging of a gas main (KHER TQ 67 SE 35). It is not known at what depth the Roman material was encountered. At Higham Saltings (KHER TQ 77 NW 7) and Higham Bight between 1 and 1.8km to the north-east, Roman pottery and briquetage has been noted on the foreshore at depths which would be between 1 and 1.2m below current marsh level. A recent desktop assessment of RSPB Cliffe Pools, some 3.5km to the North East has highlighted an Early Roman presence on Cliffe marshes which was subsequently abandoned in the 3rd/4th centuries due to rising sea levels (James 2007).
- 2.2.5 There are no specific references to medieval activity on or in the vicinity of the site on the KHER. It is likely that, like much of the Thameside marshes, Shorne Marsh was being utilised for grazing during this period, a land-use which continues through to the present day. Whilst the date of the 'inning' (enclosure by sea walls) of the marsh is unknown, it is likely to be of later medieval date (RSPB 2007).
- 2.2.6 The historic field pattern on Shorne Marshes, as illustrated on the historic maps, is largely characterised by sinuous boundaries, which are likely to be natural in origin, being salt marsh creek channels. There are also a number of straight drains which are likely to be later in date.
- 2.2.7 In the late 18th century fortifications were established on the site of Shornemead Fort (KHER TQ 67 SE 63), situated at the east end of the security ditch. The fort and its environs have been extensively studied in a desktop assessment and archaeological survey commissioned by the RSPB in 2007 (Smith 2007, Barrett 2007). As such only a summary is provided here.
- 2.2.8 The site was first occupied by a small four gun battery, built in 1796 and replaced with a polygonal fort in 1847. This was replaced in turn with the extant fort in the 1860s. This 19th century fort comprised an arc of gun casemates with iron shields and an open battery at the river end. It was fronted by a deep ditch with caponiers. Alterations and additions to the fort were made in the late 19th century and during the two world wars. The barracks to the rear of the fort were demolished in the 1960s by the Army School of demolition. Further clearance was undertaken in the 1970s.
- 2.2.9 There was a substantial submarine mining depot to the west of the fort (KHER No: TQ 67 SE210 and TQ 67 SE 1147), to the north of the new security ditch (Fig. 2). The establishment was of late 19th century / early 20th century date and consisted of mine stores and mine servicing areas,

with tramways connecting them to a jetty with cranes which projected out from the nearby riverbank into the Thames. There were also lecture rooms. The depot was both a training facility and part of the arrangements for the mining defence of the Thames. At the end of the 19th century and in the first few years of the 20th, vessels would arrive at the jetty for annual summer training exercises. The depot appears to have originated in the later 1870s or 80s and to have continued in use up to and possibly during First World War, or shortly before. The extents of what is thought to be the submarine depot, including tramways, jetty, buildings and tanks etc. is illustrated on the 1897 25" Ordnance Survey map, Essex series (not reproduced); the extents of the establishment on Fig.2 have been derived from this map. This is the only edition to show it, presumably because of security issues. It is noticeable that the fort itself is not depicted on a number of the historic maps. The date of decommissioning is unclear and the mining establishment appears to have been closed by the early 1930s. Subsequent mapping shows buildings in the area (e.g. the 4th edition OS map, 1939-46) which are no longer extant, although it is unclear if they are the reused mining/ training facility buildings or later constructions – the first option would perhaps seem most likely. There are no surviving traces of the submarine establishment or later buildings above ground.

- 2.2.10 A rifle range was established at Shorne/ Eastcourt Marshes in 1859/60. The site was chosen after it had become clear that the establishment of a range in the vicinity of Chatham Dockyard would be too costly. Col. M. Williams, the Commanding Royal Engineer, selected the site at Shorne as it:

“... presents the advantage of being exceedingly retired, its situation near the banks of the Thames rendering it little frequented by the public, thus preventing any interruptions to the troops while engaged in firing. Should a favourable report be made as to the locality, the erection of the necessary buildings for the troops will be immediately commenced, and the land levelled and put in order by several gangs of convicts from the establishment at Chatham. The huts for the troops will be erected as near as Gravesend as possible, in order that the officers and soldiers stationed there may have access to that town.”

(quoted in <http://www.kenthistoryforum.co.uk/index.php?topic=8074.0> from The Times)

- 2.2.11 The newly established ranges, the butts of which are at the west end of the security ditch, are depicted on the first edition of the Ordnance Survey 25" map. They comprise five small shooting butts (Fig 2 and 3), c.11m by 25m with a walled or fenced area in front (west) of them, presumably the location of the bullet stops. The security ditch crosses the northernmost of these individual butts which are spaced roughly 47m apart and orientated on a north-south axis. A straight ditch is shown running north-south behind the butts and presumably provided the material for construction. The firing points are situated to the west of the butts, at 50 yard (45.27m) intervals with a maximum distance of 900 yards.
- 2.2.12 The rifle range was extended at some point prior to the 1890s, the small shooting butts being linked to make a single embankment (Fig 2 and 3) which is depicted on the 1898 Ordnance Survey as “Butts (disused)”. The bank was 420m long and of a variable width, being c.10m wide at the point where

it is crossed by the new security ditch. On the more detailed 25" mapping (not reproduced) bank is shown on the map using hachures and there are parallel dashed lines running alongside the bases of the slopes, perhaps hinting at the presence of pathways or shallow ditches. Groups of what may be the target bases are also marked. The ditch to the rear of the butts has been extended to run around the southern arm of the embankment than up and along the front of the embankment for much of its length. Additional borrow pits were also dug.

- 2.2.13 By 1898 the original shooting butts, as described above, were disused and a new set constructed c.225m to the west. These butts are the basis of the extant Milton Ranges and would appear more advanced in construction having (from west to east) a mantlet and markers gallery, targets, drainage ditch and the butt embankment. This range is still used today, being part of the Metropolitan Police Training Centre (Gravesend).
- 2.2.14 In the early 20th century the range was provided with its own halt on the Hundred of Hoo railway line which runs to the south of the site (e.g. KHER TQ 77 SW 89).
- 2.2.15 The original shooting butts had been abandoned by the late 19th century but were still extant; they may have been used in World War I and II when the military are known to have been active on the ranges and at Shornemead Fort. Reference to historic mapping and aerial photographs show that a number of borrow/clay pits were dug in the vicinity of the butts in the first half of the 20th century. By the 1960s the butts had been largely levelled, only partially surviving as a low earth bank and a fragment of wall (discussed below). A number of the borrow pits were also infilled at this time, presumably with material from the butts.
- 2.2.16 The more recent major changes in the landscape have resulted from the construction of the new (extant) sea wall in the 1970s (see 1.2.2 above). The construction of these defences included the infilling of historic field boundaries and borrow pits along the route of the wall and the embanked areas and grassed areas to its rear, along which the new security ditch runs.

3.0 ARCHAEOLOGICAL METHODOLOGY

3.1 Fieldwork Methodology

- 3.1.1 Prior to the start of groundworks a photographic record was made of the extant wall and low bank which survived from the original shooting butt and levels taken across it in order to produce a cross section. Two hand dug test pits were excavated to either side of the extant wall, establishing that it continued below the surface which was confirmed by the excavation of a machine trial pit to 0.6m below the present surface level (PSL), against the western part of the wall.
- 3.1.2 It was established that the line of the new ditch would not cross the extant section of wall described above but that it would be situated below the new

embankment. As such, part of the original shooting butt has been preserved in situ.

