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# North East Coast Rapid Coastal Zone Assessment Survey

Air Survey Mapping Report

English Heritage National Mapping Programme

Historic Environment Enabling Programme: Project Number 3929

AMIE Parent Collection: EHCO1/094

AMIE Event: 1453221

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Archaeological Research Services Ltd

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## 1 SUMMARY

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This aerial survey mapping project forms part of the North East Rapid Coastal Zone Assessment Survey (NE RCZAS), funded by English Heritage (EH) through the Historic Environment Enabling Programme (3929 MAIN) and undertaken by Archaeological Research Services Ltd (ARS Ltd) in partnership with EH. The aerial survey mapping component of the project was undertaken by ARS Ltd Investigators based with EH's Aerial Survey team in York.

The survey area consists of complete 1km squares which cover a strip of land from the lowest astronomical tide level to within 1km inland, along the coast between Whitby and the Anglo-Scottish border. Digital maps at a nominal scale of 1:10,000 and supporting records were produced to National Mapping Programme (NMP) standards for an area of 560km<sup>2</sup> (62 part OS 1:10,000 quarter sheets) of which only 402km<sup>2</sup> covers exposed land, the remainder falls within the inter-tidal zone. In only mapping a narrow corridor along the coast this project deviates from the normal NMP practice of mapping whole 1:10,000 map quarter sheets. Mapping started on 1<sup>st</sup> March 2007 and was completed by 22<sup>nd</sup> July 2008 (Event No. 1453221).

The project mapped and recorded archaeological sites varying in date and type from prehistoric enclosures to twentieth century military remains. Records for 968 new sites, with a further 270 enhancements to existing records, were input to the National Monuments Record (NMR) database AMIE.

The project was also carried out in collaboration with Cambridge University's Unit for Landscape Modelling, their contribution being the loan of aerial photographs from their library (CUCAP). Other project partners included North Yorkshire County Council, North York Moors National Park, Tees Archaeology, Tyne and Wear Council, Durham County Council, Northumberland County Council, The Northumberland Coast AONB and the Durham Heritage Coast; their contribution being the loan of material from their air photo collections, provision of HER data and repositories for the project's GIS.

## 2 INTRODUCTION

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This air photo mapping project is one element of the North East Coast Rapid Coastal Zone Assessment Survey (NE RCZAS). This is a desk-based survey that aims to improve the archaeological record of the coastal zone within the various Local Authority Historic Environment Records (HERs) and to assist the formulation of long-term strategies for the management of that resource, especially in light of the current Shoreline Management Plans (SMPs; DEFRA 2001).

The standards adopted are those of the National Mapping Programme (NMP), which are intended to produce a comprehensive record of the archaeology of England, from prehistory to modern times, through the interpretation, mapping and recording of all archaeological features visible as earthworks, cropmarks, parchmarks, soilmarks and structures on aerial photographs.

This interim report provides a brief overview of the results of the aerial survey mapping element of the project.

### 3 PROJECT MANAGEMENT

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The project was funded by English Heritage (EH) and undertaken by Archaeological Research Services Ltd (ARS Ltd). Drs Clive Waddington & Richard Chatterton were the project managers and Dr Chris Tolan-Smith was the project officer for ARS Ltd. The other members of the Project Team were Robin Daniels (Tees Archaeology) who represented all the local authority partners, and Jacqui Huntley as the EH scientific adviser. Dr Jonathan Last (EH) was the Project Assurance Officer.

Dr Cinzia Bacilieri, in her role as Air Photo Team Leader, provided quality assurance for the AP mapping phase of the project. Cinzia Bacilieri, Sally Radford, Gemma Pallant (March – August 2007), Daniel Van den Toorn (November 2007 – February 2008), David Knight (April – July 2008) and Melanie Partlett (February – April 2008) carried out the air photo mapping and recording, working alongside EH's Aerial Survey team in York, supervised by Dave MacLeod (EH). Yvonne Boutwood and Matt Oakey (EH) provided training and support, offering advice on matters of interpretation, mapping, recording and NMP standards. They also carried out final NMP quality assurance checking to ensure that the work was carried out to NMP standards: approximately 5% of the work of each ARS Ltd team member was checked. They also helped with one-to-one training of new team members in all aspects of air photo interpretation, closely monitoring them until they achieved NMP standards.

The project ran for 17 months and started on 1<sup>st</sup> March 2007 and mapping and recording was completed by 22<sup>nd</sup> July 2008.

## 4 SCOPE OF THE SURVEY

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### 4.1 Geographical Scope

The aim of the aerial survey mapping element of the project was to produce accurate mapping and a record of all archaeological features from all periods that could be identified within the study area.

The project area extends across the following authorities (from north to south): Northumberland County Council, Tyne and Wear Metropolitan Borough Council, County Durham, the unitary authorities of Hartlepool, Middlesbrough, Stockton-On-Tees, Redcar and Cleveland and North Yorkshire County Council. With the exception of Whitby, the majority of the project that runs through North Yorkshire lies almost whole within the North York Moors National Park.

The aerial photographic interpretation and mapping focused on the strip of land from the lowest astronomical tide to a width of 1km in-land from the high tide level and running from the Anglo-Scottish border in the North to Whitby in the South (Figure 1). The project area falls over 62 quarter 1:10 000 scale map sheets (Appendix 1) and the mapping maintained full 1km squares within the map sheets. This amounts to an area of 560km<sup>2</sup> but only c. 402km<sup>2</sup> covers exposed land, and the remainder falls within the inter-tidal zone. This met the requirement of English Heritage's National Mapping Programme (NMP), using the same methodology and scope as the NMP. The project area was divided into 'blocks' to assist management of the photographic loans from the NMR photo library.

In June 2008 an additional 33Km<sup>2</sup> were added to the initial project area of 527km<sup>2</sup> as defined by the Project Design, totalling 560km<sup>2</sup>. It was felt that the project area would have benefited from extra coverage of the inter-tidal and inland zones between Holy Island and the coastal hinterland. This variation increased the original project area to include two further quarter sheets (NU 03 NE and NU 13 SW) from the original 60 defined in the Project Design (Figure 2).

The project area overlaps with those previously mapped in recent years by three NMP projects and consequently these areas were not re-mapped.

