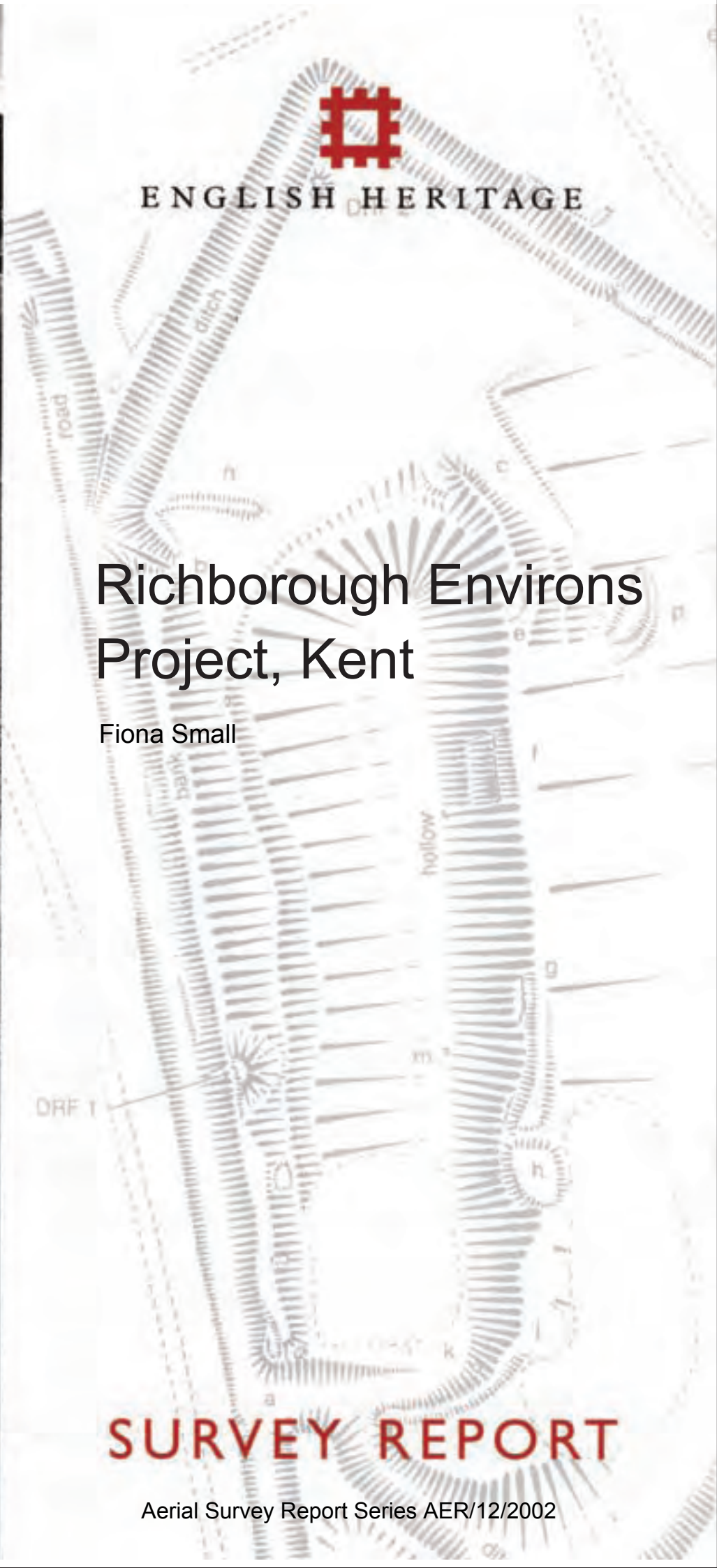




ENGLISH HERITAGE

Richborough Environs Project, Kent

Fiona Small



SURVEY REPORT

Aerial Survey Report Series AER/12/2002



ENGLISH HERITAGE

**Aerial Survey Report Series
AER/12/2002**

**Richborough Environs Project, Kent:
Report on the Aerial Photographic
Transcription and Analysis**

Surveyed: April 2002
Aerial Photographic Transcription and Analysis by Fiona Small

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SUMMARY

The earthwork and plough-levelled remains of the historic and archaeological sites in the vicinity of Richborough Roman fort Kent, and its environs, and were subject to an aerial survey using the examination and interpretation of all readily available aerial photographs held by English Heritage (EH) in Swindon, Cambridge University, and Kent County Council, Kent. A transcription of all the visible archaeological features was prepared at 1:2500 scale.

As a result of this survey a number of new sites and features were identified and the presence and interpretation of other known sites clarified. The survey revealed the extensive plough-levelled remains of the settlement and roads adjacent to the fort and amphitheatre at Richborough and a number of sites from the wider survey area.

The nature of aerial survey is such that it allows detailed investigation over large areas in an efficient manner. At Richborough the data collected from the aerial survey was combined with the results of the detailed geophysical survey carried out adjacent to the fort and proved to be very informative in the interpretation and understanding of the site. The two surveys have begun to reveal the greater extent and complexity of the Roman settlement at Richborough, highlighting the need for further investigation and excavation.

INTRODUCTION

This survey was carried out as part of a multi-disciplinary research project on the Roman fort initiated by English Heritage Centre for Archaeology, Portsmouth. The aim of this project was to 'establish the extent, morphology and complexity of the settlement in the area under active ploughing between the Saxon Shore fort and the amphitheatre' (Wilmott et al 2001).

The combined results of the aerial survey, the geophysical surveys and small scale excavations undertaken by the Centre for Archaeology (CfA) in 2001 will be used to improve the interpretation, management and presentation of the site.

The aerial photographic interpretation was carried out by English Heritage Aerial Survey section, NMRC Swindon. All work was carried out by Fiona Small, Investigator, Aerial Survey between 18th February and 31st May 2002.

THE 1:2500 AERIAL PHOTOGRAPHIC TRANSCRIPTION

Objectives

The aerial survey was carried out over an area of 15 square km extending from TR 3057 to TR 3362 centred on the Roman fort of Richborough, Kent. The Roman fort, associated amphitheatre, and presumed civil settlement are all located on a former island. The area has been subject to dramatic changes in drainage patterns with erosion and silting up of former channels over the course of time.

With the exception of the upstanding walls and excavated earthworks of the Saxon Shore fort, the ditches of the earlier fort and the eroded earthwork remains of the amphitheatre, the entire site of the Roman settlement lying beyond the walls has been completely levelled with no features discernible on the ground. Therefore remote sensing including aerial survey was considered to be the best method for recording the remains of the site.

The final objective was to produce an accurate plan of all the archaeological features within the survey area at 1:2500 scale within AutoCAD Map based on the standard English Heritage NMP (National Mapping Programme) mapping conventions (see Appendix 3) and guidelines. Features were drawn as seen with varying line thickness where appropriate. Target accuracy was +1m.

The final drawings were produced as digital files in DWG and DXF format.

Location and topography

The survey area covered an area of 15 square km centred on the Richborough Roman fort. Richborough is located on a former island on the eastern coast of Kent, on the south-eastern end of the now silted Wantsum Channel which divided the Isle of Thanet from the mainland. The channel has long-since silted up due to sediment deposited by the River Stour on its meandering course to the sea. Richborough Island which was surrounded on three sides by the sea at the time of the Roman invasion now lies over two miles inland from the sea.

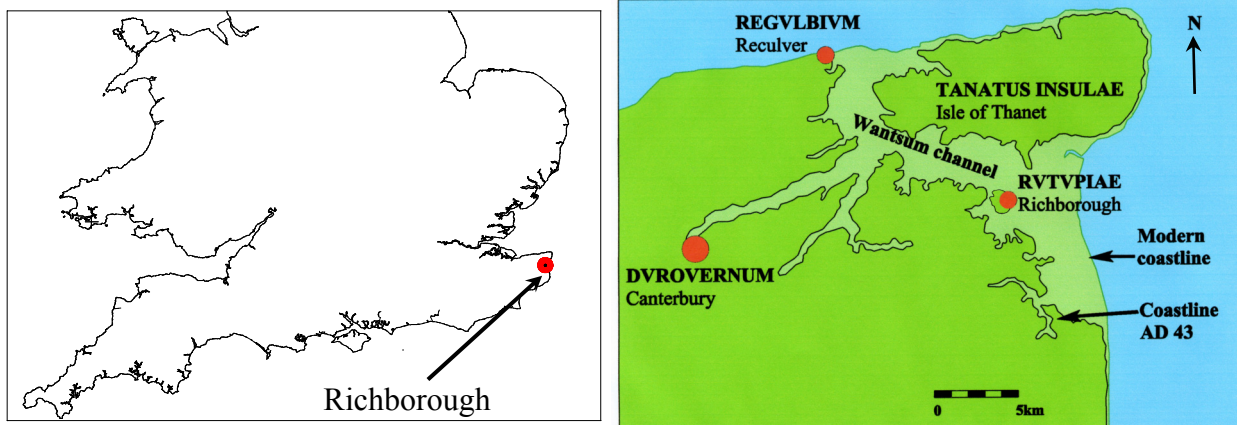


Figure 1a & 1b Location of Richborough

The survey area lies close to the coast and topographically occupies two distinct zones. There is a general decrease in height across the area from south-west to the east and north-east. The underlying chalk beds gently rise to the south-west and this is reflected in the gently rising terrain which reaches a maximum height of around 35m above sea level within the survey area, but continues rising to 110m around Aylsham beyond the limits of the survey area.

The second distinct area comprises the flat low-lying land formed by the silted up former Wantsum Channel. Geologically this area is similar to the higher areas to the south, but is lower lying and has been subjected to alluvial deposition from the rivers and the sea. This area would have been a mixture of marsh and land tidal or permanently flooded by the sea. This land has now been reclaimed from the sea and lies between 2m and 3m above sea level.

Geology and soils

The underlying geology of the area is predominantly Cretaceous chalk which dips very gently to the north in this area, forming the northern part of the Wealden Anticline. The chalk has been gently folded to form a shallow syncline forming the Isle of Thanet. The chalk is overlain by Eocene deposits (Thanet and Woolwich beds) and Pleistocene deposits (Head Brickearth). The Thanet and Woolwich beds are generally unconsolidated clays and sands. The Thanet beds comprise marine loamy sands, becoming finer and more sandy towards the north of the survey area. These are overlain by Woolwich beds which contain some clays and sand, again becoming more sandy to the north. These sedimentary beds have subsequently been eroded away and Head Brickearths deposited.

The shallow basin formed by the syncline in the underlying chalk beds was flooded when sea levels rose at the end of the last ice age (c.15,000 BP). This formed a sea passage between the Thames Estuary and the English Channel known as the Wantsum Channel, separating the Isle of Thanet and Richborough Island from the mainland.

Two soil types dominate the survey area. The soils on the higher areas (including Richborough Island) are HAMBLE 1 series (571y). These are permeable and naturally well-drained soils, which develop in aeolian silty drift and related head over chalk and Tertiary strata, chiefly loamy Thanet beds.

The second soil type is of the NEWCHURCH 2 series (814c). These soils occur on the low-lying areas of the now silted up Wantsum Channel between the Isle of Thanet from the mainland. They are characteristically stoneless clayey soils in marine alluvium. These soils are moderately permeable but require drainage systems and pumps for efficient control of the ground water levels. Even with drainage the soils are usually seasonally waterlogged.