- 3.1.3 The main ditch length was excavated by two 360° excavators equipped with 1.8m wide toothless buckets. In the first instance a trench was excavated along the centre line of the ditch in approximately 100m long lengths. The sides were then pulled back from the centre line to the full depth and width.
- 3.1.4 The excavation of the central ditch line, where it crossed the remains of the original shooting butt, was undertaken in advance of the main construction in this area to allow time for archaeological recording to be undertaken. A 40m long trench was excavated to a maximum depth of 1.2m to allow safe access and archaeological features/deposits recorded. Additional recording was undertaken once the ditch had been fully excavated.
- 3.1.5 Continuous monitoring of machining was undertaken for the eastern-most 350m of the new security ditch where its route lay in relatively close proximity to the former submarine mining depot. The area between this was subject to regular monitoring with features recorded in the sections of the central ditch line or the ditch sides with locations surveyed using DGPS.
- 3.1.6 Watching brief record sheets were completed, and additional written, drawn and photographic records made as appropriate.
- 3.1.7 Artefacts were retained for specialist analysis where appropriate. In general all material pre dating the post-medieval period was retained. Exemplars of the ceramic building material utilised in the shooting butt structure were retained along with butts. Artefacts of clearly post-medieval or modern date were not retained but a note of their presence made on the appropriate context record.

3.2 Site Archive

- 3.2.1 The site archive is currently held at the offices of ASE and will be deposited with Dartford Museum or an alternative museum/archive centre in due course. The contents of the archive are tabulated below (Table 1).

Number of Contexts	50
No. of files/paper record	1 file
Plan and sections sheets	4
Bulk Samples	2
Photographs	122 (Digital)
Bulk finds	18 fragments / 7286g
Registered finds	0
Environmental flots/residue	0

Table 1: Quantification of site archive

4.0 RESULTS

4.1 Overview

- 4.1.1 The following section of the report describes the results of the archaeological survey and monitoring during the construction of the security ditch at Shorne Marshes. For the purposes of the report this has been divided into three sections:
- Deposit Sequence
 - Shooting Butts and Borrow Pits
 - Other Features

4.2 Deposit Sequence

- 4.2.1 The natural geology of the site is mapped as alluvium and the archaeological monitoring has allowed the deposit sequence for the upper two metres of the sequence to be recorded. This sequence comprises six main lithological units, described below, which were broadly consistent along the length of the ditch and are shown on figures 4 and 5.
- 4.2.2 The uppermost deposit comprises a deposit of vegetation (turf or scrub) and topsoil, generally 0.15m to 0.2m thick. This is recorded as contexts [1], [16] and [27]. It is at its maximum height of 2.64mOD in the vicinity of the shooting butts at the west end of the security ditch with the remainder being between c.1.7m-2mOD.
- 4.2.3 The topsoil overlay a very dry, desiccated, brownish grey clay with a blocky appearance, recorded as contexts [2], [14], [15], and [27] along the ditch. This deposit was between 0.2m and 0.5m thick and it was established that it covered the backfilled ditches and historic features. It is therefore probably a relatively recent deposit associated with the remodelling of the sea defences.
- 4.2.4 Two clay deposits were identified below the desiccated clay. The upper unit, context [03], was brownish orange in colour and contained occasional fibrous fragments and becoming softer with depth. The lower unit, context [04], comprised softer grey clay (weathering on exposure to brownish grey) with an increasing amount of organic material toward the base of the deposit.
- 4.2.5 There was a merging boundary with an intermediate deposit of grey clayey silts with a high organic component, context [05], which overlaid context [06]; a dark brown silty clay with a very high proportion of organic material. The upper boundary of this peat-like deposit was at between 0.44m and -0.1mOD. It was identified along much of the length of the ditch and was between 0.2m and 0.3m thick. It overlay soft sticky bluish grey clays, context [07], the base of which was not reached.
- 4.2.6 The deposit sequence can be interpreted as follows. The lower deposit [07] is characterised by its bluish colour which suggests that it was deposited in anaerobic waterlogged conditions, perhaps of intra or supra tidal flats. The peat deposits, [06], may be interpreted as being associated

with a reduction in or slowing of sea level rise. Comparison of the level of these deposits with those known elsewhere in the estuary would suggest a possible correlation with the Tilbury V peats, found at 0.4m and -0.9m OD dating to c.230AD (e.g. Devoy 1979). This, and the relatively nearby evidence of Cliffe, suggests a Roman date for these peat deposits. It should however be noted that the Holocene stratigraphy in the estuary is complex and affected by numerous factors and as such the broad horizontal sequences predicted do not always apply (e.g. GTESC 2010, 14). The overlying clay deposits, [02]-[05] represent the development of salt and grazing marsh across the area and levelling.

Context	Type	Description	Deposit Thickness m	Height m AOD (Max)
01	Layer	Topsoil/Turf	0.15m – 0.2m	2.64m
02	Layer	Desiccated (blocky) clay	0.2m – 0.5m	2.44m
03	Layer	Clay	0.3m – 0.4m	2.14
04	Layer	Clay	0.4m – 0.5m	1.75
05	Layer	Clay/Peat	0.1m	0.28
06	Layer	Peat	0.2m – 0.3m	0.17
07	Layer	Clay	>0.2m	0

Table 2: Natural deposit sequence

4.3 Shooting Butts and Borrow Pits

- 4.3.1 The site of the shooting butts was situated at the western end of the route of the new security ditch, the route of which crossed their northernmost extents (Fig 2). Prior to the start of works the RSPB prepared a Heritage Statement which included the results of a site walkover. This identified a low-mound and a 5.10m length of concrete wall (Figs 6 and 7).
- 4.3.2 A photographic record and levelled section of the surface of the low mound was carried out. This established that the section of concrete wall was 5.10m in length and 0.40m wide, its top at 2.64mOD. The wall was of concrete construction, and appears to be of a rough mix with frequent small to rounded pebbles and a pale grey colour. The top of the wall, [43], which was at the current ground level, had a ridge line running along it and appeared rougher to the east suggesting that there may have been an additional structure above it. A test pit was excavated to the west of the extant wall to a depth of 0.6m below PSL through the topsoil and blocky clay, as described above. This established that wall [47] survived to a height of 0.4m and was built on top of [26], a concrete base of hard yellow concrete with a very hard smooth grey concrete adhered to the top and sides. A very compact chalky rubble layer, [38], was identified below the blocky clays. This was not removed. The extant section of wall, [43], has been preserved in situ below the new embankment to the north of the security ditch (Fig 2).
- 4.3.3 The security ditch was excavated to the south of the extant section of wall and enabled a record of the structure of the shooting butts to be recorded.

The first stage of recording was undertaken by excavation the central line of the ditch (Trench A; Fig 8) to a safe working depth, 1m to 1.2m, which enabled vertical sections to be recorded (Fig 7A-C). Additional recording was undertaken following the excavation of the ditch to its full depth and battering of the sides. A plan of the features identified in the vicinity of the shooting butt is provided as figure 9.

- 4.3.4 The topsoil and blocky clay deposits, [27], were 0.4-0.60m thick and stratigraphically overlaid a rubble layer [38]. This layer contained broken brick, concrete and is likely to be a demolition layer. Bullets of late 19th century date were recovered from this context along with post-medieval pottery and bricks of probable late 18th to 19th century date. Some examples showed evidence of re-use and others were vitrified. The deposit was banked up against the western side of the concrete wall, [26]. To the west of the wall this demolition layer overlaid a slightly darker blocky clay, [28], c. 0.1m thick. It is thought that this layer may represent the remains of soil/silting which accumulated following the abandonment of the shooting butts but prior to their levelling.
- 4.3.5 Layer [28] overlaid a compact gravel layer [30], the end of which was defined by a single course of fragmentary brickwork [29], c.6m from the concrete wall [26] (Fig 10). Although the survival of this wall was limited it appeared to be situated in a shallow cut within a thin chalk layer, [31] (Fig 11). This gravel deposit and the retaining brickwork could be the remains of a bullet trap, a sand/earth bank situated in front of a butt to capture the rounds fired at a target. If this is correct the target line would have been situated to the west of [29] but no archaeological remains which could represent this were identified. The cartographic sources would suggest that no mantlet was present to protect the target area and that by the 1890s the targets did not extend this far north.
- 4.3.6 The concrete wall base [26], of hard yellow concrete, sat on a band of looser sand and gravels and a compact sand and chalk footing, [37] (Fig 12). It is possible that these differing materials represent differing phases of build but this cannot be conclusively determined. Assuming that the base of the wall itself is the surface of the compact chalk and sand footing [37] at c.1.30mOD and the top of [47], at 2.64mOD, was the top of the wall it would have stood 1.3m high, perhaps with an additional brick or brick/wood structure on top of it. A comparison of the location of this wall to the cartographic sources and the location of the probable bullet catcher/trap would suggest that this wall was situated at the base of the western edge of the butt itself, that is the earthwork bank, the remnants of which survived to the east of the wall as [32].
- 4.3.7 A further compact base of chalk and brick, [36], was recorded to the east of and at the same level as [37] and may represent an earlier structure (Fig 13).
- 4.3.8 A thin chalk layer, [31], was recorded to both the west and east of the wall. As this deposit underlies [32] and [30] they pre date the butt any may be associated with the construction of the ranges, providing a firm working surface for the construction of the wall.