#### *Hadrian's Wall World Heritage Site NMP Project (Event no. 1360986)*

The Hadrian's Wall WHS NMP Project covers part of the NE RCZAS in Tyne and Wear, specifically quarter sheets NZ36NE and NZ36SE. These two quarter sheets were already mapped to NMP specifications and were therefore not remapped for this project.

#### *The Till-Tweed NMP Project (Event no. 1378874)*

The Till-Tweed NMP Project covers part of the NE RCZAS in Northumberland, specifically quarter sheets NT95SE and NU05SW. These two quarter sheets were

already mapped to NMP specifications and were therefore not remapped for this project.

*Project Variation for Durham-Assessment of Archaeological Resource in Aggregate Areas NMP project (Event no. 1454180)*

The Project Variation for the Durham Assessment Project covers part of the NE RCZAS in Durham, specifically quarter sheet NZ 44 NW. This quarter sheet was already mapped to NMP specifications and was therefore not remapped for this project.



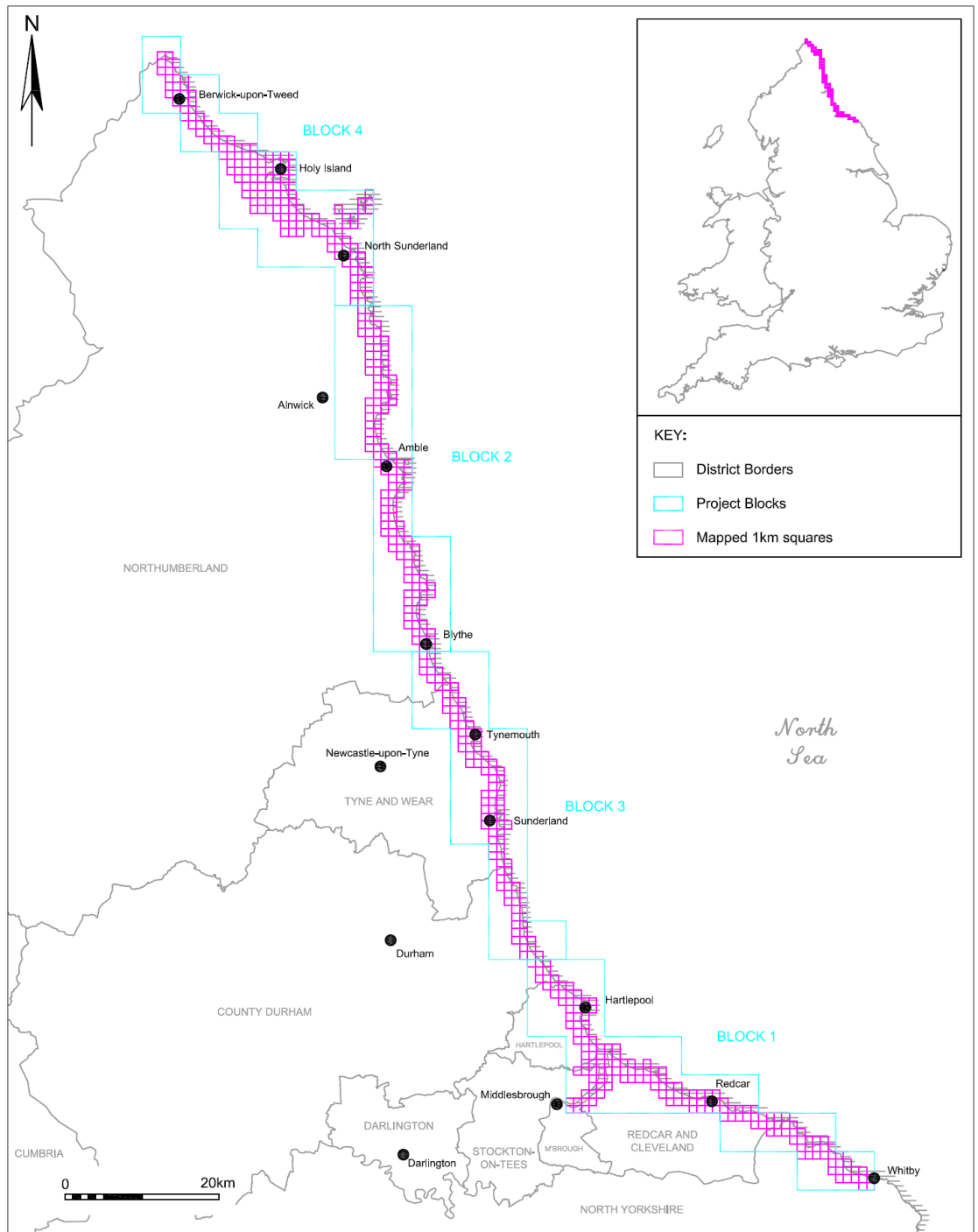


Figure 1 OS quarter sheet map showing the 1km squares mapped.