Definitions

The AutoCAD drawing has been layered into standard NMP archaeological features such as ditches, banks, buildings and extent of area (large area features). In

addition to these standard layers, the following were depicted on separate layers to aid differentiation from other features: WWII features (including gun emplacements and slit trenches), WWII bomb craters and areas of amorphous parching within the Richborough Roman settlement which could indicate the presence of fallen masonry.

Photographic sources consulted

During the course of this survey, all available specialist oblique and vertical aerial photographs for the 15 square km of the survey area held by the NMR, Cambridge University Air Photo Library and Kent County Council, Maidstone were consulted.

Appendix 1 consists of a list of the aerial photographs consulted, giving accession number, date flown and repository information.

Quality and reliability of the photography

The vertical coverage for the survey area was extensive, but only a small number of the runs included photographs showing archaeological remains. This was mostly due to the photographs either being taken at the wrong time of year, or simply that the heavy water-logged soils of low-lying areas which make up the major part of the survey do not lend themselves readily to cropmark formation. Also, most upstanding features appear to have been plough-levelled in these areas. Generally, the vertical coverage was most useful for earthwork features in the wider survey, the majority of which were medieval or post medieval or dating from WWII. Very little detail for the area immediately around the Saxon Shore was obtained from the vertical photographs.

In total 408 verticals from the NMR collection were consulted. These comprised 31 individual sorties dating from 1941 through to 1979. The majority was taken by the RAF, the remaining few by the OS and Meridian Airmaps Ltd. In addition to these, a number of vertical photographs held by Kent County Council were also consulted at the SMR in Maidstone.

The NMR held 255 specialist oblique photographs. The majority of these were photographs of the Saxon Shore fort and surrounding features. Only a small number were of other sites from the wider survey area. The reason for this was two-fold. Firstly, the fort is an obvious target for aerial survey, and secondly, the fort is located on a sandy island which is by its nature more sensitive to cropmark formation than the heavier clayey soils which surround it. This is one of the few locations where cropmarks have been recorded.

However, a large proportion of the oblique photographs of the site were disappointing in their content. It is only in two separate years of photography that significant remains were visible. The first of these sorties was taken in July 1979, but field control throughout the site was poor for the majority of these photographs. The second and more detailed set of photographs were taken in July 2001. The cropmarks at this particular time were very clear, providing the most detailed information for the settlement and associated roads to the NW, west and SW of the Saxon Shore fort.

In addition to the photographs held by the NMR, 75 specialist oblique photographs from the Cambridge University Air Photo Library were also consulted. Most of these photographs were of the main Roman fort and settlement site, and many contained cropmark evidence for parts of the settlement not shown by other sources of photography.

Survey methods and techniques

All archaeological sites (extant or plough-levelled) visible on aerial photographs were transcribed using a compilation of photographs which were scanned and then rectified via the AERIAL rectification program (Bradford University plane transformation software) with archaeological details transcribed in AutoCAD Map. Control information for the aerial photographs was taken from 1:2500 scale OS plans supplied in a digital format. The target accuracy level for the survey was in the region +3 metres. However, a lack of control information in some photographs meant this could not always be achieved. The rectification of all but four photographs was supported by DTM (Digital Terrain Model) to eliminate inaccuracies caused by undulations across the survey area. This contour data was obtained from current 1:10,000 scale OS plans.

In addition to these maps, where available, first or second edition OS map plans were also consulted to eliminate the possibility of former field boundaries being confused for earlier features visible as earthworks or cropmarks.

Where features were plotted from more than one photograph the correlation between photogrammetric plots was in most cases good, and also compares well with the geophysical plan. During the course of the survey forty-five individual AERIAL plots were prepared, all of which were incorporated into the final drawing.

Appendix 2 consists of a list of the digital files created during the course of the survey, giving file name, maximum residual error and the reference number of the digitised photograph.

Cartographic representation

The AutoCAD drawing has been layered by archaeological features such as ditches, banks, buildings (former buildings on WWII radar station), structures (upstanding remains of Saxon Shore fort), WWII features such as gun emplacements, slit trenches and bomb craters and areas of amorphous parching. These areas of parching may possibly indicate the presence of buried building remains in the vicinity of the Roman fort and associated settlement. Full details of the conventions and layers used can be found in Appendix 3. A map of archaeological features can be found in Appendix 5 and a composite map featuring the archaeological sites, geology and contour data can be found in Appendix 6.

THE ARCHAEOLOGICAL SITES

Introduction

The survey area extended across 15 square km, but there were very few archaeological sites recorded outside the immediate area of the Roman fort at Richborough. This is due mainly to local topographic and geological factors emphasising the difference between the sandy island of Richborough and the surrounding deposits of alluvium and clay on the eroded lower lying ground. Richborough Island has been the focus for settlement activity from at least the late Iron Age. The sandy soils of Richborough Island and the higher ground to the south-west naturally lend themselves to cropmark generation, being well drained and more prone to drying out, causing greater soil moisture differentials between any buried features and the surrounding soil.

The aerial survey revealed a high concentration of archaeological features, mostly attributed to the Roman settlement of the site, located in the immediate vicinity of the fort. All these features have been plough levelled and are only visible as cropmarks. The majority of these features were only seen on the most recent set of aerial photographs taken by English Heritage Aerial Survey in July 2001. These were the most informative set of photographs consulted during the whole project, and it is felt that there is considerable scope for further aerial reconnaissance of Richborough fort and its environs.



Figure 2 - View of the fort with the traces of the adjacent settlement visible as cropmarks NMR TR3260/116 (21266/04) 16-JUL-2001 © English Heritage (NMR)

It should be noted that virtually all the features comprising the Roman settlement were seen as ditches on the aerial photographs. These ditches have been interpreted as the robbed-out foundation trenches of the buildings. Stone robbing of this nature is a common feature of sites located in areas where there is a lack of local naturally available building stone. This is illustrated by the discovery of large flints and fragments of Carrara marble from Richborough which had been incorporated into the foundations of a 13th century chapel on Mary-le-Bone Hill, over 2km to the south of the fort.

The lower areas were tidally submerged marshland, or fully submerged by the sea at the time of the Roman occupation of the site. These would have been the last areas to be farmed and settled as silting and land reclamation took place into the medieval and post medieval periods. Of note are the earthwork remains of several lengths of early sea wall. The Monk's Wall (pre 1280 AD), extends from the south of Sandwich, past Richborough and encloses the Ash Levels on the southern side of the River Stour. This is mirrored on the northern side of the river by the Abbot's Wall. The course of both these earthworks can be seen on the current OS 1:2500 scale map.

Consequently, these areas were not generally expected to yield any archaeological features of any significant age. It is also recognised that water-logged soils do not lend themselves readily to the formation of cropmarks. Today this land is characteristically low-lying, artificially drained pasture.

Where earlier features have been located, they have been found in these lower lying areas through augering and excavation. The course of the Roman causeway of Watling Street to the west of the fort between Richborough Island and Fleet Farm was located by Ogilvie in 1957 over a foot beneath the present land surface under centuries of sediment accumulation (Ogilvie 1957 in Cunliffe 1968). It is not usual to detect such features on aerial photographs.

Dowker in 1872 suggested that there could be some significance in the place naming of Fleet Farm at the western end of the causeway – Fleet being the Saxon name for a port or harbour. He suggested that the inlet in the north-western side of Richborough Island could have been a harbour used at the time of the Roman occupation of the site, prevailing into Anglo Saxon times until it eventually silted up.

The development of the Roman settlement at Richborough

The settlement to the west of the Roman fort at Richborough has been completely plough-levelled. However, the extensive remains of the settlement have been detected both through extensive aerial survey throughout the entire site, and locally through geophysical survey which was carried out by EH CfA in 2001. The site of Richborough fort has been the target for aerial reconnaissance since the 1920s when it was first photographed from the air during the Bushe-Fox excavations. However it is the most recent photographs of the site taken in July 2001 which have proved to be the most informative, revealing numerous previously unrecorded features within the settlement as cropmarks.

The settlement appears to have two distinct areas lying on totally different alignments, linked by a curving stretch of metalled roadway. The roadway appears to have been in use for quite some considerable length of time, the settlement expanding and developing around it. This is the one feature which has been consistently visible as a cropmark throughout several decades of aerial reconnaissance, possibly due to repeated re-metalling over time creating a considerable depth of compacted material.

The area of settlement to the immediate west of the fort is aligned on the NNE-SSW axis of the rectilinear grid formed by the roads within the fort which extend westwards through the western gate of the fort heading towards the mainland. To the north and south of this main E-W road traces of numerous structures, probable buildings and ditches have been recorded, all of which respect the alignment of this road and the fort. However, further to the south-west is an area of development with a NE-SW alignment. It is possible that this part of the settlement may have pre-dated or grown up at the same time as the settlement development adjacent to the fort. It is possible that the two areas of the settlement represent the Roman settlement adjacent to the fort and the contemporary (and possibly earlier) native settlement. This could explain why there are two separate nuclei of settlement where there is no obvious reason, topographic or other for this change in alignment.

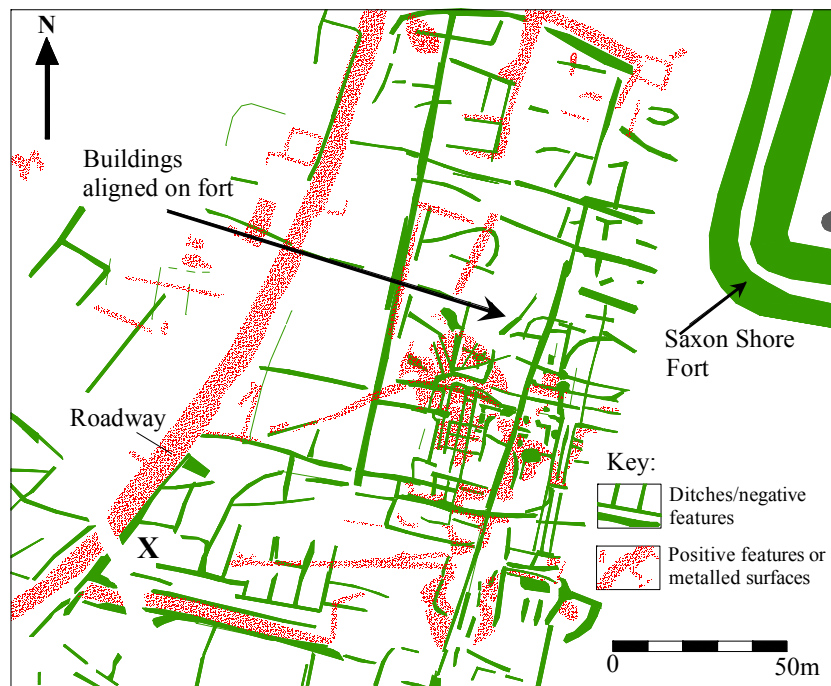


Figure 3 – Plan of building X within the south-eastern quarter of Richborough Roman settlement

Where elements of the two areas meet there is some indication of the two alignments overlapping, particularly immediately to the north of the Amphitheatre at TR 3205 5997, but it is not possible to say which pre-dates the other without excavation of the site. The roadway ran between the two areas curving to accommodate the differing alignments. There is an example at TR 3214 6002 of a building respecting the

alignment of the fort, but also that of the road as it begins to curve to the south-west, resulting in a block (X) with one corner forming an angle of 65°. It is apparent that this road was a main route through the town for most of the life of the settlement. This too is an area that would greatly benefit from excavation.