- 4.3.9 To the east of the concrete wall layer [31] overlay [34], a firm brown clay with a slightly mixed appearance. This deposit is thought to be a levelling layer at the base of the earthwork butt, infilling a natural hollow. The base of this hollow was lined with a dark brown, slightly fibrous clay, [35] which was up to 0.2m thick. This is likely to be a buried soil or turf line.
- 4.3.10 Ditch [40] was identified 11m to the east of the concrete wall and was c.4-5m wide and c1.3m deep (from the surface level). No finds were recovered from its mixed brown/grey clay fill, [39]. This feature could be the continuation of a ditch line shown on historic Ordnance Survey mapping which would appear to have been backfilled prior to the construction of the ranges or a drainage ditch to the rear of the butt, backfilled at a later date. The former would seem most likely as the further part of this ditch line was identified in the batter of the security ditch to the west of the butts. A cut feature, [42], was identified to the east of [40], filled with modern debris.
- 4.3.11 The construction of the earthwork butt would have required a considerable amount of clay and additional ditches and borrow pits were dug to obtain material for these, as illustrated on historic mapping. These were then backfilled. A large ditch and clay pit were identified to the east of the butts. The ditch, [44], was some 11m wide and approximately 1.3m deep (from PSL) backfilled with a brown/grey clay fill. Patches of darker material were present in places towards the base of the ditch. This ditch line matches that depicted as a narrower ditch on the 1st Editions of the Ordnance Survey (1860s) which was widened by the 1890s to the extents recorded during fieldwork. A borrow pit, [45], was identified to the east of [44] and was 9.2m wide and c1.2m deep. It was dug between the late 19th and early 20th centuries. As with [44] it was filled with a mixed brown/grey clay. This pit is one of numerous pits dug in the vicinity of the eastern (original) shooting butts which were disused by this date. It is assumed that the material was utilised on the new ranges to the west and it is also possible that some may have been used to re-enforce sea defences. Both features were backfilled in the late 20th century. To the south of the security ditch they survive as partially open ponds.

Context	Type	Description	Depth/ Thickness	Height M AOD (Max)
26	Wall	Concrete wall, possibly with a brick /timber top	0.4-0.6m wide 1.3m high	2.64
27	Layer	Topsoil and blocky clay	0.4-0.6m	2.64
28	Layer	Dark brown blocky clay	0.1m	2.14
29	Wall	Base of a brick wall	>0.1m	1.80
30	Layer	Compact gravel layer	0.15m	2.04
31	Layer	Compact chalk layer	0.10m	1.94
32	Layer	Remnants of	0.4m	1.98

Context	Type	Description	Depth/ Thickness	Height M AOD (Max)
		earthwork bank		
33	Layer	Natural - clay	>0.2m	1.8
34	Layer	Clay levelling deposit	>0.7m	2.02
35	Layer	Fibrous clay, buried soil	0.2m	2.02
36	Layer	Compact chalk and brick.	>0.1m	1.72
37	Wall	Compact chalk and sand. Wall footing.	>0.1m	1.62
38	Layer	Brick and concrete rubble. Demolition layer.	0.5m	2.35
39	Fill	Mixed clay fill of [40]	0.8m	1.8
40	Cut	Ditch	0.8m	1.8
41	Fill	Fill of 42	0.8m	1.8
42	Cut	Ditch filled with modern debris	>0.8m	1.8
43	Wall	Extant section of concrete all	0.4-0.6m wide	2.64
44	Cut	Ditch	1.3m	1.54
45	Cut	Borrow Pit	1.3m	1.54
46	Fill	Clay backfill of 44 and 45	1.3m	1.54

Table 3: Context Information; Shooting Butt and associated features

4.4 Other Features

- 4.4.1 The only other features identified along the new security ditch was a series of field ditches which are depicted on historic mapping and most were backfilled during the sea defence works in the 1970s. In plan form these ditches form two distinct types, sinuous boundaries which are essentially relict marsh creeks which have been retained for drainage, and straight ditches in the vicinity of Shornemead Fort. Each of the back-filled ditches identified were visible in the grazing marsh to the south, the majority as open ditches and others as hollows with different vegetation growing along them.
- 4.4.2 Ditch [47] (Fig 14) is situated c.150m to the east of the shooting butt and, where it crosses the security ditch, is orientated roughly west-east. The ditch is c.2.6m wide and 1.16m deep (from PSL). Ditch [49] (Fig 13) is situated 82m further east and is orientated north-south where it crosses the security ditch. It is 5m wide and c. 1.5m deep. Both ditches were backfilled with brown clay.
- 4.4.3 Ditch [24] (Fig 14) situated 330m further east, is the largest of the ditches recorded, being some 15m wide and c. 2m deep. This is a significant

landscape element being a major drainage feature and the parish boundary between the parishes of Chalk and Shorne. Three fills were identified in this ditch, soft silts, [21] and [22], which represent silting at the base of the ditch, and a modern clay backfill, [23]. No traces of embankments which may have been present along the edges of such a boundary were identified.

4.4.4 Ditch [17] was situated to the southwest of the former submarine station, 146m east of the parish boundary (Fig 15). This ditch was orientated west-east and crossed the security ditch at an angle. The ditch was c.1.5m wide and 1.1m deep. The base of the ditch was filled with black silts, [18]. These were overlain by clays, [19], a back-fill deposit. It was covered by a thin band of fibrous material, [20], which presumably accumulated in a hollow left following backfilling. This was then covered by further silty loam levelling deposit, [21] and topsoil and turf. Clearly modern material (not retained) was observed in these upper deposits which represent the remains of the modern alterations of the sea defences.

4.4.5 Ditch [08] was situated towards the eastern end of the security ditch (Fig 15) just to the south of the submarine station. This was a straight ditch, orientated north-south. It was c.2.2m wide and 1.2m deep. It contained soft silty basal fills, [09] and [10], overlain by a fibrous clay [11]. This was covered by a clay back-fill deposit [12] and a silt clay [13]. The latter is thought to have accumulated in the hollow left along the ditch line following backfilling. Further levelling deposits, [14] and [15] overlaid this. It was overlain by the topsoil and turf. The fills of this ditch contained occasional late post-medieval and modern finds (not retained).

Context	Type	Description	Depth/ Thickness	Height mAOD (Max)
47	Cut	Ditch	1.6m	1.67
48	Fill	Backfill of ditch [47]	1.6m	1.67
49	Cut	Ditch	1.5m	1.8
50	Fill	Backfill of ditch [49]	1.5m	1.8
24	Cut	Ditch. Parish boundary	2m	1.82
21	Fill	Basal silty fill of [24]	0.5m	-
22	Fill	Silty fill of [24]	0.5m	-
23	Fill	Backfill of [24]	1m	0.8
17	Cut	Ditch	1.1m	1.73
18	Fill	Silty fill of [17]	0.2m	0.13
19	Fill	Clay fill of [17]	0.45m	0.83
20	Fill	Fibrous fill of [17]	0.1m	0.83
21	Layer	Levelling deposit over [17]	0.3m	1.53
08	Cut	Ditch	1.2m	1.77
09	Fill	Silty fill of [08]	0.05m	0.62
10	Fill	Silty Fill of [08]	0.15m	0.77
11	Fill	Fibrous fill of [08]	0.15m	0.77
12	Fill	Backfill of [08]	0.4m	1.15

Context	Type	Description	Depth/ Thickness	Height mAOD (Max)
13	Fill	Silt clay fill of [08]	0.1m	1.42
14	Layer	Levelling deposit over [08]	0.4m	1.62
15	Layer	Levelling deposit over [08]	0.5m	1.62
16	Layer	Topsoil and turf	0.15m	1.77

Table 4: Context Information; Other Features

5.0 FINDS

5.1 Summary

- 5.1.1 A small assemblage of finds was recovered during the archaeological work (Table 4). These were all washed and dried or air dried. They were subsequently quantified by count and weight and bagged by material and context. Finds are all packed and stored according to IFA guidelines (2008). No further conservation was necessary.