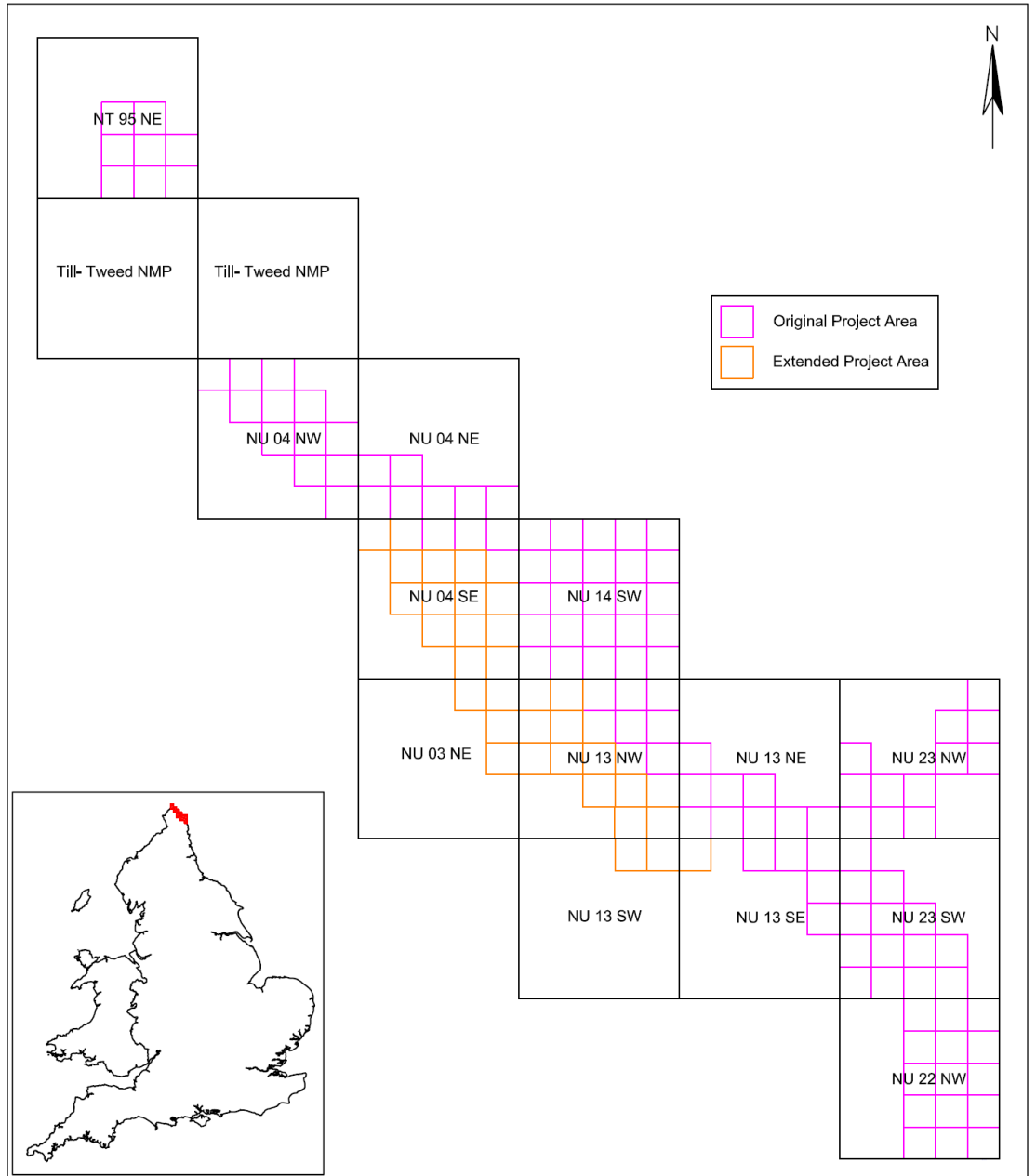


Figure 2 Block 4 Extension Area

## **4.2 Geology**

The solid geology of the study area consists primarily of various alternating strata of Carboniferous rocks such as limestone, shale, sandstone, Millstone Grit and coal. In County Durham, the principal rock exposed by processes of erosion is Magnesian limestone where the East Durham Plateau gently shelves to the east to meet the sea in cliffs that average 15m in height (Jones 1977). To the north the Northumberland coast is more varied with localised exposures of limestone, sandstone and occasionally coal. In addition to sedimentary rocks there are occasional outcrops of the igneous Dolerite known locally as Whinstone. The exposures of Whinstone, a hard rock and, as a result, resistant to erosional forces forms distinctive landscape features along the coast, which have attracted settlement and defensive sites from prehistory through to the medieval period. Around Teesside and North Cleveland the coastline is relatively featureless where the wide estuary of the Tees reaches the coast. However, to the south the coastline becomes the most dramatic of the study area with high, rugged cliffs around Saltburn and Boulby Head where Liassic shales and sandstones are exposed (Kent 1980).

The topography of the area of study has been significantly altered by glaciation. The whole area of study was affected by ice action or permafrost during the last period of glaciation (the Devensian). These ice sheets transported eroded material which was then re-deposited during periods of stasis or during periods when the glaciers began to melt. Along the coast drift deposits, principally tills but also sand and gravels, cover the underlying bedrock. It often comprises a combination of clay resting on limestone or sandstone which meets the coast in the area under study (Beaumont 1970). In some areas the clay can reach considerable depths as, for example, at Whitley Bay, where the clay has a depth of 6m (Spratt 1979).

## **4.3 Archaeological Scope**

The project adheres to those adopted for the National Mapping Programme (NMP), which aims to increase our understanding of the historic environment. All probable and possible archaeological features visible on air photographs as cropmarks, soilmarks, parchmarks, earthworks and structures were identified, interpreted, mapped and recorded. The NMP Sphere of Interest draft report (RCHME 1997) documents the scope of the NMP; the main aspects relevant to this project are summarised below.

### **4.3.1 Earthwork archaeology**

All extant earthworks identified as archaeological in origin were mapped. Available RCHME /EH ground survey plans were used to assist and enhance the air photograph interpretation and mapping. If the quality of photography was not sufficient to depict individual earthwork features the latter were mapped as an extent of area.

#### 4.3.2 Levelled archaeology

All cropmarks, soilmarks and parchmarks identified as archaeological in origin were mapped.

#### 4.3.3 Post medieval and modern field boundaries

Field boundaries that have been removed (upstanding or levelled), but are depicted on first edition Ordnance Survey or later edition maps, were generally not mapped. However, where they occurred with newly identified field boundaries, which were not depicted by the Ordnance Survey, then some were mapped to provide a wider context for the field systems.

#### 4.3.4 Medieval and post medieval ridge and furrow

Ridge and furrow was mapped, using a simple graphical depiction, delineating the extent of area and direction of the furrows. The difference between levelled and earthwork ridge and furrow was distinguished. The state of preservation of the latter was evaluated from the latest photography, which in the case of this project was mainly from vertical photographs.

#### 4.3.5 Industrial features and extraction

Widespread and common small-scale (less than 2 hectares) extraction of stone resources was not mapped unless it directly impinged on archaeological features. Large-scale quarries (greater than 2 hectares) were mapped and recorded, irrespective if they were depicted on any Ordnance Survey map. Coal mining and associated features, such as tramways, were mapped and recorded. Large collieries or open cast mining complexes were mapped generally as an extent of area.

#### 4.3.6 Post Medieval and 20<sup>th</sup> Century military features

Former Post Medieval, First and Second World War military sites and installations were mapped. Extensive military complexes and sites were outlined as an extent of area as were anti-landing obstacles and tank traps. Installations such as pill boxes and coastal gun/searchlight batteries were mapped. As many sites of this period and function were by nature short lived and transitory emphasis was placed on the identification and general extent of activity when appropriate, rather than the accurate depiction of single features such as barbed wire fences and local trackways. Significant features within outlined areas were mapped either “as seen” or schematically, according to the quality of the available photography. Where the only source was oblique imagery with poor control coastal defence sites in the inter-tidal zone, such as pillboxes, tank traps, barbed wire fences and beach scaffolding, were sketched plotted (A sentence was added to the record stating that ‘the monument was sketched because it was not possible to locate the feature due to lack of control points on the source photograph’).