There is evidence of late Iron Age occupation on Richborough Island with occupation layers, ditches and pottery from c.75BC discovered beneath the site of the earlier Roman fort during the Bushe-Fox excavations (1922-38). The report for Richborough from Kent SMR suggests from pottery and coin evidence that Richborough was in use as a port/harbour in the 1st century BC. This is not surprising considering the fact that Richborough Island was a prominent island amongst marshes and tidal channels at this time and a suitable location for settlement.

Scope for further research

The fort at Richborough has been extensively studied and excavated by a long list of interested parties from the nineteenth century onwards, culminating in the Bushe-Fox excavations in the 1920's and 1930s.

However, apart from the occasional passing comment or note and discoveries of two temples and a large building during the construction of the railway line in the 1840s, there has been little or no work done on the settlement known to have existed beyond the walls and earthwork ditches of the fort.

The fort and surrounding area have been the focus of aerial reconnaissance since the first aerial photographs of the fort were taken in the 1920's during the Bushe-Fox excavations. Subsequent photography has recorded the cropmark remains of a road and tantalising glimpses of buildings and areas of parching suggesting the presence of further settlement remains to the west, north-west and south-west of the fort. Photographs taken by English Heritage in July 2001 revealed the largest extent the remains surviving as cropmarks – a network of roads and numerous rectilinear enclosures interpreted as the robbed-out foundations of buildings. This was mirrored by the detailed results of the CfA's geophysical survey of the site also carried out in 2001.

There is considerable scope for a more intensive programme of aerial reconnaissance of Richborough and its environs. Historically, most aerial photographs have been focused on the Saxon Shore fort, only a few sorties extending beyond the immediate area of the fort.

Only a very sketchy picture exists of the routes taken by the Roman roads out of Richborough. Until quite recently much of the land to the west of Richborough Island not under pasture has been used for orchards. Now many orchards are being cleared, thus making the chance of locating sites previously obscured by the trees more likely.

Through the combined aerial and geophysical surveys carried out by English Heritage for this project a picture of a complex multi-phase settlement has been revealed. However, without complementary excavation it is virtually impossible to

attempt to date the numerous phases of building and development which has taken place on the site. Gaining access to the main areas of the settlement has proved difficult, but from the combined aerial and geophysical surveys it should be possible to locate areas where peripheral parts of the settlement can be investigated within land adjacent to the fort to which English Heritage has access.

Features in the vicinity of the fort

Richborough fort is centred at TR3241 6018 and comprises the stone built Saxon Shore fort surrounded by contemporary double concentric earthwork ditches dating from around AD 275. Within the stone fort are the earthwork remains of the earlier and short lived earthen fort in the form of three concentric ditches dating from the mid 3rd century AD. These inner ditches surround the remains of the Great Foundation, the base of a monumental archway constructed around 85 AD. The remaining features comprise the excavated remains of several buildings (including a possible mansio and bath house, and an early Christian baptismal font) and other structures, which like the earthwork remains of the fort, were revealed by the Bushe-Fox excavations of the site and left open and exposed after the work was over. The interior of the fort was excavated extensively under Bushe-Fox between 1926 and 1938 and no additional detail could be added from aerial photographs to these plans of the site (Bushe-Fox 1924).

The majority of the features recorded during this survey were found concentrated around the site of the Roman fort on Richborough Island. Most of these features were associated with the various phases of Roman occupation, though there were a number of other sites which postdate the Roman remains, most of which were identified as WWII defences. For the purpose of this report the individual features which make up the Roman settlement, where appropriate, have been described and recorded separately. These sites were listed as follows:

1. TR 3237 6019 – TR 3248 6047. The fragmented remains of the earliest recorded Roman feature at Richborough were visible as earthworks within the fort and as a fragmented cropmark to the north of the fort. This took the form of two parallel ditches which have been attributed to the period of the Claudian invasion, and believed to represent the primary bridgehead defences of the invading forces. This defence was short-lived, being rapidly replaced as the site was established as a town and port.

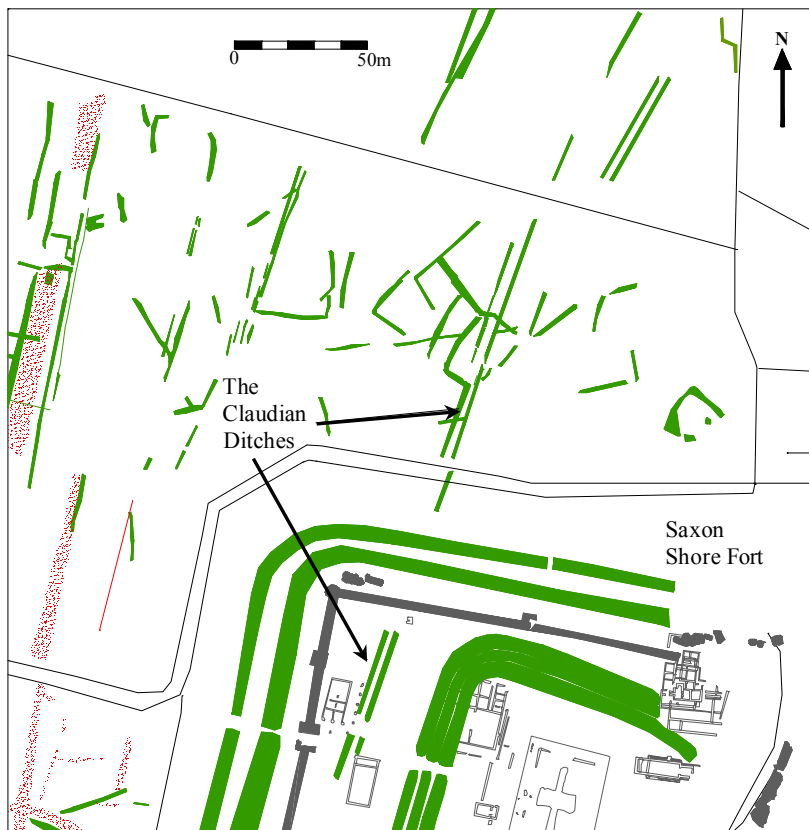


Figure 4 – The relationship of the Claudian Ditches, the later phases of the fort and fragmented cropmarks of the adjacent settlement at Richborough

(Background mapping © Crown Copyright and database right 2002. All rights reserved. Ordnance Survey Licence number 100019088)

Immediately to the east of these ditches the fragmented cropmark remains of two further parallel ditches were also traced for 44.5m between TR 3247 6041 and TR 3249 6045. These ditches may well be associated with the construction of the Claudian defences.

There are two sections visible as earthworks, one measuring 17m in length, and the other 35m. This part was excavated as part of the Bushe-Fox excavations of the site between 1922 and 1938, and left as open ditches. North of the fort the ditches have been traced for a further 200m, gently curving to the NNE. The full extent of this pair of ditches was traced during the Bushe-Fox excavations. Interestingly, this pair of ditches was not detected by the geophysical survey undertaken by the CfA in 2001.

NMR 35NW 97.

Source AP's- MAL/78027 249 19-AUG-1978 & NMR TR 3260/117 (212266/5) 16-JUL- 2001

2. TR 3241 6036. A group of sub-rectangular conjoined enclosures, possibly a building seen on a different alignment to and cutting across the line of the Claudian ditches to the north of the fort. These were defined by ditches (possibly robbed out footings) and visible as cropmarks. From the aerial photographic evidence alone it is not possible to say whether they pre-or post-date the Claudian ditches.

NMR TR36SW 48

Source AP – NMR TR 3260/117 (212266/5) 16-JUL-20013.

3. TR 3200 5995 – TR 3223 6023. Curving SSW through the main area of the Roman settlement to the west of the Saxon Shore fort the course of a road could be traced for over 395m as a clear cropmark. This road branches off the main E-W road, which leaves the Roman fort through its western gate, heading inland towards Canterbury. This road is the one feature which has been consistently visible as a cropmark throughout several decades of aerial reconnaissance, possibly due to repeated re-metalling over time creating some depth of compacted material. The road has numerous side branches, probably forming the narrow streets and alleys between the blocks of buildings which made up the settlement. The road curves away from the fort, passing to the north of the amphitheatre rather than leading to it. The buildings flanking the road change their alignment to mirror that of the road. This may indicate the settlement developed outwards from the fort where the buildings are aligned on the fort. This is discussed further below.

The continuation of the course of this road can be traced as a cropmark for a further 175m to the north of the main E-W road. The fragmented traces of both the side ditches and two stretches of metalled surface were clearly visible as a cropmark. The course of the road is cut at several points by the ditches of earlier or later structures. This road appears to be heading out of the settlement to the north, possibly to a second beaching or port on the northern edge of Richborough Island.

NMR/SMR No. TR35NW 221

Source AP - NMR TR 3260/117-118 (212266/5-6) 16-JUL-2001

4. TR 3205 5980. The earthwork/cropmark remains of the eroded/plough-levelled Roman amphitheatre were seen c.340m to the south-west of the fort. The site appears as an oval enclosure, measuring approximately 80m x 95m, defined by a broad embankment broken by the two entrances to the north-east and south-west. Both entrances are defined by a pronounced thickening and outward bulging of the enclosing embankment. On either side of the embankment, mid-way between the two entrances there appears to be a sub-circular pit or depression cut into the bank of the amphitheatre. It is not clear what these two features represent but they were also noted during the geophysical survey. The mound has been badly eroded by ploughing, but was in very much its present condition when recorded on photographs taken in 1942 and has been under pasture for much of the twentieth century, hopefully ensuring no further erosion of the site will occur.

NMR TR35NW1

Source AP's – AFL 13 and 18 (CUCAP) 14-JUN-1962

5. TR 3223 6006. The cropmark remains of a building complex of some considerable size located to the south-west of and on the same alignment as the Roman fort. This site is situated on the top of the slope which leads down to the supposed site of the Roman port. The plan of this group of buildings was visible as the cropmarks of the robbed out foundation trenches. The paler marks around and within which have been interpreted as the spreads of fallen masonry rubble. Though fragmented, the cropmarks are clear enough to enable the plan of individual rooms to be identified. In the north-western area of the complex a block of twelve or more

rooms, all approximately 3.5m x 4m, can be seen. The traces of further walls and can be seen around these rooms.

This particular site was more prominent on the aerial photographs possibly due to its location which facilitated the removal of topsoil which appears to have been deposited at the bottom of the slope to the south. The thinner soils enable cropmark generation to occur more readily than deeper soils with more moisture retention.



Figure 5 - The cropmark remains of the building complex south-west of the fort. NMR TR3260/39 (1661/399) 16-JUL-1979 © Crown copyright NMR

NMR/SMR No. TR36SW 48

Source AP - NMR TR 3260/37-39 (1661/397-399) 16-JUL-1979

6. TR 3208 6037. A sub-rectangular area of parching indicative of underlying compacted ground seen as a cropmark in the north-western section of the Roman settlement. Generally, the cropmark is indistinct, but the western edge of the area is marked by a very clearly defined edge indicating that the feature or underlying structure is man-made. Within the main feature are areas of darker or negative/cut features, but these could represent later quarrying or robbing. This part appears to be separated from the eastern section and may represent the remains of a roadway. It is also cut by numerous contemporary or later fragmented ditches. Further fragments of these ditched structures were also recorded to the north of this feature.