Context	Pottery	Wt (g)	CBM	Wt (g)	Bullets	Wt (g)
29			2	2114		
38	1	14	4	4942	11	216
Total	1	14	6	7056	11	216

Table 5: Quantification of the finds

- 5.1.2 Only a small assemblage was recovered, comprising pottery, ceramic building material and ordnance. The group is small and is of no potential other than its contribution to the dating evidence. None of the finds are of inherent interest, although the bullets are clearly related to site function. The assemblage is recommended for discard.

5.2 Post-Medieval Pottery by Luke Barber

- 5.2.1 The archaeological work recovered a single burnt sherd of post-Roman pottery from the site (context [38]). The 14g sherd consists of a body fragment in an oxidised unglazed hard-fired earthenware with deliberately reduced surfaces. This type of fabric has a long period of use within the 16th to 17th centuries and cannot be dated closer in isolation.

5.3 Ceramic Building Material (CBM) by Elke Raemen

- 5.3.1 A total of six brick fragments (weight 7056g) was collected from two different contexts. All six are frogged bricks. The fabric can only in one case be established, as the remaining bricks are all vitrified. A frogged brick from [38] was in a red clay fabric with abundant fine to medium calcium carbonates, common medium quartz and common medium to coarse red iron-rich inclusions. The fabric is unevenly mixed, remaining lumpy in places. This particular brick is fairly abraded, with mortar on the breaks signifying its reuse. The other five bricks are all frogged as well, and include

two examples in yellow clay. All bricks are of probable late 18th to mid 19th century date.

5.4 Bullets by Justin Russell

5.4.1 Six .450" bullets were recovered from context (38) and while five examples show minor signs of impact damage, one has been entirely flattened on impact. Each of the bullets conform to the same pattern, (two cannellures and a weight of between 470 to 477 grains, approximately 30 grams) and two examples bear a War Department broad arrow mark on the base. These can be identified as Mark III Martini Henry rifle bullets, a pattern that was in use by the British army from between 1873 until the late 1880's. The remainder of the recovered material is made up of three unidentified fragments of impact flattened lead, each weighing three grams.

5.4.2 Also found were two .303 bullets, with cupro-nickel envelopes over a lead core. The first conforms to the MK I, II and VI type, being round nosed and with one cannellure. The date range for use in service of this type is from 1892 to 1910. The second, a MKIV or V, is round nosed with a hollow tip, which was designed to aid expansion upon impact. Introduced in 1898, manufacture of this type of bullet ceased in 1900.

6.0 DISCUSSION AND CONCLUSIONS

6.1 The archaeological monitoring and survey at Shorne Marsh has identified the remains of the original shooting butts at Milton Ranges and enabled these to be preserved by record. These were shown to be relatively complex remains, although not fully understood due to the limited extent of exposure in the security ditch groundworks. The shooting butts extended to the north of the new security ditch line and thus part of this historic feature has been preserved in situ below new bunding.

6.2 The geological sequence identified is consistent with that identified elsewhere on the north Kent marshes and no old land surfaces were identified. The impact of the works on these natural deposits is not considered major given their extensive nature.

6.3 The field ditches identified contained few artefacts and those were limited to post-medieval and modern material which is derived from the backfilling of these features during the remodelling of the sea defences. The ditches, which are still extant in the grazing marshes to the south of the security ditch, represent two phases; the sinuous natural field drainage system and the straight field system imposed in the area to the west of Shornemead Fort which is probably associated with military activity in the vicinity of the fort. The ditches are of low archaeological significance and the impact of the works on them has not been major.

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HER Summary Form

Site Name: RSPB Shorne Marshes	
Site Address: RSPB Shorne Marshes, Off Mark Lane, Gravesend, Kent	
Summary: <p><i>A programme of archaeological monitoring and survey was undertaken at RSPB Shorne Marshes during the excavation of a 950m long security ditch. The works exposed a geological sequence typical of the Thameside marshes.</i></p> <p><i>At the western end of the security ditch the remains of a shooting butt, part of ranges opened in 1859/60 and disused by the late 19th century were recorded along with associated ditches and borrow pits. Other identified features comprised field ditches, all of which were illustrated on historic Ordnance Survey mapping and infilled in the 1970s.</i></p>	
District/Unitary: Gravesham	Parish: Gravesend / Shorne
Period(s): Post-medieval / modern	
NGR: 568257/174374 to 569151/174643	
Type of archaeological work: Watching Brief	
Date of Recording: August – September 2013	
Unit undertaking recording: Archaeology South-East	
Geology: Alluvium	
Title and author of accompanying report: Heppell, E. 2014 <i>Archaeological Survey, Monitoring and Excavation at RSPB Shorne Marshes</i> , ASE Report No. 2014056	
Summary of fieldwork results: <p><i>Archaeology South-East undertook a programme of archaeological monitoring and survey at RSPB Shorne Marshes during the excavation of a 950m long security ditch in the vicinity of Shornemead Fort. The western end the security ditch crossed shooting butts associated with the mid to late 19th century Milton Rifle Ranges.</i></p> <p><i>The security ditch was excavated to a depth of 2m from the present surface level and exposed a geological sequence typical of the Thameside marshes; topsoil and turf, clays, an organic peat deposit and underlying clays which were probably deposited in anaerobic conditions.</i></p> <p><i>At the western end of the security ditch the remains of a shooting butt were visible as a low mound and the top of a concrete wall. These butts opened in 1859/60 and were disused by the late 19th century when they were replaced by those at the adjacent Milton Ranges. These, and associated features such as ditches and borrow pits, were levelled/infilled by the 1960s. Further alteration of the landscape took place in the 1970s when the sea defences were remodelled. A section through the butt was recorded during excavation of the security ditch, recording levelling layers, the remains of the bullet stop/catcher, the concrete wall and demolition layers.</i></p> <p><i>Other identified features comprised field ditches, all of which were illustrated on historic Ordnance Survey mapping and infilled in the 1970s. These ditches, still extant in the grazing marsh to the south, represent two phases; the sinuous natural field drainage system and the straight field system imposed in the area to the west of Shornemead Fort which is probably associated with military activity in the area.</i></p>	
Location of archive/finds: ASE Braintree	
Contact at Unit: E. Heppell	Date: March 2014

OASIS Form

OASIS ID: archaeol6-170687	
Project details	
Project name	RSPB Shorne Marshes
Short description of the project	Monitoring of the excavation of a new security ditch recorder the remains of a 19th century shooting butt and a number of field ditches. The latter were shown on historic mapping and in-filled in the 1970s.
Project dates	Start: 31-07-2013 End: 31-07-2014
Previous/future work	No / Not known
Associated project reference codes	8053 - Contracting Unit No.
Type of project	Recording project
Site status	Site of Special Scientific Importance (SSSI)
Current Land use	Other 15 - Other
Monument type	SHOOTING BUTT Post Medieval
Monument type	SHOOTING BUTT Modern
Significant Finds	CBM Post Medieval
Significant Finds	AMMUNITION (BULLETS) Post Medieval
Investigation type	"Salvage Record"
Prompt	National Planning Policy Framework - NPPF
Project location	
Country	England
Site location	KENT GRAVESHAM GRAVESEND RSPB Shorne Marshes
Study area	1.00 Kilometres
Site coordinates	TQ 68257 74374 51.4427979908 0.421373885392 51 26 34 N 000 25 16 E
Site coordinates	TQ 69151 74643 51.444947618 0.434355508918 51 26 41 N 000 26 03 E
Height OD / Depth	Min: 1.50m Max: 2.00m
Project creators	
Name of Organisation	Archaeology South-East
Project brief originator	Kent County Council
Project design originator	ASE
Project director/manager	A Scruby