#### 4.3.7 Buildings

The foundations of buildings visible as cropmarks, soilmarks, parchmarks, earthworks, or ruined stonework were mapped, except when they were depicted on first edition

Ordnance Survey or later edition maps. Standing roofed or unroofed buildings or structures were generally not recorded unless they had a particular association in the context of industrial or military remains. Medieval castles and monastic sites previously recorded and extensively surveyed and mapped by the Ordnance Survey were generally mapped as an extent of area.

#### 4.3.8 Geomorphological features or natural deposits

Geomorphological features and natural deposits were not mapped. When such features occurred in the context of archaeological sites they were noted within the monument data text. This is in line with normal NMP methodology. Organic sediments and paleochannel fills were not mapped.

#### 4.3.9 Parkland, landscaped parks, gardens and country houses

Although within the NMP sphere of interest none of these features were encountered within the project area.

#### 4.3.10 Maritime Features

Ship wrecks and fish traps visible in the inter-tidal zones were mapped. If it was not possible to position these features accurately due to a lack of reference points on the source photograph, only a circle on the extent of area layer with a diameter of 100m, 500m or 1km (the radius depending on the control points on the source photograph) was drawn. The centre of this was the grid reference obtained from the source photograph.

## 5 SOURCES

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### 5.1 Air Photographs

All readily available air photographs were consulted, which effectively means those held in seven main collections. The National Monuments Record (NMR) was the prime source. A search for photographs identified 4066 specialist obliques and 14,227 vertical prints for the project area. For the purposes of mapping the area was divided into four blocks to facilitate loans from the NMRC library. Additionally, 484 specialist oblique and 427 vertical prints were consulted from the Photograph Library of Cambridge University Collection of Air Photographs (CUCAP), administered by the Unit for Landscape Modelling (ULM). AP Collections of North Yorkshire County Council, North York Moors National Park, Tees Archaeology, Tyne and Wear County Archaeology and Durham HER were also consulted but only a handful of these latter photographs were used for the project.

The vertical photographs held by the NMR comprise mainly RAF and Ordnance Survey sorties with some Meridian Airmaps Limited photographs, which together range in date from 1940 to 1999. The specialist oblique photographs range in date from 1940 to 2006, which includes specialist military photographs and those from recent reconnaissance.

The CUCAP collection's holding for this project were quantified using the online catalogue ([www-arcis.geog.cam.ac.uk](http://www-arcis.geog.cam.ac.uk)). The ULM then kindly loaned the relevant photographs on a quarter sheet by quarter sheet basis. Yvonne Boutwood (EH) and Sally Radford (ARS Ltd) administered the loan liaison between the project and ULM.

Other forms of remote sensing imagery (e.g. lidar) were not used during the mapping phase of the project. Lidar data tiles in JPEG format for the whole NMP project area were provided by the Environment Agency. However, a review of a sample area suggested that because a proportion of the data was collected at high tide lidar was of limited use in identifying features in the inter-tidal zone. Where the tide was low, the resolution was too low to show small discrete features like wrecks but showed major features.. Consequently it was not felt that this was the most appropriate project in which to test the potential of this data to its fullest. This is not to say that lidar data does not have a contribution to make to future coastal or inland archaeological surveys.

### 5.2 Monument data

The National Monuments Record database AMIE was consulted as was the relevant HER data for each quarter sheet during the course of transcription and recording. This process was assisted by the output from EH's GIS Data which facilitates graphic representation of the records with attached summary data. Where possible, concordance between HER datasets and AMIE was made. There are several scheduled monuments in the project area.

### 5.3 Previous Survey Work and Research

The North East coast of England has long been recognised as an area exceptionally rich in archaeological remains of all periods. From the advent of archaeological interest, the North East coast has produced nationally important prehistoric sites through the discovery and collection of flint assemblages uncovered by erosional processes at the coast. Francis Buckley, who was at the vanguard of Mesolithic research in the early 20<sup>th</sup> Century, developed his theories, in part, upon flint sites discovered in Northumberland such as those near Berwick-upon-Tweed and Budle Bay (Buckley 1922a, 1922b & 1925). Active processes of erosion have continued to reveal such sites along the coast. Important sites were discovered at Filpoke Beacon (Coupland 1948) and Crimdon Dene (Raistrick & Westoll 1933) in County Durham. Most of these sites contained lithic assemblages typical of the later Mesolithic, Neolithic and Bronze Age periods (Raistrick 1933). The discovery of flint scatters has continued to the present day, although additional information such as radiocarbon dates have been lacking. However, the recent discovery of a Mesolithic hut at Howick has indicated the potential of such coastal sites, even when exposed by erosional processes (Waddington *et. al.* 2007). The site at Howick was the subject of a detailed dating programme which has shown that the site was occupied for a period of 100-300 years from c.8000 cal BC. This is the most detailed and accurately dated Mesolithic structure in the world to date and it has transformed thinking about Meso settlement in Britain and other parts of NW Europe.

From an early date there was also recognition of the importance of submerged forests and peat beds which had been identified in the inter-tidal zone off the North East Coast. C.T Trechman, who had been involved at the outset of archaeological investigation (Trechman 1905, 1912), reported on flints collected from the submerged forest at Hartlepool and undertook further work on the deposits. Artefacts and animal bones dating from the early Mesolithic, late Mesolithic and Neolithic periods have been collected from this forest bed. Significant discoveries from the peat beds include the discovery of a skeleton of Neolithic date (Tooley 1975) and a hurdle panel radiocarbon dated to c.3700 cal BC was discovered in 1984. Further work undertaken by Cleveland Archaeology Section in 1990 uncovered a line of wooden stakes in association with a small pile of domestic waste, worked flints and a cut piece of antler which may indicate the presence of a settlement. Additional investigations of the submerged forest were undertaken by Tees Archaeology in 1995 and 2002 as part of sea defence works.