NMR TR36SW 96

Source AP - JASAIR/R15/2490/247 12-JUL-90 & NMR TR 3260/117 (212266/5) 16-JUL-2001

7. TR 3221 6030. The traces of a single large building or block of buildings which were seen as lodging in the crop on a single set of Cambridge University photographs. Though the remains are very fragmented it is possible to identify the foundation trenches of a building or part of a building measuring 28m x 34m. Further detail of this and other features including an adjacent metalled road linear ditches and the traces of further buildings to the north were recorded from recent EH photography of the site taken in 2001.

This building is located adjacent to the course of one of the main N-S roads through the Roman settlement and is on the same alignment as the fort and the eastern area of the settlement. However, these features are all cut through by a number of parallel ditches of unknown date.

NMR36SW 48

Source APs – CUCAP AU 27 – 28 (date uncertain) and NMR TR 3260/117 (212266/5) 16-JUL-2001

8. TR 3201 6025. The fragmented cropmark remains of a large rectilinear ditch-defined enclosure which was recorded in the western region of the Roman settlement immediately to the south of the main E-W road from the fort. The northern and eastern sides of the enclosure are not clear, but it is probable that if it is contemporary with the Roman settlement and would have abutted the southern side of the road. It is estimated that the enclosure would have had a width of c.50m and an estimated length of between 58m and 80m, the eastern side not being visible, probably obscured by the houses and gardens of Castle Farm Cottages. Modern development obscures any remains which may be present to the north of the road.

Here, as with other parts of the settlement, there are numerous ditches and traces of banks or positive structures which cut through (post-and pre-dating) other features making it difficult to separate the various features and phases.

Extending south-west and at right angles from this enclosure the cropmark remains of a broad metalled road can also be seen. The metalled area could only be traced for 128m and traces of one of the side ditches for another 35m.

NMR TR36SW 48

Source APs – NMR TR 3260/38 (1661/392) 16-JUL-1979, NMR TR 3260/116-118 (21266/04-06) 16-JUL-2001 and NMR TR 3260/106-107 (21306/20-21) 16-JUL-2001

9. TR 3190 5975. The outline of a possible building (possibly Roman) seen as a sub-rectangular enclosure. This feature was visible as a positive cropmark 18m x 25m located on the south-western edge of the settlement.

NMR TR36SW 48

Source AP – TR 3259/9 (NMR 1740/207) 01-APR-1980

10. TR 3161 6017. The cropmark remains of a windmill mound with the cropmark traces of a central cross shaped depression from the foundations of the

post structure clearly visible. The mound is located on a small south facing promontory and is enclosed within a circular ditch with a diameter of c.33m. Attached to the south-eastern side of this is an incomplete U-shaped ditch defined annexe measuring 35m x 45m. Within this are traces of further indistinct features which lie on the south-eastern edge of the windmill mound. It is not clear if these features are associated with the remains of the windmill mound, but it is possible that the windmill was located on a site previously occupied by an earlier site, possibly a settlement.

NMR/SMR TR36SW 32. NB. This site has also been recorded in a separate record (TR36SW 53) as 'Ring ditches'.

Source AP – TR 3160/2 (NMR 2176/096) 03-AUG-1984 and ADI 76 (CUCAP) 14-JUN- 1961

11. TR 3173 6019 – 3178 6017 and TR 3186 6013. The fragmented cropmark remains of two parallel linear ditches aligned NW-SE, the longest of which measures c.53m. This may represent a fragment of Roman road leading north-west out of the Roman settlement, and appears to continue in the next field to the south-east as a positive feature 70m long, possibly the agger of a road. The combined length of both these features is 145m.

NMR TR36SW 98

Source AP- TR 3160/2 (NMR 2176/096) 03-AUG-1984

12. TR 3190 6013. The cropmark remains of a semi-circular single ditched feature abutting the western side of the modern field boundary to the west of the remains of the Roman settlement. The feature had a diameter of c.45m and was visible on aerial photographs taken in 1946 and 1950 and cannot be explained.

NMR TR36SW 99

Source APs – RAF 106G/UK/5122 04-APR-1946 and RAF 541/599 3083-4 27-JUL-1950

13. On the north-western edge of Richborough Island there were a group of dispersed fragmented features which may be associated with the Roman fort and settlement. All were noted on SMR vertical: HSL/Kent/R25/6644-5 17-JUL-1967 and are described individually below.

a) TR 3147 6018 – TR 3155 6024. The cropmark remains of a linear ditch c.100m in length aligned NE-SW down the north-western slope of the island.

NMR TR36SW 100

b) TR 3158 6030. The cropmark remains of a pit and two ditches, possibly a fragmented enclosure of unknown date which may be associated with the Roman fort and settlement.

NMR TR36SW 100

c) **TR 3144 6049.** An elongated macula (negative feature) of unknown date and origin noted at the foot of the slope on the very north-west of Richborough Island. This may well be a natural feature and has been mapped but not recorded separately.

d) **TR 3148 6039 – TR 3160 6036.** Probably a natural feature which appears as a gully or hollow way leading down the north-western slope of Richborough Island immediately to the south of the Fleet Causeway. This may have been used as a possible route from the shore to the settlement. This feature has been mapped but not recorded separately.

14. TR 3167 6041 – TR 3173 6038. The faint traces of a linear feature c. 73m in length situated to the west of Castle Farm which is almost certainly the remains of the Roman road leading out of the town towards Fleet Farm and beyond. It was visible as a cropmark on recent aerial photographs.

NMR TR36SW 101

Source AP – TR 3260/113-113 (NMR 21307/02-03) 16-JUL-2001

15. TR 3253 6055. The earthwork remains of a length of crenelated WWII slit trench located in the corner of the modern field to the north of the Roman fort at Richborough. To the south at TR 3252 6046 is a second shorter slit trench located at the edge of the same field.

NMR TR36SW 102

Source AP – RAF 106G/UK/1378 5122 04-APR-1946

16. cTR3237 6005. Five WWII gun emplacements/gun pits which were seen located immediately to the south of the Saxon Shore fort at Richborough. These were visible on aerial photographs taken by the RAF in 1946 recorded as follows:

a) **TR 3239 6006.** A penannular embanked depression seen as an earthwork with a diameter of 10m and situated on the cliff edge south of the fort.

Source AP – RAF 106G/UK/1378 5122 04-APR-1946

b) **TR 3237 6005.** A sub-circular embanked depression with a diameter of 10m seen as an earthwork and situated on the cliff edge south of the fort.

Source AP – RAF 106G/UK/1378 5122 04-APR-1946

c) **TR 3231 6008.** A circular embanked enclosure with an internal sub-division and a diameter of 9.5m. This was seen as an earthwork located immediately to the south of the south-western corner of the Saxon Shore fort.

Source AP – RAF 106G/UK/1378 5122 04-APR-1946

d) **TR 3227 6002.** The earthwork remains of an embanked figure-of-eight-shaped enclosure measuring 12.8m x 7.5m situated to the west of the car park, south of the Saxon Shore fort. This site coincided with a very strong anomaly recorded during the

geophysical survey of the area, perhaps indicating the presence of some of the concrete or metal structures surviving within the gun pit.

Source AP – RAF 106G/UK/1378 5122 04-APR-1946

e) TR 3230 6003. The site of a possible gun pit located immediately to the west of the car park. This appeared as a circular ditched enclosure measuring c.9m in diameter with traces of an internal pit.

SMR TR36SW 50

Source AP - RAF 106G/UK/1378 5122 04-APR-1946

17. TR 3225 5982 – 3228 5985. The earthwork remains of probable WWII slit trenches with crenelated form which were seen situated on the cliff edge north-east of the amphitheatre extending for c.41m.

NMR TR36SW 189

Source AP – RAF 106G/UK/1178 3026 20-FEB-1946

18. TR 3222 5976. A length of WWII slit trench visible as an earthwork to the east of the amphitheatre. The trench appeared fragmented and could be traced for c.16m.

NMR TR36SW 189

Source AP – RAF 106G/UK/1178 3026 20-FEB-1946

19. TR 3203 5974. The earthwork/cropmark remains of a length of crenelated WWII slit trench located to the south of the Roman amphitheatre. Photographs of taken on the 26th March 1942 clearly show this trench being excavated. This slit trench produced a very strong geophysical signature and was clearly visible on the geophysical survey of the site.

NMR TR36SW 115

Source APs – HLA/430 6 092, 101 26-MAR-1942, RAF 106G/UK/1178 3026 20-FEB-1946 and AFL 13 and 18 (CUCAP) 14-JUN-1962

20. TR 3205 5980. The earthwork/cropmark remains of a single WWII gun pit excavated into the south-eastern flank of the Roman amphitheatre. This site showed as a very strong geophysical anomaly.

NMR TR36SW 190

Source APs – HLA/430 6 092, 101 26-MAR-1942, RAF 106G/UK/1178 3026 20-FEB-1946 and AFL 13 and 18 (CUCAP) 14-JUN-1962

21. Located to the south-west of Richborough Island are the earthwork remains of two probable medieval/post medieval moats. Both lie at around 3-4m OD on the southern edge of the sandy deposits of the Thanet Beds. No written reference to either site has been found yet. Both sites are described below:

Source APs – NMR TR 3159/3 (1828/284) 22-JUL-1980 and NMR TR3259/18-20 (2131/0148-0150) 17-FEB-1983

a) TR 3176 5977. The earthwork remains of a probable moated enclosure approximately 47m x 69m enclosing an area of c. 51m x 33m. There is a break in the moat, possibly a causeway in the north-western side, and to the north of this a drain or feeder ditch could be seen branching out of the main moat. Two groups of cottages collectively referred to as Lowton on the first edition map were marked immediately to the north-east of this moat, and were described by G. Dowker in his account of researches at Richborough dating from 1872. In his account he noted “From the number of Roman remains found here, I should conjecture this to have been the site of the Roman town. No excavations, so far as I am aware, have ever been made here, but in the dry summer of 1865, traces of foundations were visible in the corn”. However, at no point in his account is any reference made to the presence of a moated enclosure.

NMR TR36SW 191

A curving road associated with the Roman settlement (visible as a cropmark and described in 3 above) appears to be heading towards this moated enclosure, possibly indicating that this may have been the location of a beaching or crossing point during the Roman occupation of the island.

b) TR 3168 5996. The earthwork remains of a possible moated enclosure with a broad moat 49m x 53m and a relatively small rectangular platform or island measuring 10m x 21m. Leading south-west from the moat a single drain or feeder ditch could be traced for 90m to where it terminates at a modern drainage ditch. This site is located c.145m to the north-west of the possible moat described above.

NMR TR36SW 192

22. TR 3211 6062. The cropmark remains of a number of linear ditches on the north-western edge of the known extent of the vicus. These ditches have the more the appearance of boundaries than the traces of robbed out foundations, but it is not clear whether they are contemporary with or associated with the Roman fort and settlement. These features are less clear than others recorded in the vicinity of the fort, lying in a field which has consistently been under pasture when photographed, and only visible on recent high level vertical aerial photographs held by Kent County Council. The southern-most feature centred at TR 3209 6057 is more massive in form with the appearance of a hollow way.