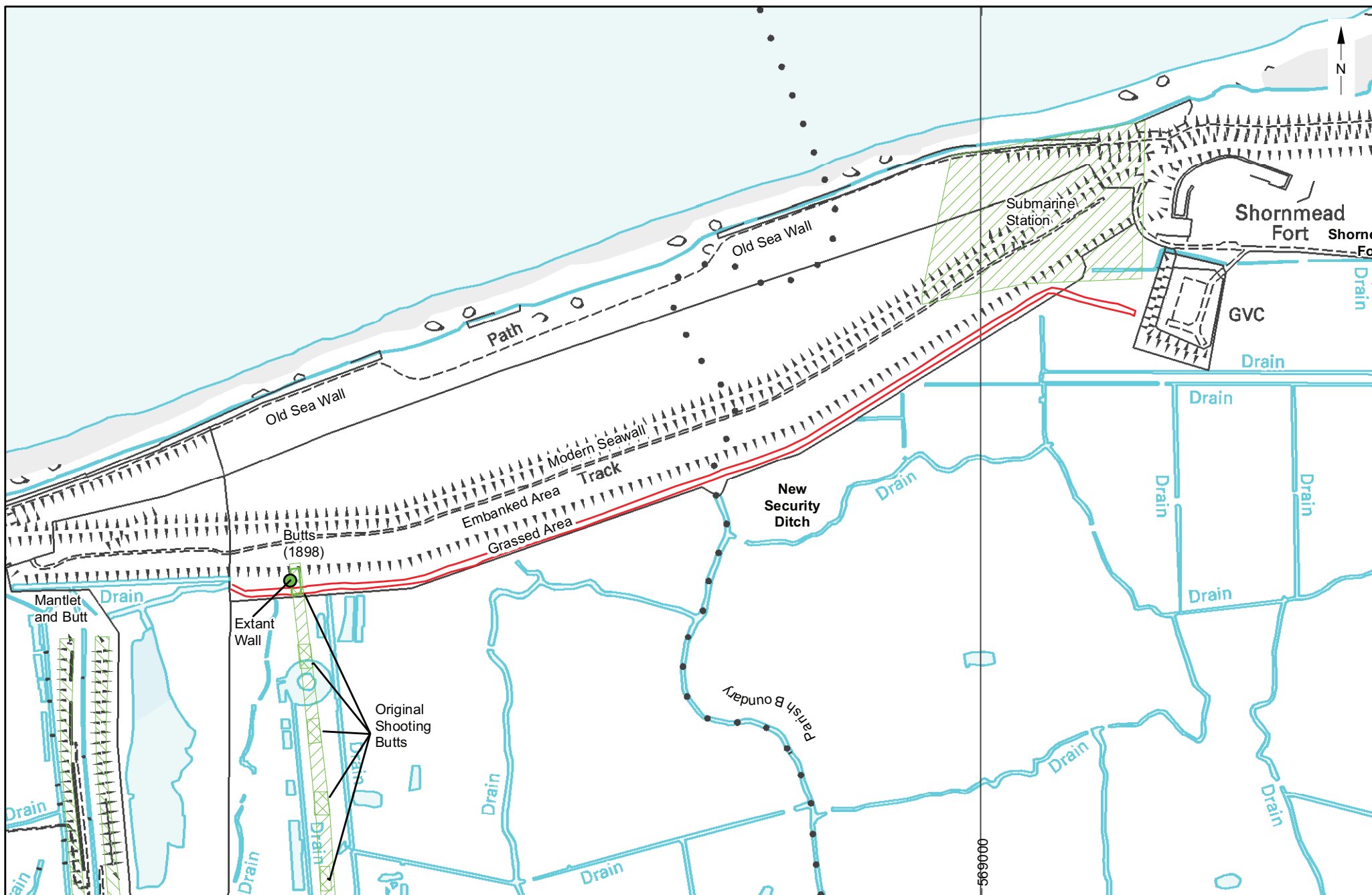
Project supervisor	E Heppell
Type of sponsor/funding body	Client
Name of sponsor/funding body	RSPB
Project archives	
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Physical Contents	"Ceramics","Industrial","Metal","other"
Digital Archive recipient	local museum
Digital Contents	"Stratigraphic","Survey","other"
Digital Media available	"GIS","Images raster / digital photography","Survey","Text"
Paper Archive recipient	local museum
Paper Contents	"other"
Paper Media available	"Context sheet","Drawing","Map","Plan","Section","Unpublished Text"
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	Archaeological Survey, Monitoring and Excavation at RSPB Shorne Marshes, Gravesend, Kent
Author(s)/Editor(s)	Heppell, E.
Date	2014
Issuer or publisher	ASE
Place of issue or publication	Braintree
Description	Grey literature report - A4
Entered by	E. Heppell (e.heppell@ucl.ac.uk)
Entered on	25 February 2014



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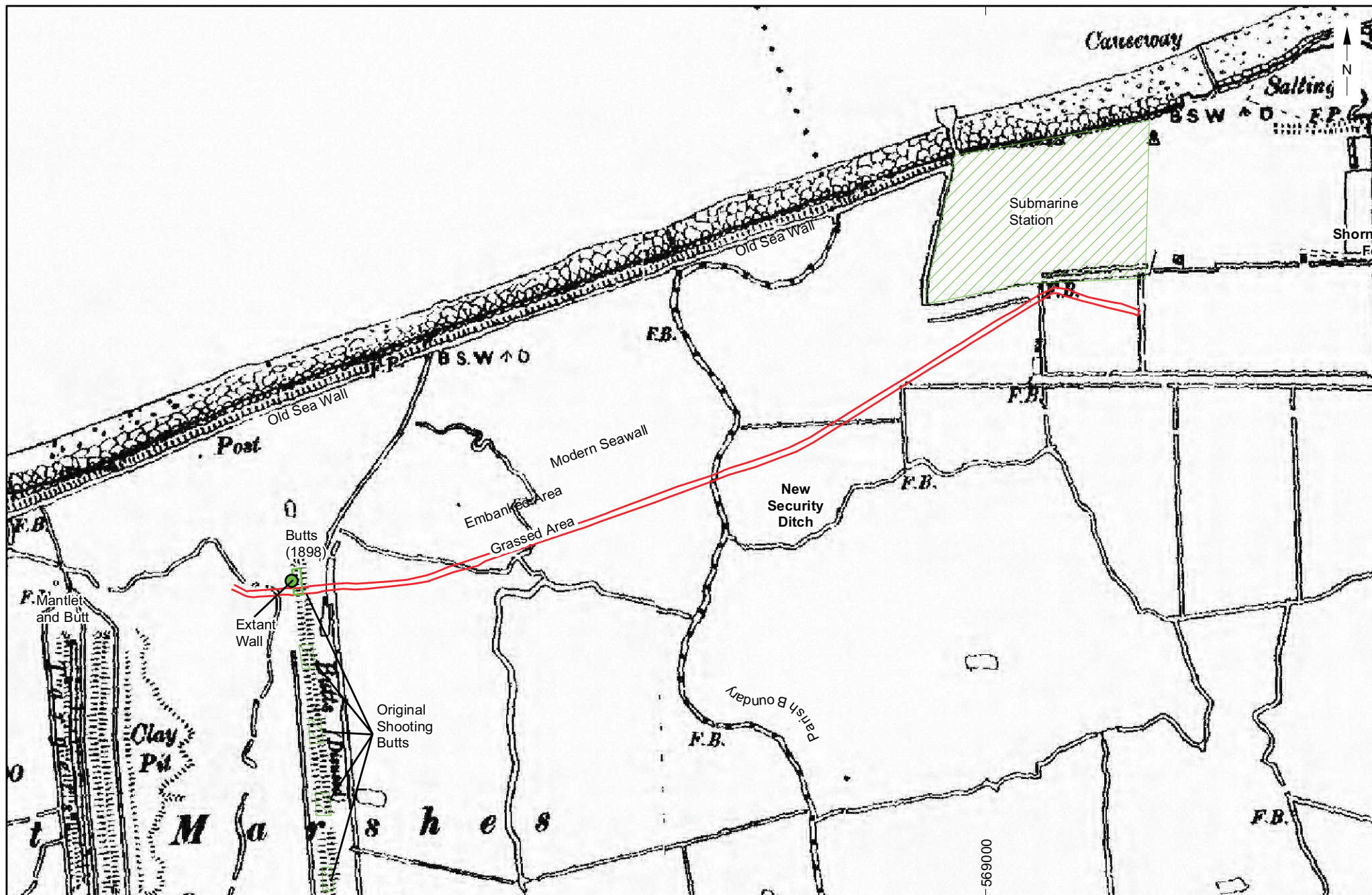
© Archaeology South-East		Shorne Marshes	Fig. 1
Project Ref: 8053	Feb 2014	Site location	
Report Ref: 2014056	Drawn by: EMH		