Similar remains of peat beds have been discovered preserved beneath sand dunes in Northumberland at Howick and Low Hauxley. Other sites include Creswell and Budle Bay. The area at Low Hauxley has been the subject of several archaeological investigations due to the exposure of Bronze Age cairns and cists by erosion and movement of the dunes which formerly covered them. Bonsall (1983 unpublished) identified a Bronze Age cairn overlying midden deposits of Mesolithic date. Further unpublished excavations have been undertaken by Tyne and Wear Museum Service in 1992 and Lancaster University Archaeology Unit in 1995, which confirmed the excellent state of preservation of the Bronze Age cemetery and extended the known area of Mesolithic activity (Drury *et. al.* 1995), as well as dates for the buried land surfaces.

Bronze Age funerary remains in the form of cists and cairns have been identified at many sites along the North East Coast. A recent excavation of a Bronze Age cemetery was undertaken at Howick on the Northumberland coast which revealed five stone lined cists (Waddington *et. al.* 2003, Waddington C. 2007). Evidence for Neolithic monuments is more enigmatic though the Street House long cairn (Vyner 1990) and possible causewayed enclosures at South Shields (Hodgson 2001) and Hasting Hill (Newman 1976) suggest some Neolithic monuments still remain.

Within the area of study there have been several long term multi- period investigations of localised areas of the landscape. On Holy Island, a detailed programme of surveying, surface collection and excavation has investigated important evidence for early Christian and medieval activity and has identified artefact scatters at Ness End of Mesolithic, Neolithic and Bronze Age date (O'Sullivan & Young 1995). In county Durham, a programme of fieldwalking revealed concentrations of prehistoric flint in the coastal region (Haselgrove *et. al.* 1988; Haselgrove and Healey 1992). A long term multi period programme of excavation has also been undertaken at Bamburgh Castle under the aegis of the Bamburgh Research Project. A further long term programme of excavation has taken place at South Shields Roman fort at the mouth of the Tyne which has revealed evidence for Iron Age and Neolithic structures beneath the Roman fort (Hodgson 2001).

Work has been undertaken on the development of ports and harbours from the medieval period to the present day (Daniels 2002). Examples in the study area which date from the medieval period are Hartlepool, Berwick upon Tweed, Alnmouth, Beadnell and Whitby. In addition to the fishing industry, the North East coast displays evidence of many other industries, such as shipping in the form of wrecks which can be seen in the inter-tidal zone and are still being exposed by erosional processes. Excavation of one of these wrecks at Seaton Carew by Tees Archaeology revealed a wooden collier dating from the late 18<sup>th</sup>/19<sup>th</sup> Century.

Extensive remains of the coal industry, which developed from the 19<sup>th</sup> Century in the North East and had a dramatic impact on the coast, are to be found particularly in County Durham with large collieries at Easington, Whitburn and Seaham. Evidence of the alum industry, which began in the 17<sup>th</sup> Century, can be seen further south at Loftus, Kettleless and Boulby. The remains of the Kettleless alum works have recently been recorded by the Archaeological Survey and Investigation team at York (AMIE UID 1118399). Extensive networks of rutways, deliberately carved into the rock on the beaches of Cleveland to guide carts carrying quarried material to ships at low tide, have been identified and their recording by the Nautical Archaeological Society (NAS) North-East has recently begun.

This project will build on two pieces of earlier work undertaken in the study area. The first was a programme of work which aimed to produce a strategy for coastal archaeology in Northumberland (Hardie 1995). The research considered the conservation and management of archaeological remains on the coast of Northumberland, especially those exposed to processes of erosion. The second was a project undertaken by Archaeological Services of the University of Durham and was an



assessment of the archaeological resource along a section of the Durham coastline as part of the 'Turning the Tide' project (Carne 1998).

An extensive database of military installations along the coastline has been collated by the Defence of Britain Project, the findings of which are now presented online via the Archaeology Data Service. There are, in addition, several projects which ran concurrently with this project. The Scarborough to Hartlepool Seascapes Project being undertaken by Cornwall Historic Environment Service and funded by the Aggregate levy Sustainability Fund and the Coastal Saltmaking Project undertaken by Cranstone Consultants investigated the evidence for historic saltmaking along the North East coast.

## 6 METHODOLOGY AND RECORDING

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### 6.1 Mapping Methods

Mapping methods were in accordance with practices developed for the National Mapping Programme (NMP). All air photographs were examined under magnification and stereoscopically where possible. Oblique and vertical photographs were scanned at a suitable resolution, normally between 350-400dpi, and rectified using appropriate software (AERIAL 5.29). Ordnance Survey NTF (Block 1 and 3) and MasterMap (Block 2 and 4) 1:2,500 maps were used for control and as a base for mapping in AutoDesk Map 2004 and AutoDesk Map 3D 2007. Where appropriate, topographic information was derived from Ordnance Survey Land-Form PROFILE (5m vertical interval, scale 1:10,000) and the height data used to create Digital Terrain Models to improve the accuracy of the photo rectification.

Accuracy for the Ordnance Survey map is in the range of  $\pm 2.8\text{m}$  and rectification of photographs is normally within  $\pm 2\text{m}$ . The latter mismatch may increase up to  $\pm 4\text{m}$  in the inter-tidal areas where the lack of control points on the available source photograph makes a more accurate rectification impossible. When it was not possible to position maritime features accurately due to a lack of reference points on the source photograph, only a circle on the extent of area layer with a diameter of 100m, 500m or 1km (the radius depending on the control points on the source photograph) was drawn. The centre of this was the grid reference obtained from the source photograph.

Rectified images were output from AERIAL in uncompressed TIF format at a resolution of 300dpi and a scale of 1:10,000. A World file (.TFW) was created alongside each TIFF file and the control information was retained in the AERIAL RDA file (RDA). Mapping conventions and the layer structure used in the AutoDesk Map drawing files is summarised in Appendix 2. Within the AutoDesk Map drawing files the interpretation of the features was recorded in an attached data table (see Appendix 3).

The Ordnance Survey First Edition and later mapping was routinely consulted as an aid to the interpretation and mapping. Reports of previous archaeological investigations in the project area were consulted, where they were published and readily available.

### 6.2 Recording Practice

All mapped features were recorded in the English Heritage National Monuments Record database, AMIE. The monument types and evidence terms used for this project are listed in Appendix 4 and 5. This was routinely consulted and data from EH's GIS was downloaded for use in the AutoDesk Map environment. New records were created (968), or existing monument records were amended (270), following NMR Heritage Datasets: Monument Recording Guidelines.