NMR TR36SW 103

Source AP – JASAIR/R15/2490 247 12-JUL-1990

Features from the wider survey area

Beyond the edges of Richborough Island very few archaeological sites were recorded on the available aerial photographs. These sites were recorded as follows:

1. TR 3018 5755 – TR 3025 5773. The cropmark remains of a possible length of Roman road visible as a positive feature (possibly an agger) with traces of a side ditch on either side. It is aligned NNE-SSW and can be traced for 192m. A ditch of c.64m in length extends at a perpendicular from its western side.

NMR TR36SW 193

Source AP – Kent SMR Vertical JASAIR/L16/2490 634 12-JUL-1990.

2. TR 3055 5779 – TR 3061 5788. The cropmark remains of a possible length of road visible as a positive linear feature aligned NE-SW and measuring c. 118m in length. This feature appears to be on the same alignment as and may be a continuation of (3) and (4) below.

NMR TR36SW 184

Source AP- Kent SMR Vertical JASAIR/L16/2490 634 12-JUL-1990.

3. TR 3087 5829 – TR 3098 5846. The cropmark remains of two possible lengths of road aligned NE-SW measuring 114m and 38m in length respectively. These two linear features appear to be in the same alignment and may be a continuation of the possible length of road described in (2) above and (4) below.

NMR TR36SW 195

Source AP - Vertical JASAIR/L16/2490 634 12-JUL-1990.

4. TR 3110 5860 – TR 3119 5872. The cropmark remains of a single length of possible road traceable for 115m. The feature is aligned NE-SW, on the same alignment as and possibly a continuation of linears described in (2) and (3) above.

NMR TR36SW 196

Source AP - Vertical JASAIR/L16/2490 634 12-JUL-1990.

5. c TR 3003 5839. A group of features visible as cropmarks centred at TR 3003 5839. These features coincide with the location of numerous finds including metal objects possibly indicating the site of an Iron Age-Romano British/Roman settlement. To the north-east of this field the course of a minor Roman road and remains of an associated settlement have been discovered through excavation (Hicks 1992) and it is likely that the features to the south-west are associated with this settlement. The settlement has been recorded by the NMR and SMR as TR35NW 221.

The features recorded on aerial photographs have been recorded as follows:

a) **TR 3000 5815.** A curved length of ditch c47m long, possibly part of an incomplete enclosure of unknown date which was visible as a cropmark.

NMR TR36SW 197

Source AP- Vertical JASAIR/L16/2490 634 12-JUL-1990.

b) **TR 2996 5831.** The faint rectilinear cropmark remains of a possible building foundation (possibly Roman). This site lies just outside the project area, but was thought to be worthy of note.

NMR TR36SW 64

Source APs - NMR TR 30581/1 (1661/414) 16-JUL-1979 and NMR TR 3058/2-4 (2120/0134-6) 14-JUN-1982.

c) **TR 3004 5839.** An incomplete sub-rectangular enclosure possibly of IA/RB date measuring 27m x 30m. The enclosure is defined by a single ditch, but has traces of a second inner ditch on the south-eastern side where there is a terminally defined entrance. Two of the sides are straight, while a third is slightly convex. The north-western side is not visible.

NMR TR36SW 198

Source APs – NMR TR 30581/1 (1661/414) 16-JUL-1979 and NMR TR 3058/2-4 (2120/0134-6) 14-JUN-1982.

d) **TR 3009 5843.** The cropmark remains of an incomplete curvilinear single ditched enclosure with a diameter of c.17.5m and traces of internal pits. The western side of the enclosure is not visible. Adjacent to this enclosure is a linear ditch (TR 3010 3843 – 3010 5847) which may be associated with the site. This is aligned NNE-SSW and can be traced for 25m. Both these features may be associated with the IA/RB settlement thought to occupy this site.

NMR TR36SW 198

Source APs – NMR TR 30581/1 (1661/414) 16-JUL-1979 and NMR TR 3058/2-4 (2120/0134-6) 14-JUN-1982.

e) **TR 3005 5846.** The cropmark remains of a probable incomplete curvilinear enclosure possibly associated with the supposed IA/RO settlement on this site. The enclosure is defined by a single ditch and has a diameter of c.17m.

NMR TR36SW 198

Source APs – NMR TR 30581/1 (NMR 1661) 16-JUL-1979 and NMR TR 3058/2-4 (NMR2120/0134-6) 14-JUN-1982.

6. TR 3144 5854 – TR 3246 5776. The earthwork remains of a line of WWII bomb craters from a single stick of bombs which could be seen curving in an arc to the north-west of Sandwich. These were recorded at the following grid references:

TR 3144 5854, TR 3167 5822, TR 3182 5807, TR 3196 5793, TR 3206 5783 and TR 3246 5776. There appear to be two gaps in the otherwise regularly spaced line of craters, which may indicate the presence of unexploded bombs. The approximate location of bombs potentially missing from the group would be in the region of TR 3156 5836 and TR 3232 5777.

NMR TR36SW 199

Source AP's – RAF 541/513 4008-9 10-MAY-1950 and RAF 58/1111 0012 05-MAY-1953

7. TR 3224 5808. The low earthwork/cropmark remains of what is thought to be a large motte and bailey at a site known as Mary-le-Bone Hill. The site appears as a low circular mound surrounded by a broad ditch, possibly a motte, with a diameter of 68m. In the centre of the mound there is a rectilinear depression synonymous with a building foundation, however, on photographs taken in 1945 a small rectilinear structure thought to be a WWII gun pit was noted at this location. It is not certain if the two features are connected with one another.

Attached to the southern side of this enclosure is a second sub-circular enclosure with a broad ditch measuring 73m x 98m. To the west of the supposed bailey and to a lesser extent to the north-east of the supposed motte are a number of interconnecting ditches which may be associated with the drainage/water supply to the site. The site is low lying, occupying a low promontory on the well-drained Thanet Beds to the west of Sandwich. Despite its name, at no point does the 'hill' rise to the height of the 5m contour.

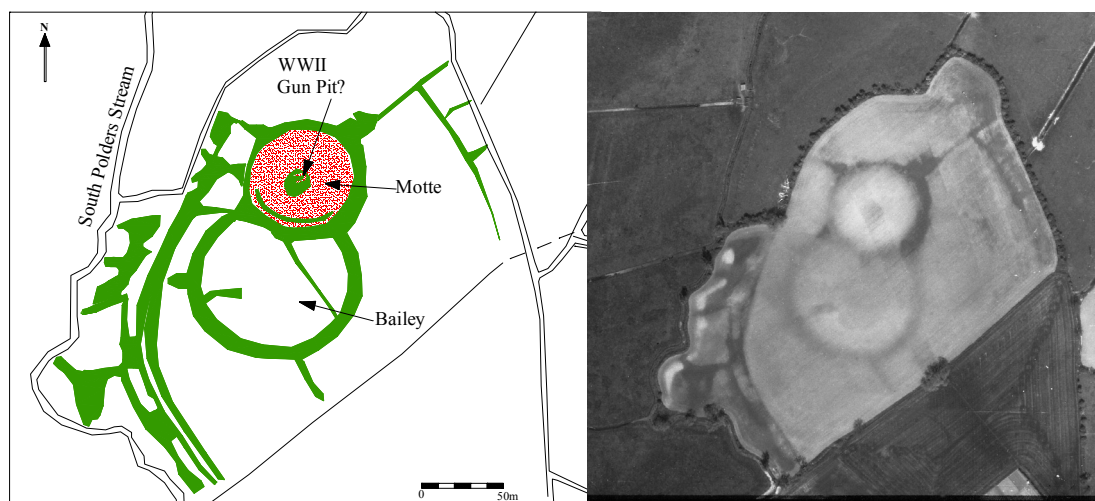


Figure 6 – a) Plan of the possible motte and bailey b) aerial photograph of Mary-le-bone. (Background mapping © Crown Copyright and database right 2002. All rights reserved. Ordnance Survey Licence number 100019088; RAF 541/513 4008-9 10-MAY-1950 English Heritage (NMR) RAF Photography)

The site is suggested as a possible motte and bailey by the NMR, but there is no record in the SMR of a motte and bailey at this location. The name Mary-le-Bone Hill is a recent corruption, the site being called Marrowbone hill on the 1871 OS plan. On

the south-western mound the SMR notes the possible foundations of a 13th century chapel which include large flints and fragments of Carrara marble which has most probably been robbed from the Roman fort at Richborough. This may have been the early site of The Maldry, a Sandwich leper hospital or possibly connected with an enclosure by Leeds Priory in the early 14th century which was the subject of a law suit.

Motte and bailey – NMR TR35NW 114

Chapel – NMR/SMR TR35NW 47

Source APs – RAF 106G/LA/90 4052 04-JAN-1945, RAF 541/513 4008-9 10-MAY-1950 and RAF 58/1111 0012 05-MAY-1953.

8. TR 3170 5707 and TR 3203 5702. Two WWII bomb craters visible as earthworks to the south west of Sandwich.

NMR TR36SW 200

Source AP – RAF 106G/UK/1178 3030-2 20-FEB-1946

9. TR 3269 5823. The earthwork remains of a possible WWII bomb crater on the western edge of Sandwich.

NMR TR36SW 201

Source AP – RAF 106G/LA/90 4054 04-JAN-1945

10. TR 3201 5872. A WWII radar station with later post war additions. The radar station was established at the start of the war as a Ground Control Intercept (GCI) Station which functioned to direct aircraft close enough to incoming enemy aircraft to enable use of their own radar. The site comprised numerous buildings from several phases of development, including a modified 'Happidrome', a stand-by set house, and Identifier Friend or Foe building and a number of masts of varying types for transmission and receiving. Of note is a Type 7 transmitter/receiver with a large rotating aerial at TR 3189 5866. Also scattered around the site were a number of gun pits to provide protection to the site.

NMR TR36SW 173

Source AP – RAF 541/388 4056-8 10-NOV-1949

11. TR 3164 5865. A rectilinear enclosure constructed out of what appears to be corrugated sections of prefabricated concrete with slight banks built up against the upright walls. The enclosure measures c. 21m x 21m and has an entrance to the south, opening onto the A257 the main E-W Sandwich to Canterbury road. It is thought to be military in origin, possibly a depot. However, the site is not obviously in use when photographed during the Second World War, and is thought to originate from the First World War. When photographed in 1979 the site appeared overgrown and the western side was damaged or missing.

Also noted along the verge of the road were a series of evenly spaced depressions seen stretching for approximately 1km. These have been suggested to be war time weapons or explosives caches (Roger Thomas 2002, pers com).

NMR TR36SW 202

Source APs – RAF 106G/UK/1178 3029-30 20-FEB-1946, RAF 541/513 4008 10-MAY-1950 and MAL/05/79 019 01-MAR-1979

12. TR 3157 5967. The earthwork remains of three small oval mounds of unknown date or function which were seen located in a low lying field with post medieval drainage ditches. They lie c.12m apart in a NW-SE line and range in size from 5.6m x 8m to 6m x 7m. These have also been recorded on the SMR: TR 35 NW 110.