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0 0.25km

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Project Ref: 8053	Feb 2014	Site location showing main historic features	
Report Ref: 2014056	Drawn by: EMH		



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Project Ref: 8053	Feb 2014	Site location overlain on OS 2nd Edition 6" Map	Fig. 3
Report Ref: 2014056	Drawn by: EMH		



Figure 4 Example of Geological strata (looking east)

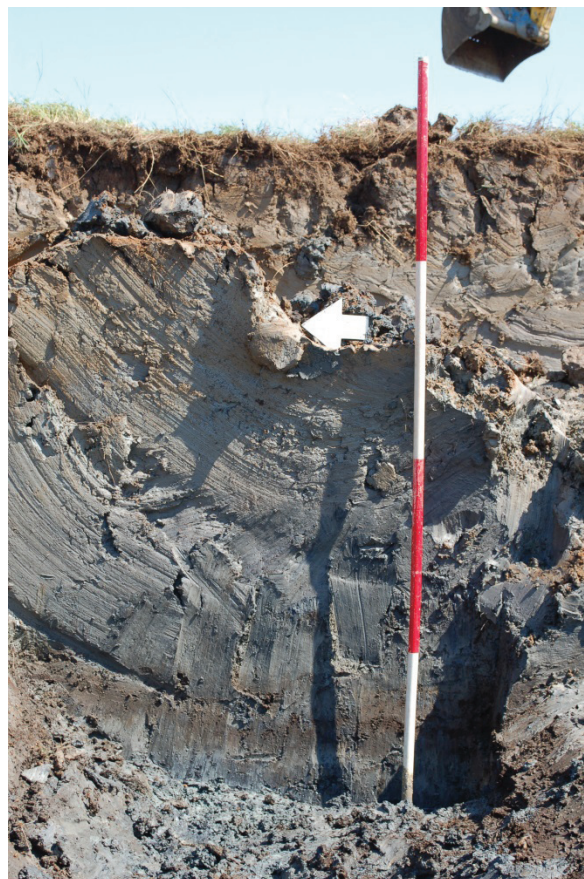


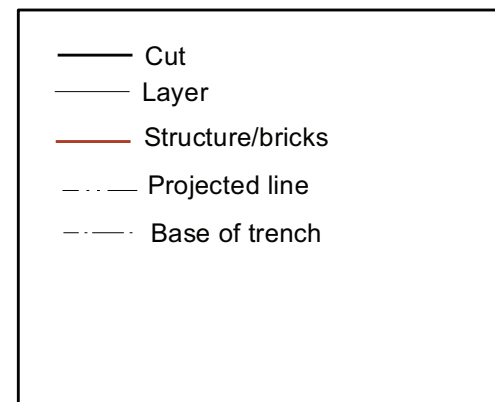
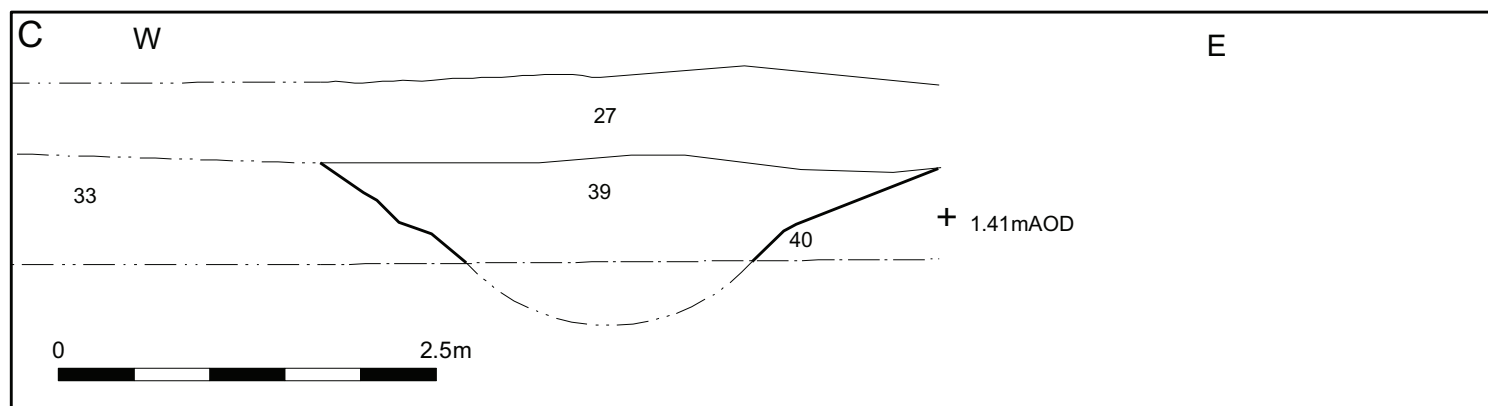
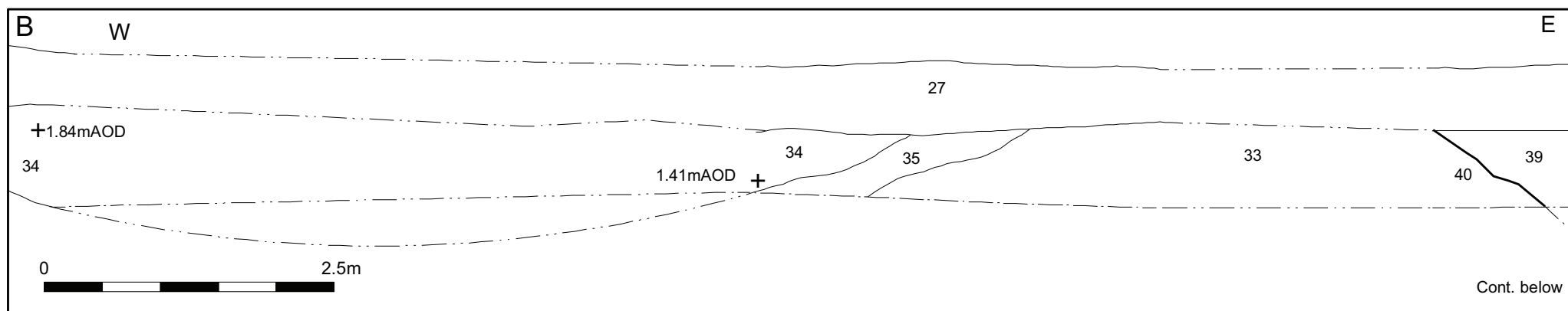
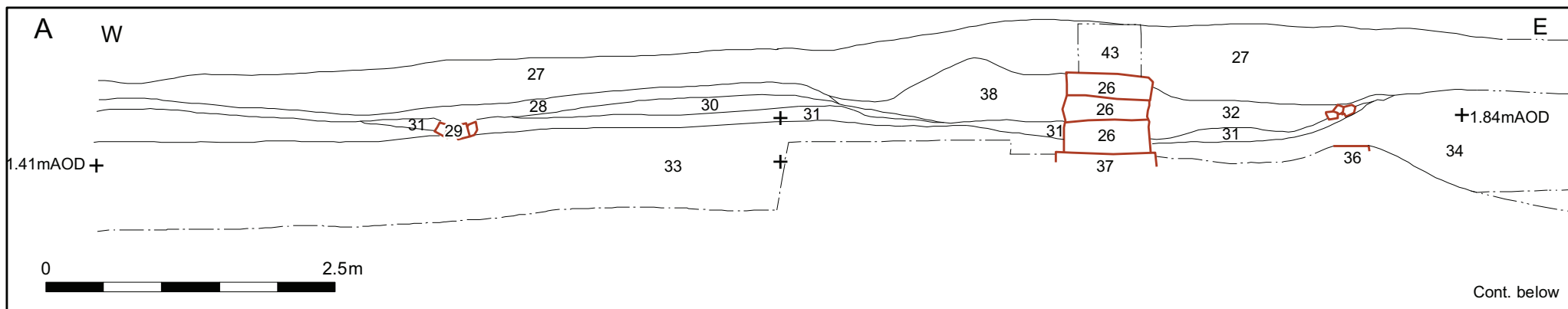
Figure 5 Example of geological strata (2m scale)