In January 2008 a meeting between EH's Aerial Survey and the ARS Ltd team reviewed recording practice in AMIE and AutoDesk Map. Some guidance notes were

drawn up to clarify recording practice but for the already completed Block 1 & 3A it was decided not to implement these minor changes retrospectively.

### **6.3 Copyright**

Copyright of the aerial survey mapping and associated AMIE records produced by the project resides with EH. Licence to use the data has been extended to ARS Ltd and the project partners.

### **6.4 Project Archive**

This project produced 56 AutoDesk Map drawing files, one for each part 1:10,000 quarter sheets (see Appendix 1).

The parent collection number is EHCO1/094 and collection numbers for each map are listed in Appendix 5. Copies of the digital drawing files are deposited in the archive of the NMR. Aerial Survey York and Swindon also retain copies of the digital files, for day to day access. This report will be deposited in the NMR archive.

The newly created and amended text records form part of the national monuments database AMIE, which are downloaded into the English Heritage webGIS.

### **6.5 Project Dissemination**

Copies of the AutoDesk Map drawing files have been supplied to ARS Ltd. These will be incorporated within the wider RCZA project results and shared with HERS and project partners. The final product of the NE RCZAS, which includes the aerial survey mapping, will have a wider distribution to the local authority project partners.

All AMIE records have been supplied to ARS Ltd in Portable Document Format (.pdf). This project also used Oracle Discoverer Plus Version 9.0.4.45.04 to output the AMIE record data in EXCEL spreadsheet format. A copy of this aerial survey mapping report has been deposited within the NMR archive in Swindon.

## 7 SUMMARY OF PROJECT RESULTS

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The following is intended to provide a brief overview of the project's results. Taking account of the nature of the NE RCZAS and considering that the area examined was only a narrow corridor 1km wide, a comprehensive analysis of the monuments in a broad archaeological landscape context has not been attempted here. A more detailed archaeological report will be produced by Chris Tolan-Smith for the NE RCZAS.

For the aerial survey mapping project a total of 968 new records were created and amendments were made to 270 records in the AMIE database. In other words, 78% of the records for this project were new to the NMR. This summary provides an overview of the archaeology of the area as evidenced by the aerial survey record. Sites discussed in this report are referenced by their AMIE monument unique identifier number.

The predominant forms of evidence in the survey area were earthworks, structures and cropmarks, including parching. Soilmarks are not explicitly differentiated from cropmarked sites in the record but it was noted that very few were encountered, probably because the area was rarely flown at the times of the year when the soils are bare.

Dating of monuments recorded from aerial photographs relies on recognising morphologically characteristic forms. Other sources of archaeological and historical data have been consulted to complement the aerial survey evidence and aid interpretation. The data is evaluated chronologically to provide 'period' overviews, spanning the millennia from early prehistory to the twentieth century. In the text sites are referred to by their NMR Unique Identifier Number (UID), which is used in the attached data tables in the AutoDesk Map drawings (Appendix 3). The monument types and evidences recorded by this project, in AMIE and the AutoDesk Map drawing attached data tables, are in accordance with EH's thesaurus and are listed in Appendix 4 and 5.

Considering that the area examined was only a narrow corridor 1km or so wide, throughout the project sites were occasionally interpreted and recorded more as individual features than as cohesive elements forming part of a wider historical landscape.

### 7.1 Prehistoric

#### 7.1.1 Funerary monuments

The earliest diagnostic prehistoric monument form identified in the aerial survey mapping project area is represented by a single Neolithic long barrow known as Lingrow Howe (29445). The Lingrow Howe long barrow is aligned north-east by south-west and measures approximately 42m x 10m.

A number of presumably Bronze Age round barrows are visible on air photographs. Interestingly, the barrows appear to be clustered in North Yorkshire (e.g. 29442 and 29522) and Redcar & Cleveland (e.g. 29017 and 29035), although a stray round barrow

(7600) is located as far north as Northumberland. The majority of the barrows survive as extant earthwork mounds on the latest available photography, whilst a few have been levelled so that only the surrounding ring-ditches are visible as cropmarks.

#### 7.1.2 Prehistoric settlement and enclosures

The majority of the early features discovered as part of the NE RCZAS were located in Northumberland; this is most likely due to a lack of coastal industry and urbanisation in this area. Two curvilinear enclosures (1472878 and 6484) were visible on air photographs; all are levelled and evident only as cropmarks. The latter of the two (6484) has elements of a second-outer ditch, forming a double ditched enclosure.

To the northernmost section of the NE RCZAS a section of prehistoric pit alignment and associated ditch are visible as cropmarks (1472853). The pit alignment runs on a north-south alignment, a distance of approximately 259m. 64m to the east, two short sections of a ditch lie parallel to the pit alignment and are potentially broadly contemporary in date.

A number of Iron Age multivallate forts and hillforts were discovered along the north-east coast of Northumberland. Some such as at Howick Hill (8094, Figure 3) are still extant as earthworks. Others, such as at Fenhamhill (1474769) have earthwork elements of bank to the south of the fort still surviving. Furthermore at Fenhamhill, another Iron Age/Roman curvilinear enclosure (1474779) is visible as a cropmark and is located just 93m to the north-west. Further multivallate forts are visible as cropmarks e.g. 6483 and 7562, Figure 3), the latter of which has an internal curvilinear enclosure which may represent an earlier phase of occupation. An Iron Age defended site was also discovered (8329) at Westfield, west of Seahouses. The feature consists of a number of concentric curvilinear ditches, the central and most prominent of which was approximately 82m in diameter and has a ditch width of approximately 10m. This enclosure has a potential entrance to the south east. Traces of a further ditched feature at this entrance possibly provided additional defensive strength at the entrance. A second entrance may also be located to the west.

Although a number of Iron Age/Roman rectilinear enclosures were recorded, two (1470210 and 1465452) were particularly significant as they contained circular gullies, representing domestic roundhouses. Features suggesting domestic occupation are rare within the cropmark elements of this survey. Winton (1998, 47), in her research into the cropmark evidence for Prehistoric and Roman settlement in West Lincolnshire suggests that there may be a twofold reason for this. Firstly, due to the poor quality of the aerial photographic cover and secondly, because of the relatively slight nature of the domestic structures, which need very good conditions to show as cropmarks.

## **7.2 Roman**

Only two sites of note were identified as Roman features during this survey, both of which had been previously recorded. One is an earthwork signal station at Goldsborough in the Parish of Lythe (29439). The feature is rectilinear in plan with an internal dimension of 35m.