NMR TR36SW 110

Source AP - TR 3059/2/252 01-MAR-1979

13. TR 3060 6048 – TR 3079 6047. The faint earthwork remains of a low bank 195m long and 12m wide aligned east-west to the west of Fleet Farm. It is possible that this is part of the course of the Roman road which extends westwards from Richborough to a causeway north-east of Fleet Farm.

NMR TR36SW 104

Source AP – TR 3060/1/248 01-MAR-1976

14. TR 3151 6107. The earthwork remains of a probable WWII bomb crater.

NMR TR36SW 105

Source AP – RAF 541/388 3048 10-NOV-1949

15. TR 3179 6105. The remains of a small oval embanked earthwork enclosure, possibly post medieval in date which was seen located on a small promontory beside a small stream or post medieval drain. The enclosure measures approximately 12m x 15m. The bank of the water course appears to have been artificially built up.

NMR TR36SW 106

Source AP – RAF 541/388 3048 10-NOV-1949

16. TR 3240 6081. A probable WWI or WWII gun pit in the form of an elongated mound with a lobed cross-shaped trench in its eastern end. This trench appears to be lined with pre-cast curved sections of concrete and may extend further beneath the mound.

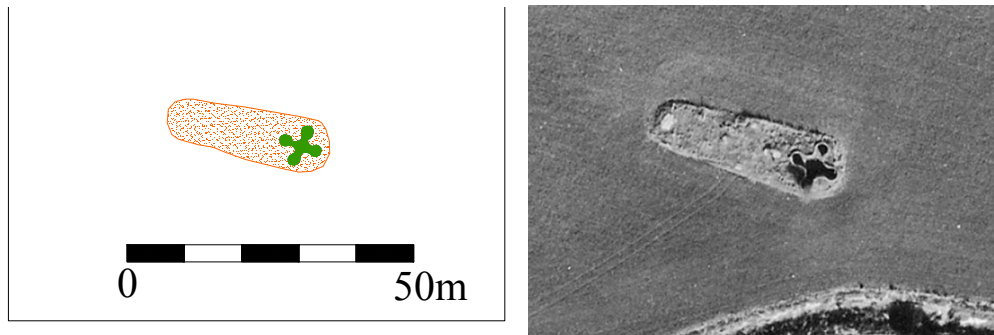


Figure 7a & 7b - Illustration and aerial view of the probable gun pit at TR 3240 6081. Extract of photograph: MAL 0479/105 01-MAR-1979. © Binnie & Partners

There is a faint perpendicular bank at its western end which appears to be associated with the main feature. The site was first noted on RAF vertical photographs taken in 1946. If this site is a gun pit, it is a form not previously recorded in this area. The lining to the trench appears to be very similar in form and scale to that which has been seen forming a square enclosure at TR 3164 5865 (record No.15 above). A WWII date has been suggested for this site.

NMR TR36SW 107

Source AP: MAL 0479/105 01-MAR-1979

17. TR 3273 6019. A single probable WWII bomb crater seen as an earthwork.

NMR TR36SW 108

Source AP – RAF 106G/UK/1378 5122 04-APR-1956

18. TR 3215 6088 and TR 3228 6078. Probable post medieval drainage ditches visible as cropmarks in a single field to the north of Richborough Island.

NMR/SMR TR36SW 52

Source AP: JASAIR R15/2490/247 12-JUL-1990

19. TR 3252 6170. The earthwork remains of a single probable WWII bomb crater. No trace of further craters from the same episode of bombing could be identified in the immediate vicinity apart from a single crater to the north-west at TR 3209 6205, located just outside the limits of the survey area.

NMR TR36SW 109

Source AP: RAF 106G/UK/1110 3080-2 10-JAN-1994

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APPENDICES

APPENDIX 1 – Photographic sources index

Oblique Photographs Consulted

NGR Index	Accession number	Frame	Date flown	Repository
TR2957/1	NMR 1745	399-400	15-APR-1980	NMR
TR2957/3-4	NMR 18114	03-04	07-AUG-1998	NMR
TR2957/5-6	NMR 18099	28-29	07-AUG-1998	NMR
TR3058/1	NMR 1661	414-415	16-JUL-1979	NMR
TR3058/2-4	NMR 2120	0134-0136	14-JUN-1982	NMR
TR3059/2	NMR 906	251-252	01-MAR-1976	NMR
TR3060/1-2	NMR 906	247-250	01-MAR-1976	NMR
TR31561-2	NMR 18114	01-02	07-AUG-1998	NMR
TR3156/3-4	NMR 18099	26-27	07-AUG-1998	NMR
TR3159/2	NMR 1740	210-213	01-APR-1980	NMR
TR3159/3	NMR 1828	283-289	22-JUL-1980	NMR
TR3160/1-3	NMR 2176	095-097	03-AUG-1984	NMR
TR3258/2	NMR 1105	2-3	14-MAR-1977	NMR
TR3258/3	NMR 1110	1	14-MAR-1977	NMR
TR3258/4	NMR 1110	9-10	14-MAR-1977	NMR
TR3258/5-6	NMR 1106	9-10	14-MAR-1977	NMR
TR3259/4	NMR 1661	400-406	16-JUL-1979	NMR
TR3259/5	NMR 1661	412-413	16-JUL-1979	NMR
TR3259/6	NMR 1671	117-119	16-AUG-1979	NMR
TR3259/7-8	NMR 1676	354-360	20-AUG-1979	NMR
TR3259/9	NMR 1740	207-209	01-APR-1980	NMR
TR3259/10	NMR 2131	0143	17-FEB-1983	NMR
TR3259/11	NMR 2131	0146	17-FEB-1983	NMR
TR3259/12	NMR 2134	1131	26-APR-1983	NMR
TR3259/13	NMR 2137	26	28-JUN-1983	NMR
TR3259/14	NMR 2121	1108	05-JUN-1982	NMR
TR3259/15	NMR 2176	098	03-AUG-1984	NMR
TR3259/16	NMR 2176	100	03-AUG-1984	NMR
TR3259/17	NMR 2131	0147	17-FEB-1983	NMR
TR3259/18	NMR 2131	0148	17-FEB-1983	NMR
TR3259/19	NMR 2131	0149	17-FEB-1983	NMR
TR3259/20	NMR 2131	0150	17-FEB-1983	NMR
TR3259/21	NMR 2131	0144	17-FEB-1983	NMR
TR3259/22	NMR 2131	0145	17-FEB-1983	NMR
TR3259/23	NMR 2134	1132	26-APR-1983	NMR
TR3259/24	NMR 2134	1133	26-APR-1983	NMR
TR3259/25	NMR 2176	099	03-AUG-1984	NMR
TR3259/26	NMR 2176	101	03-AUG-1984	NMR
TR3259/27	NMR 2121	1109	05-JUL-1982	NMR
TR3259/28	NMR 18113	18	07-AUG-1998	NMR
TR3259/29	NMR 18113	19	07-AUG-1998	NMR
TR3259/30	NMR 18113	20	07-AUG-1998	NMR
TR3259/31	NMR 18099	23	07-AUG-1998	NMR
TR3259/35	NMR 21307	04	16-JUL-2001	NMR
TR3259/36	NMR 21307	05	16-JUL-2001	NMR
TR3259/37	NMR 21307	06	16-JUL-2001	NMR
TR3259/38	NMR 21307	07	16-JUL-2001	NMR
TR3259/39	NMR 21266	03	16-JUL-2001	NMR
TR3260/1	CCC 8487	2702	unknown	NMR
TR3260/2	CCC 8487	2703	unknown	NMR
TR3260/3	CCC 8487	2704	unknown	NMR

NGR Index	Accession number	Frame	Date flown	Repository
TR3260/4	CCC 8487	2705	unknown	NMR
TR3260/5	CCC 8487	2706	unknown	NMR
TR3260/6	CCC 8487	2707	unknown	NMR
TR3260/7	CCC 8487	2708	unknown	NMR
TR3260/8	CCC 8487	2709	unknown	NMR
TR3260/9	CCC 8487	2711	unknown	NMR
TR3260/10	CCC 8487	2713	unknown	NMR
TR3260/11	CCC 8487	2714	unknown	NMR
TR3260/12	CCC 8487	2716	unknown	NMR
TR3260/13	CCC 8487	2717	unknown	NMR
TR3260/14	CCC 8487	2712	unknown	NMR
TR3260/15	CCC 8487	2718	unknown	NMR
TR3260/16	CAP 7745	29	26-JUN-1948	NMR
TR3260/17	CAP 7973	70	29-JUN-1949	NMR
TR3260/18	KAS 9767	ORACLEF1	unknown	NMR
TR3260/19	KWG 9792	ORACLEF10	01-JAN-1960	NMR
TR3260/20	KWG 9792	ORACLEF11	01-JAN-1960	NMR
TR3260/21	KWG 9792	ORACLEF12	01-JAN-1960	NMR
TR3260/24	NMR 906	227-229	01-MAR-1976	NMR
TR3260/25	NMR 906	231&233	01-MAR-1976	NMR
TR3260/26	NMR 906	234-236	01-MAR-1976	NMR
TR3260/27	NMR 906	237&240	01-MAR-1976	NMR
TR3260/28	NMR 906	241-243	01-MAR-1976	NMR
TR3260/29	NMR 906	244-246	01-MAR-1976	NMR
TR3260/36	NMR 1661	379-385	16-JUL-1979	NMR
TR3260/37	NMR 1661	386-389	16-JUL-1979	NMR
TR3260/38	NMR 1661	391-393	16-JUL-1979	NMR
TR3260/39	NMR 1661	394-399	16-JUL-1979	NMR
TR3260/40	NMR 1661	407-410	16-JUL-1979	NMR
TR3260/41	NMR 1671	110	06-AUG-1979	NMR
TR3260/42	NMR 1671	111&113	06-AUG-1979	NMR
TR3260/43	NMR 1671	120-121	06-AUG-1979	NMR
TR3260/44	NMR 1676	352-353	20-AUG-1979	NMR
TR3260/45	NMR 1676	361-364	20-AUG-1979	NMR
TR3260/46	NMR 1676	365-366	20-AUG-1979	NMR
TR3260/47	NMR 1763	198	28-MAY-1980	NMR
TR3260/49	NMR 2101	316	05-FEB-1982	NMR
TR3260/50	NMR 2101	320	05-FEB-1982	NMR
TR3260/51	NMR 2101	322	05-FEB-1982	NMR
TR3260/52	NMR 2101	324	05-FEB-1982	NMR
TR3260/53	NMR 2107	0092	09MAR-1982	NMR
TR3260/54	NMR 2107	0094	09MAR-1982	NMR
TR3260/55	NMR 2107	0096	09MAR-1982	NMR
TR3260/56	NMR 2120	0129	14-JUN-1982	NMR
TR3260/57	NMR 2120	0131	14-JUN-1982	NMR
TR3260/58	NMR 2121	1106	05-JUL-1982	NMR
TR3260/59	NMR 2121	1110	05-JUL-1982	NMR
TR3260/60	NMR 2176	102	03-AUG-1984	NMR
TR3260/61	NMR 2176	105	03-AUG-1984	NMR
TR3260/62	NMR 2176	106	03-AUG-1984	NMR
TR3260/63	NMR 1671	114-116	06-AUG-1979	NMR
TR3260/65	NMR 2663	161-164	25-APR-1986	NMR
TR3260/66	NMR 2134	1129	26-APR-1983	NMR
TR3260/67	NMR 2134	1130	26-APR-1983	NMR
TR3260/68	NMR 2176	103	03-AUG-1984	NMR
TR3260/69	NMR 2176	104	03-AUG-1984	NMR
TR3260/70	NMR 2101	317	05-FEB-1982	NMR
TR3260/71	NMR 2101	318	05-FEB-1982	NMR