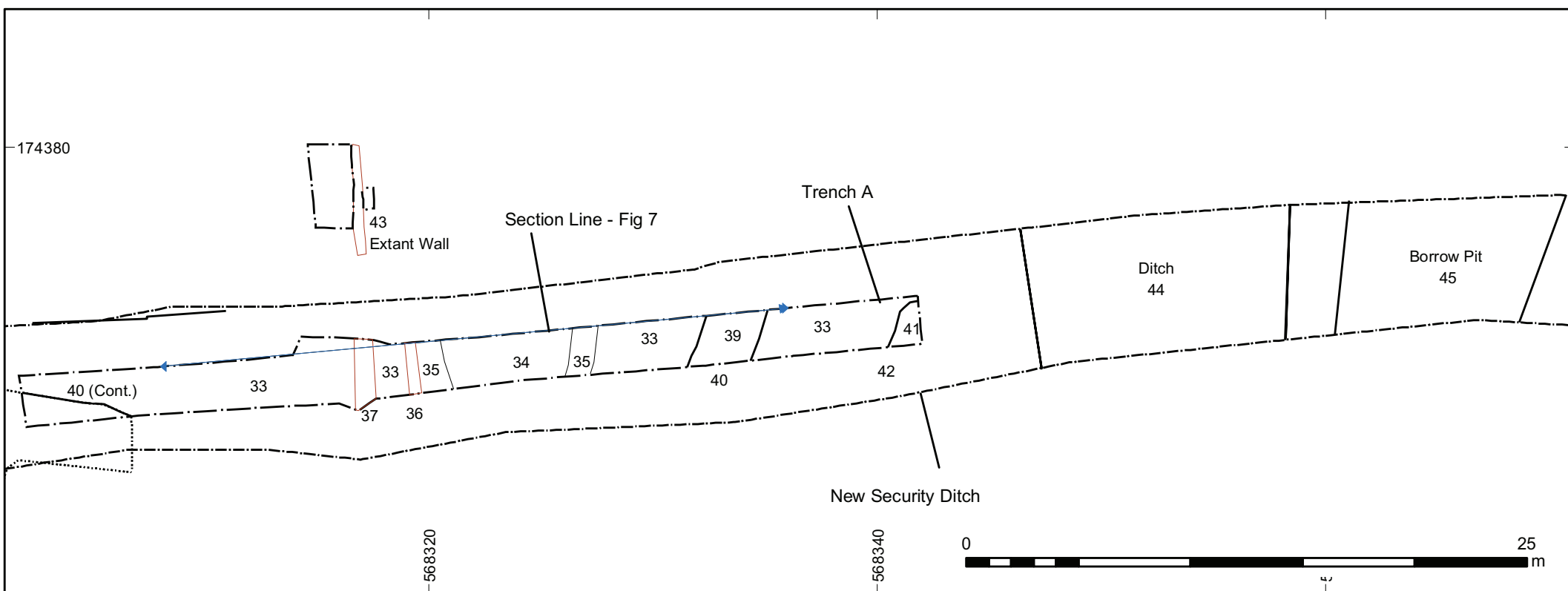
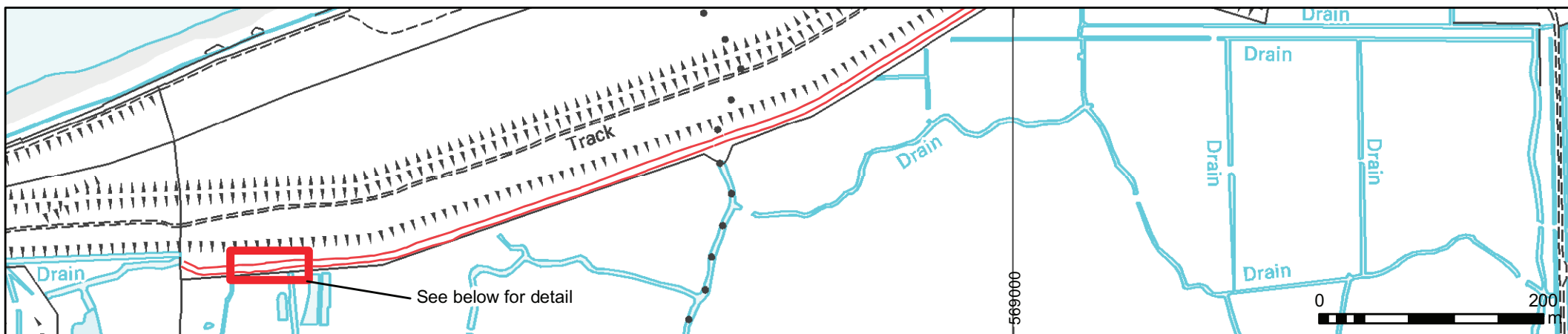


Figure 6 Extant wall [43] (looking south over the grazing marsh)



Figure 7 Extant wall [43] (0.5m scale)





- Structure/bricks
- Layer
- Cut
- Edge of Ditch / Trench

© Archaeology South-East		Shorne Marshes		Fig. 9
Project Ref: 8053	Feb 2014	Plan of features in the vicinity of the shooting butt		
Report Ref: 2014056	Drawn by: EMH			



Fig 10 Brick wall [29] (0.5m scale)