Further north, is the well-known and extremely well recorded South Shields Roman Fort (26402). This site was mapped from air photographs during the earlier NMP project for Hadrian's Wall, but was incorporated into the survey area of the NE RCZAS. Large areas of masonry foundations survive at South Shields, as well as various earthworks recorded on earlier photography.

## **7.3 Medieval**

Medieval and post medieval ridge and furrow together with a narrower form that is probably Napoleonic in date is prevalent along most of this coast but it is particularly prevalent amongst the Northumberland parishes. A rapid assessment of the condition of these remains from the most recent photography available suggests that only a minority still survives as earthworks to the present day whilst the remainder have been built over or ploughed level.

Whilst ridge and furrow is probably the most extensive type of medieval feature encountered in the project, there was very little evidence for medieval settlements along the coastal hinterland and inter-tidal zone. These medieval sites are almost exclusively visible as earthworks with the exception of a small number of field boundaries (1468619) which are visible as cropmarks.

These include; the settlement of Budle in the parish of Bamburgh (7542). All that survives of this settlement is only a few platforms and associated field boundaries, ditches and banks. Medieval ridge and furrow is also associated with Budle, as it is with most of the other medieval settlement sites within the project area. Furthermore we have the remains of a Benedictine grange or manor house of Lindisfarne Priory at Fenham (1476831). The monument appears as a mound surrounded by the remains of a precinct wall and ditch and a series of enclosures thought to contain the remains of service and agricultural buildings, crofts and tofts, the remains of medieval agricultural systems and part of a mill race. Also, a moated manor and medieval settlement are visible at Easington (29042). This site consists of the surviving part of an approximately rectangular moated site, the platform of which is now occupied by Easington Hall Farm, with further settlement remains on the north and west sides. Some of these earthwork remains appear to be visible on air photographs but were too dispersed and fragmentary in nature to be depicted in the mapping. Even so, they were recorded in AMIE to help further investigations. At the north of the moated site the original watercourse was clearly engineered to service at least one pond to the east, part of the earthworks of which survives. Finally, a medieval manor house in a field known as Castle Field or Hall Close, is located at Salturn Maske and New Maske (28740). These earthworks comprise a number of boundary banks and enclosures, some of which, at

the north of the area, overlies medieval ridge and furrow. A possible dovecote is visible to the south.

One of the most noteworthy features dating to the medieval period is that of a potential broad salt working site (27783) on Coatham East Mars on the Tees mouth, created prior to the realignment of the Middlesbrough-Redcar railway line. This site was documented during the medieval period but thought to be natural in origin in recent times (Oral information/staff comment reported by Ordnance Survey Archaeology Division on 22-Sep 1954 in AMIE). Air photo evidence showed the existence of over a dozen saltern mounds over an area of approximately 90ha. Earthwork remains of what are thought to be a possible saltern were also seen on top of one of the southern mounds.

## **7.4 Post medieval and Twentieth Century**

### **7.4.1 Industry**

A range of post medieval and 20<sup>th</sup> century collieries are visible throughout the project area but appear to be particularly widespread where the coal seam geology is located at the southern end (e.g. Easington Colliery 926147, Vane Tempest Colliery 933210). Ordnance Survey vertical photography shows many had been levelled in the latter part of the 20th century (e.g. 933210, 1460706).

Limestone and Sandstone quarries dating from the post medieval period to the 20<sup>th</sup> century are generally extant on the latest Ordnance Survey vertical photography, but the majority are disused (e.g. 1465197, 1465355 and 1458607).

Post medieval alum works are visible in the Redcar & Cleveland parishes. The most impressive example is Boulby Alum Quarry (612070). This extends about 1km along the coastline with the quarry face up to 200m inland from the current cliff edge. The workings started in the 1650s and originally extended further north, but substantial areas have been lost to coastal erosion. In the 18th century the works thrived and in 1784 expanded westward with the opening of the New Works. On air photographs two discrete areas of quarrying are visible, the earliest being at the east end of Rockhole Hill where a large quarry scoop with three terraces survives. To the west of Rockhole is a second area of quarrying known as New Works, separated from Rockhole by two large spoil tips.

Remains of an ironstone working site are visible in the parish of Skelton and Brotton. The monument covers an area of approximately 35.8ha and may be associated with the Whitby, Redcar and Middlesbrough Union Railway formed in 1866 running on an almost parallel alignment. Interestingly, a potential dismantled railway track branches from the main line and appears to cut across one of the ironstone working fields possibly showing phasing.

## 7.5 Military Features

### 7.5.1 Post Medieval Coastal Defences

A number of post medieval military features were also located as part of the NE RCZAS. Of particular interest are the post medieval military features located at South Gare, Teeside (900075): three gun emplacements are situated on the northern tip of the South Gare breakwater, the oldest of the gun emplacements dates from c1890. Also on the South Gare breakwater, to the south of the gun emplacements and contemporary in date to the latter, is a submarine mine-loading complex/fortification (900047). These features were re-used during the First and Second World War and barbed wire fences, trackways, military buildings, an army camp and a tank trap were all visible on 1940's RAF photography.

### 7.5.2 World War I

The First World War has left very little evidence on the North East coast, but the few extant features which are still present, either as earthworks or cropmarks, are those of practice trenches. These can be found almost anywhere throughout the country; over varying terrain depending on the training of the soldiers at the time and where they were to be based. One illustrative example was seen in the Parish of Saltburn Marske and New Marske (1458481), displaying the classic layout of a front line trench, reserve trenches and communication trenches with saps in-between.

Coastal batteries consisting of naval guns were often placed upon the shorelines during the Great War. One such example is known as the Tyne Turret: one of two 12 inch gun positions (1403278) built in 1918 and closed in 1921. The position has since been completely destroyed by quarrying.

Dating of the 20<sup>th</sup> century military sites was not refined unless information was readily available to attribute either a First or Second World War date. First World War and inter-war camps were often utilised throughout the following conflict, and sometimes even into the Cold War in the 1960s. Anti-aircraft batteries were frequently rebuilt in the late 1940s on the site of their earlier counterparts. In these cases the features are described as 20<sup>th</sup> Century. One such example is an airfield in the Parish of Saltburn Marske and New Marske (1458559), which may date to the First World War, but could also be an early grass-runway airfield from World War Two.