NGR Index	Accession number	Frame	Date flown	Repository
TR3260/72	NMR 2101	319	05-FEB-1982	NMR
TR3260/73	NMR 2101	321	05-FEB-1982	NMR
TR3260/74	NMR 2101	323	05-FEB-1982	NMR
TR3260/75	NMR 2101	325	05-FEB-1982	NMR
TR3260/76	NMR 2101	326	05-FEB-1982	NMR
TR3260/77	NMR 2107	0093	09-MAR-1982	NMR
TR3260/78	NMR 2107	0095	09-MAR-1982	NMR
TR3260/79	NMR 2107	0097	09-MAR-1982	NMR
TR3260/80	NMR 2121	1107	05-JUL-1982	NMR
TR3260/81	NMR 2121	1111	05-JUL-1982	NMR
TR3260/82	NMR 2121	1112	05-JUL-1982	NMR
TR3260/83	NMR 2121	1113	05-JUL-1982	NMR
TR3260/84	NMR 2121	1114	05-JUL-1982	NMR
TR3260/85	NMR 2121	1115	05-JUL-1982	NMR
TR3260/86	NMR 2120	0130	14-JUN-1982	NMR
TR3260/87	NMR 2120	0132	14-JUN-1982	NMR
TR3260/88	NMR 2120	0133	14-JUN-1982	NMR
TR3260/94	NMR 18113	15	07-AUG-1998	NMR
TR3260/106	NMR 21306	20	16-JUL-2001	NMR
TR3260/107	NMR 21306	21	16-JUL-2001	NMR
TR3260/108	NMR 21306	22	16-JUL-2001	NMR
TR3260/109	NMR 21306	23	16-JUL-2001	NMR
TR3260/110	NMR 21306	24	16-JUL-2001	NMR
TR3260/111	NMR 21307	01	16-JUL-2001	NMR
TR3260/112	NMR 21307	02	16-JUL-2001	NMR
TR3260/113	NMR 21307	03	16-JUL-2001	NMR
TR3260/114	NMR 21266	01	16-JUL-2001	NMR
TR3260/115	NMR 21266	02	16-JUL-2001	NMR
TR3260/116	NMR 21266	04	16-JUL-2001	NMR
TR3260/117	NMR 21266	05	16-JUL-2001	NMR
TR3260/118	NMR 21266	06	16-JUL-2001	NMR
TR3260/119	NMR 21266	07	16-JUL-2001	NMR
TR3260/120	NMR 21266	08	16-JUL-2001	NMR
TR3260/121	NMR 21266	09	16-JUL-2001	NMR
TR3357/1	KWG 9792	97	01-JAN-1960	NMR
TR3357/2	KWG 9792	96	01-JAN-1960	NMR
TR3357/3	KWG 9792	99	01-JAN-1960	NMR
TR3357/4	NMR 1105	9	14-MAR-1977	NMR
TR3358/2	NMR 9792	ORACLEF13	01-JAN-1960	NMR
TR3358/2	NMR 906	253-255	01-MAR-1979	NMR
TR3358/4	NMR 1105	4	14-MAR-1977	NMR
TR3358/5	NMR 1105	5	14-MAR-1977	NMR
TR3358/6	NMR 1105	6	14-MAR-1977	NMR
TR3358/7	NMR 1105	7	14-MAR-1977	NMR
TR3358/8	NMR 1105	8	14-MAR-1977	NMR
TR3358/9	NMR 1105	10	14-MAR-1977	NMR
TR3358/10	NMR 1105	11	14-MAR-1977	NMR
TR3358/11	NMR 1105	12	14-MAR-1977	NMR
TR3358/12	NMR 1110	2	14-MAR-1977	NMR
TR3358/13	NMR 1110	3	14-MAR-1977	NMR
TR3358/14	NMR 1110	4	14-MAR-1977	NMR
TR3358/15	NMR 1110	5-6	14-MAR-1977	NMR
TR3358/16	NMR 1110	7	14-MAR-1977	NMR
TR3358/17	NMR 1110	8	14-MAR-1977	NMR
TR3358/18	NMR 1110	11	14-MAR-1977	NMR
TR3358/19	NMR 1106	6-7	14-MAR-1977	NMR
TR3358/20	NMR 1106	8	14-MAR-1977	NMR

Vertical Photographs Consulted

Library	Sortie	Frame	Date	Repository
295	106G/UK/1378	5103-5106	04-APR-1946	MOD
295	106G/UK/1378	5120-5125	04-APR-1946	MOD
295	106G/UK/1378	5130-5136	04-APR-1946	MOD
295	106G/UK/1378	7132-7138	04-APR-1946	MOD
295	106G/UK/1378	7149-7155	04-APR-1946	MOD
1065	541/508	3076-3083	22-APR-1950	MOD
1075	541/480	3087-3094	07-APR-1950	MOD
1075	541/480	3130-3138	07-APR-1950	MOD
1075	541/480	3152-3157	07-APR-1950	MOD
1075	541/480	4087-4094	07-APR-1950	MOD
1075	541/480	4130-4138	07-APR-1950	MOD
1075	541/480	4152-4156	07-APR-1950	MOD
1520	82/1006	5-9	31-AUG-1954	MOD
1520	82/1006	5-9	31-AUG-1954	MOD
2406H	HSL/UK/72/84	6234-6236	13-JUL-1972	AEL
2406H	HSL/UK/72/84	6253-6255	13-JUL-1972	AEL
2594	541/599	3072-3076	27-JUL-1950	MOD
2594	541/599	3081-3085	27-JUL-1950	MOD
2594	541/599	4072-4075	27-JUL-1950	MOD
2594	541/599	4081-4084	27-JUL-1950	MOD
2605	541/513	3003-3011	10-MAY1950	MOD
2605	541/513	3014-3020	10-MAY1950	MOD
2605	541/513	3028-3036	10-MAY1950	MOD
2605	541/513	3041-3044	10-MAY1950	MOD
2605	541/513	4003-4011	10-MAY1950	MOD
2605	541/513	4014-4020	10-MAY1950	MOD
2605	541/513	4028-4036	10-MAY1950	MOD
2605	541/513	4041-4044	10-MAY1950	MOD
2632	541/388	3036-3049	10-NOV-1949	MOD
2632	541/388	4037-4044	10-NOV-1949	MOD
2632	541/388	4047-4058	10-NOV-1949	MOD
3406	106G/UK/1178	3026-3033	20-FEB-1946	MOD
3406	106G/UK/1178	4033-4040	20-FEB-1946	MOD
3440	106G/UK/1110	3039-3051	10-JAN-1946	MOD
3440	106G/UK/1110	3056-3060	10-JAN-1946	MOD
3440	106G/UK/1110	3077-3089	10-JAN-1946	MOD
3440	106G/UK/1110	4037-4048	10-JAN-1946	MOD
3440	106G/UK/1110	4051-4055	10-JAN-1946	MOD
3440	106G/UK/1110	4078-4078	10-JAN-1946	MOD
3592	58/1111	8-13	05-MAY-1953	FD
5299	MAL/68003	39	28-JAN-1968	NMR
5299	MAL/68003	42-43	28-JAN-1968	NMR
6544	26J/8/3	13	21-SEP-1941	FDM
6544	26J/8/3	14-19	21-SEP-1941	FDM
6544	26J/8/3	25	21-SEP-1941	FDM
6544	26J/8/3	26	21-SEP-1941	FDM
6560	2C/UK925	26	05-JUN-1942	MOD
6560	2C/UK925	27-30	05-JUN-1942	MOD
6560	2C/UK925	32	05-JUN-1942	MOD
6560	2C/UK925	33-35	05-JUN-1942	MOD
7498	MAL/78027	247	19-AUG-1978	NMR
7498	MAL/78027	249	19-AUG-1978	NMR
7561	MAL/79004	87	01-MAR-1979	NMR
7561	MAL/79004	89	01-MAR-1979	NMR
7561	MAL/79004	91	01-MAR-1979	NMR
7561	MAL/79004	93	01-MAR-1979	NMR

Library	Sortie	Frame	Date	Repository
7561	MAL/79004	95	01-MAR-1979	NMR
7561	MAL/79004	97	01-MAR-1979	NMR
7561	MAL/79004	99	01-MAR-1979	NMR
7561	MAL/79004	101	01-MAR-1979	NMR
7561	MAL/79004	103	01-MAR-1979	NMR
7561	MAL/79004	105	01-MAR-1979	NMR
7561	MAL/79004	107	01-MAR-1979	NMR
7561	MAL/79004	109	01-MAR-1979	NMR
7561	MAL/79004	134	01-MAR-1979	NMR
7561	MAL/79004	136	01-MAR-1979	NMR
7561	MAL/79004	138	01-MAR-1979	NMR
7561	MAL/79004	140	01-MAR-1979	NMR
7561	MAL/79004	142	01-MAR-1979	NMR
7561	MAL/79004	144	01-MAR-1979	NMR
7561	MAL/79004	146	01-MAR-1979	NMR
7561	MAL/79004	148	01-MAR-1979	NMR
7561	MAL/79004	150	01-MAR-1979	NMR
7561	MAL/79004	152	01-MAR-1979	NMR
7561	MAL/79004	154	01-MAR-1979	NMR
7561	MAL/79004	156	01-MAR-1979	NMR
7562	MAL/79005	11	01-MAR-1979	NMR
7562	MAL/79005	13	01-MAR-1979	NMR
7562	MAL/79005	15	01-MAR-1979	NMR
7562	MAL/79005	17	01-MAR-1979	NMR
7562	MAL/79005	19	01-MAR-1979	NMR
7562	MAL/79005	21	01-MAR-1979	NMR
7562	MAL/79005	23	01-MAR-1979	NMR
7562	MAL/79005	25	01-MAR-1979	NMR
2562	MAL/79005	27	01-MAR-1979	NMR
2562	MAL/79005	29	01-MAR-1979	NMR
7562	MAL/79005	31	01-MAR-1979	NMR
7562	MAL/79005	33	01-MAR-1979	NMR
7628	MAL/79003	223	27-FEB-1979	NMR
7628	MAL/79003	225	27-FEB-1979	NMR
7628	MAL/79003	227	27-FEB-1979	NMR
7628	MAL/79003	229	27-FEB-1979	NMR
7628	MAL/79003	231	27-FEB-1979	NMR
7628	MAL/79003	233	27-FEB-1979	NMR
7628	MAL/79003	235	27-FEB-1979	NMR
7628	MAL/79003	237	27-FEB-1979	NMR
7628	MAL/79003	239	27-FEB-1979	NMR
7628	MAL/79003	241	27-FEB-1979	NMR
7628	MAL/79003	243	27-FEB-1979	NMR
7628	MAL/79003	245	27-FEB-1979	NMR
8334	106G/LA	3004-3012	04-JAN-1945	MOD
8334	106G/LA	3052-3054	04-JAN-1945	MOD
8334	106G/LA	4004-4012	04-JAN-1945	MOD
8334	106G/LA	4028-4032	04-JAN-1945	MOD
8334	106G/LA	4051-4058	04-JAN-1945	MOD
8454	HLA/430	6087	02-JAN-1942	FDM
8454	HLA/430	6088	02-JAN-1942	FDM
8454	HLA/430	6089	02-JAN-1942	FDM
8454	HLA/430	6090	02-JAN-1942	FDM
8454	HLA/430	6101	02-JAN-1942	FDM
8454	HLA/430	6102	02-JAN-1942	FDM
11426	OS/64004	7-9	10-MAR-1964	NMR
11427	OS/64018	94-95	12-MAY-1964	NMR