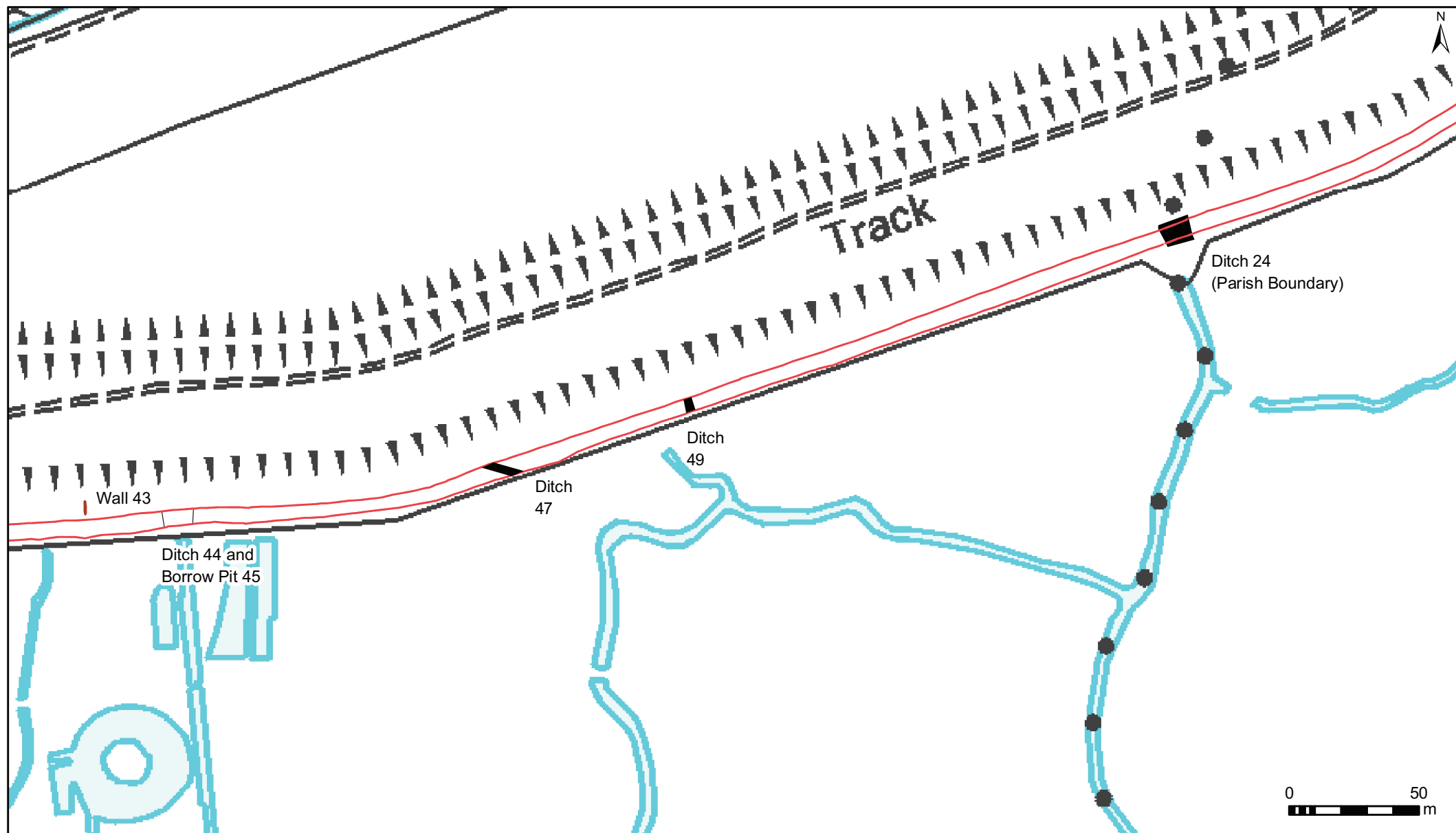
Fig 11 Chalk layer [31] (1m and 2m scales)



Fig 12 Wall foundation [37] and wall [26] (0.5m and 2m scale)

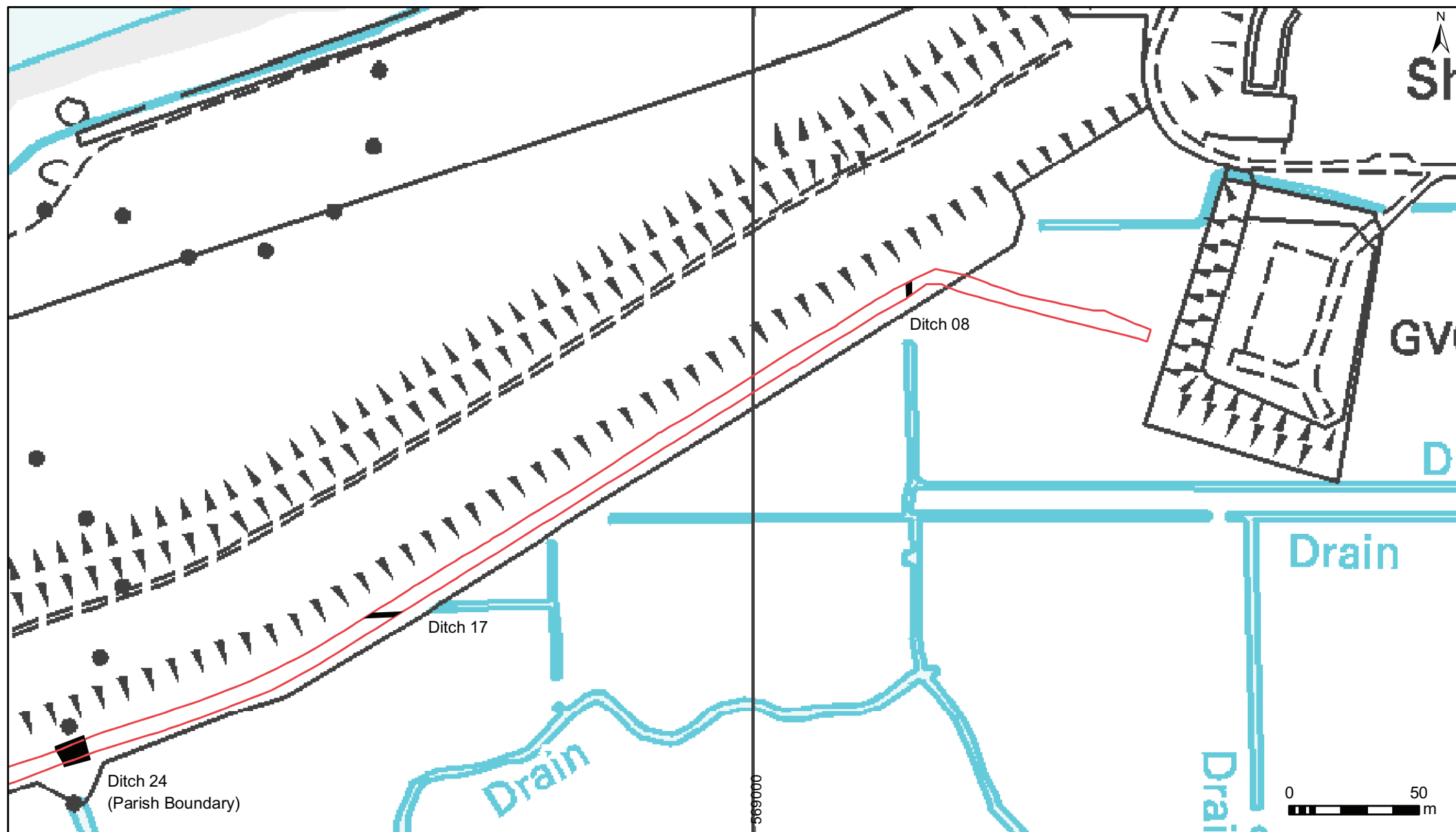


Fig 13 Chalk wall base [36] in the foreground (1m scale)



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© Archaeology South-East		Shorne Marshes	Fig. 14
Project Ref: 8053	Feb 2014	Backfilled ditches along the security ditch	
Report Ref: 2014056	Drawn by: EMH		



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Project Ref: 8053	Feb 2014	Backfilled ditches along the security ditch	
Report Ref: 2014.056	Drawn by: EMH		

Sussex Office

Units 1 & 2
2 Chapel Place
Portslade
East Sussex BN41 1DR
tel: +44(0)1273 426830
email: fau@ucl.ac.uk
web: www.archaeologyse.co.uk

Essex Office

The Old Magistrates Court
79 South Street
Braintree
Essex CM7 3QD
tel: +44(0)1376 331470
email: fau@ucl.ac.uk
web: www.archaeologyse.co.uk

London Office

Centre for Applied Archaeology
UCL Institute of Archaeology
31-34 Gordon Square
London WC1H 0PY
tel: +44(0)20 7679 4778
email: fau@ucl.ac.uk
web: www.ucl.ac.uk/caa