APPENDIX 2 - AERIAL digital file index

Aerial file	Photograph	Date flown	Maximum error (metres)	DTM
TR3058f1fr 415	NMR 1661/415	16-JUL-1979	±1.2	Y
TR3058fr4	NMR 2120/0136	14-JUN-1982	±2.1	Y
TR3059f2fr252	NMR 906/252	01-MAR-1976	±0.6	Y
TR3159f3	NMR 1828/284	22-JUL-1980	±0.7	Y
TR3160fr2	NMR 2179/096	03-AUG-1984	±1.1	Y
TR3258f35	NMR 21307/04	16-JUL-2001	±1.7	Y
TR3259f9fr207	NMR 1740/207	?-AUG-1980	±0.5	Y
TR3259fr20	NMR 2131/0150	17-FEB-1983	±2.7	Y
TR3259fr35	NMR 2176/099	16-JUL-2001	±2.7	Y
TR3259fr35c	NMR 2176/099	16-JUL-2001	±1.7	Y
TR3259fr35d	NMR 2176/099	16-JUL-2001	±1.7	Y
21266fr118	NMR 21266/06	16-JUL-2001	±1.2	Y
21266fr8	NMR 21266/8	16-JUL-2001	±1.7	Y
21266fr5	NMR 21266/5	16-JUL-2001	±1.3	Y
TR3260fr18	KAS 9767/ORAC1	unknown	±1.2	Y
TR3260f36fr385	NMR 1661/385	16-JUL-1979	±1.6	Y
TR3260f38fr391	NMR 1661/391	16-JUL-1979	±2.2	Y
TR3260f39fr394	NMR 1661/394	16-JUL-1979	±1.5	Y
TR3260f39fr394b	NMR 1661/391	16-JUL-1979	±1.3	Y
TR3260fr46	NMR 1676/366	20-AUG-1979	±1.7	Y
TR3260fr65	NMR 2663/161	25-APR-1986	±1.1	Y
TR3260fr81	NMR 2121/1111	05-JUL-1982	±0.5	Y
TR3260fr108	NMR 21306/22	16-JUL-2001	±1.0	Y
TR3260fr119	NMR 21266/07	16-JUL-2001	±1.8	Y
MAL0479fr144	MAL/79004 144	01-MAR-1979	±1.2	Y
MAL0479fr142	MAL/79004 142	01-MAR-1979	±0.7	Y
MAL24927fr0084	MAL/78027 0084	19-AUG-1978	±1.5	Y
MAL0479fr103	MAL/70004 103	01-MAR-1979	±1.7	N
106GUK1378fr5122	RAF106G/UK/1378 5122	04-APR-1946	±1.7	Y
106GLA190 4028	RAF106G/LA90 4028	04-JAN-1945	±2.0	N
541388 3048	RAF541/388 3048	10-NOV-1949	±1.2	Y
106GUK1110fr3058	RAF106G/UK/1110 3058	10-JAN1946	±2.5	Y
106GUK1378fr5122	RAF106G/UK/1378 5122	04-APR-1946	±1.4	Y
106GUK1378fr5122r	RAF106G/UK/1378 5122	04-APR-1946	±1.5	Y
541fr513 3042	RAF 541/513 3042	10-MAY-1950	±1.9	N
AFL13	AFL 13 (CAP)	14-JUN-1962	±1.7	Y
AFL18	AFL 18 (CAP)	14-JUN-1962	±1.3	Y
ADI79	ADI 79 (CAP)	14-JUN-1961	±1.1	Y
AU28	AU28 (CAP 7745)	26-JUN-1948	±2.0	Y
HSLR25fr6644	HSLKentR25/6644	17-JUL-1967	±2.5	Y
AF95c386R11fr8978	Aerofilms/95c/386/R11/8978	24-JUL-1995	±2.4	Y
JAS R152490fr647	JASAIR/R15/5249 647	12-JUL-1990	±2.3	Y
JAS R152490fr647	JASAIR/R15/5249 647	12-JUL-1990	±3.0	N
JAS R162490fr634	JASAIR/R15/5249 634	12-JUL-1990	±2.1	Y
106GLA90fr4045	106G/LA/90 4045	04-JAN-1945	±1.2	N

APPENDIX 3 - Mapping Conventions

These mapping conventions have been adapted from the standard NMP (National Mapping Program) conventions with inclusion of additional layers appropriate to this project.

All cut features e.g. Ditches, hollow ways pits etc
Using Ditch layer in AutoCAD



*WWII cut features have been mapped on a separate layer
in a darker green.

Earthwork or Cropmark Banks
Using Bank and Bankout layers in AutoCAD



** WWII features visible as banks have been mapped on a separate
layer depicted in orange.

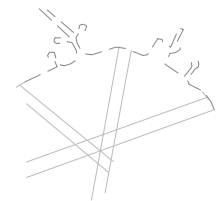
WWII bomb craters
Using Bombcrater layer in AutoCAD for the crater and WWIIbankout
and WWIIbank for any upcast earth around the crater.



Richborough Castle walls and former buildings associated with the
WWII radar station.
Using the Stonework and Building layers in AutoCAD



Large area features, such as airfields, depicting
the extent of the feature (using the Extent of area
layer in AutoCAD), and the main features
(using the Structure or Stonework layers in
AutoCAD).



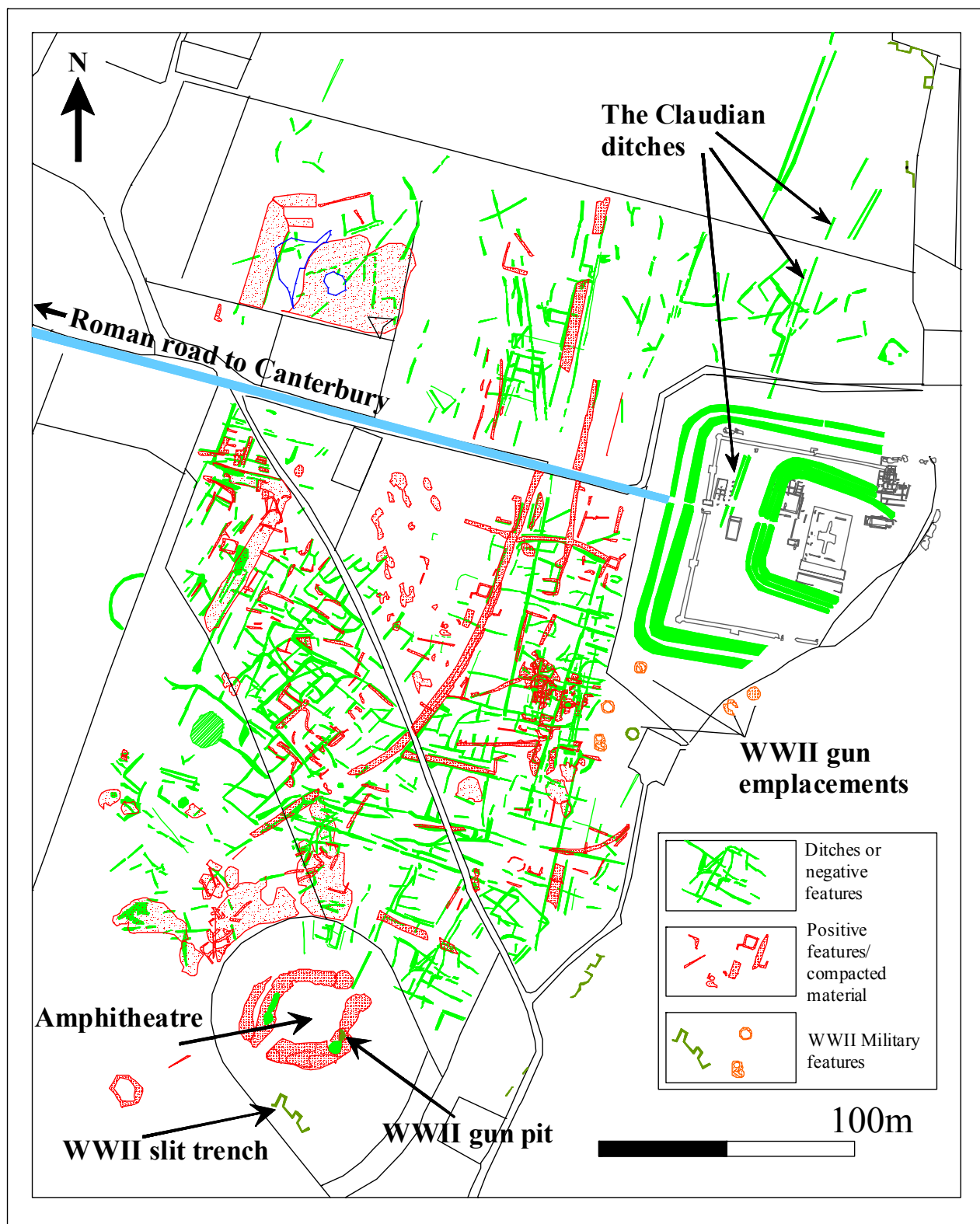
Large cut features, such as quarries, ponds, using the
Large cut feature layer in AutoCAD



APPENDIX 4 - AutoCAD Layers

Layer Name	Colour	Linetype
BANK All banks (created on “bankout” layer) filled with stipple,'dots', at a scale of 2.25 and an angle of 53°	1 (red)	N/A
BANKOUT Outline of banks	1 (red)	CONTINUOUS
BOMB CRATER WWII bomb craters	30 (orange)	CONTINUOUS
DITCH Negative features such as ditches, pits and small ponds	3 (green)	CONTINUOUS
EXTENT OF AREA Depicting the extent of large area features e.g. airfields, Military camps and mining/extraction	8 (grey)	CONTINUOUS
GRID Grid at 1km intervals on one OS 1:10,000 quarter sheet,	7 (white)	CONTINUOUS
LARGE CUT FEATURE Depicting large cut features such as quarries and ponds	5 (blue)	ISO02W100
STONEMWORK Depicting stonework e.g. walls, cairns, standing stones and concrete building platforms	8 (grey)	CONTINUOUS
STRUCTURE Used to depict features which do not easily fit into other categories because of their form e.g. tents, radio masts, painted camouflaged airfields	9(grey)	CONTINUOUS
WW2BANK Bank outlines for all WW2 features	30 (orange)	CONTINUOUS
WW2BANKOUT Outline of banks of WW2 features	30 (orange)	CONTINUOUS
WW2DITCH Negative features such as ditches and pits of WWII date	72 (green)	CONTINUOUS

APPENDIX 5 – Archaeological features



Richborough fort and the adjacent settlement and amphitheatre

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