### 7.5.3 World War II

The greatest proportion of the NE RCZAS recorded sites date to this period. Photographs taken by the RAF during the conflict and in the post war era have captured a snapshot of Britain during that time. This is particularly important as many features associated with the Second World War were quickly removed in the years following the end of the war (Small 2006, 125). For this project area the study of the RAF photography has revealed a considerable number of World War II sites, the majority of them previously unrecorded.



A particularly interesting example is a 'Q' and 'K' Type bombing decoy at Long Houghton (1463955), dating to 1940 (C S Dobinson 1996, 102). Designed with the layout of camouflaged runways this site was brought into use later in the war as an actual airfield: RAF Boulmer (1387328). Defined by a typical triangular plan tarmac runway system it consisted of the usual aircraft dispersal areas along the north western stretch of the site. Several of these also display aircraft hangers. This airfield was opened in 1943 for fighter training operations, seeing continued service into the post-war years when it acted as an anti-Soviet base during the Cold War. RAF Boulmer is still in operation today, the runway ruinous though still partly visible.

Acting in a reverse role were the anti aircraft batteries of the east coast, such as that seen in the Parish of Blythe (1413842). This survey has revealed sixteen such batteries, of which four were previously unrecorded (1463068, 1461927, 1461973 and 1459189). These sites were generally constructed in the same manner, consisting of four main gun positions with an additional two for extra support. To the rear of the four-gun set-up was the command bunker, behind which was the magazine. Usually set off to the side was an associated military camp for stationing troops for every day running and maintenance of the battery. Sometimes also seen (depending on the period and quality of the photography), is an octagonal setup of poles and wire with a platform in the centre. The platform held a radar unit while the poles and wire (GL Mat) provided a false datum to allow accurate positioning of enemy aircraft.

Further military features visible on 1940s RAF vertical photography are bombing range markers (e.g. 1459256 and 1474595). These related features comprise a directional arrow pointing to the north-east and a target. This allowed pilots to practice accurate bombing prior to live missions. Finally, air aid shelters, practice trenches, barrage balloon sites (e.g. 1462609 and 1462634) and tank traps, pill boxes and other military buildings forming broad anti-invasion defence systems are situated throughout the project area.

## **7.6 Features of Uncertain date**

A number of sites were identified as of uncertain date due to either poor aerial photographic quality, their poor preservation or simply that the features were not characteristic of any one particular period or function.

This was particularly true of the wrecks discovered using air photographs. All the wrecks mapped in the project were recorded as features of uncertain date even though their origins are likely to be medieval or later. Of these, and of particular interest, were a number of wrecks located on the sand flats at Amble on the north bank of the River Coquet (907649). These wrecks are clearly visible in the same location on air photographs as far back as the 1940's. Though little is known as to why these hulks came to be resting at this location, it would appear likely that the ships were deliberately left to disintegrate over time.

Uncertain features can sometimes become the most controversial. Curvilinear marks of uncertain date and function were visible on air photographs taken in the 1950s (1214377). The double concentric dark marks had previously been interpreted as an

'enclosure' and speculatively as a possible Neolithic henge (Stevenson 1998). The origin and function of these linear features remain uncertain, but closer examination of all the available photographs suggests that the features may have been associated with a near by Second World War military site (1465240). It seems unlikely that this issue will be resolved in the near future as the linear marks were built over during the expansion of housing developments at Cullercoats in 1988.

## **7.7 Discussion**

Through this research, evidence for human activity has been discovered from the prehistoric period through to the present day. Sites vary from the funerary monuments of earlier prehistory, through to the settlement features of the Iron Age/Roman and medieval periods. An abundance of military features have been recorded ranging from the Roman period through to the 20<sup>th</sup> century, (though the majority date to the Second World War). Though the threat from natural erosion processes is always present, it is human impact parting the form of quarrying and extraction, particularly open-cast mining that has led to the most dramatic changes visible on the aerial photographic record.

The quality of the aerial photograph coverage can have a huge impact on an aerial survey. Fortunately, in this instance, the vertical and oblique photographic coverage of the project area was particularly extensive. However it should be noted that the number of photographs available as we proceeded north decreased. This was particularly true of the early RAF photography and perhaps led to a negative bias in the number of Second World War sites transcribed in the northern counties – particularly in north-Northumberland. A further issue for the NE RCZAS was the poor quality of the available early M-series RAF photography. The NMR photo library does not hold the negatives to these prints and therefore their loan outside the archive is restricted. They were therefore only supplied as laser scans rather than the original prints and the inevitable reduction in quality was compounded by the scanning and rectification process, which further reduced the quality of these images. Clearly much more could be made of this important resource if the original prints were scanned at high resolution and supplied digitally

A number of sites seem worthy of further study: a previously unknown pit alignment, the only one recorded in the project area, located to the south of Lamberton, Northumberland (1472853). Further sites of interest are the various multivallate forts of Northumberland (i.e. 8094, 1474769, 6484, 7562 and 8329): these are all lowland multivallate forts and consequently relatively unusual, as similar forts are generally known to be located in the uplands.

Finally, the technique of aerial survey has shown to be successful in the North East coastal region. It is therefore reasonable to suggest further aerial photographic mapping in the North East to place these archaeological features in their wider landscape context.

Recommendations for future research:

- Additional aerial reconnaissance.
- Further investigation for significant features (as discussed).
- Mitigation measures at sites under imminent threat from coastal erosion.

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## APPENDIX 1 1:10,000 MAP SHEETS

Filename	Block (order of mapping)	Archive Parent Collection EHCO1/094 AF00230	Author	Date of completion
NZ 81 SE	1	MD002083	Gemma Pallant	13/09/2007
NZ 81 SW	1	MD002084	Sally Radford	23/03/2007
NZ 81 NW	1	MD002085	Sally Radford	13/09/2007
NZ 71 NE	1	MD002086	Sally Radford	14/09/2007
NZ 71 NW	1	MD002087	Gemma Pallant /Cinzia Bacilieri	04/04/2007
NZ 72 SW	1	MD002088	Gemma Pallant /Cinzia Bacilieri	17/09/2007
NZ 62 NW	1	MD002091	Sally Radford	04/09/2007
NZ 62 SW	1	MD002090	Sally Radford	12/09/2007
NZ 62 SE	1	MD002089	Cinzia Bacilieri	12/09/2007
NZ 52 NW	1	MD002095	Sally Radford	05/10/2007
NZ 52 SW	1	MD002094	Sally Radford	03/10/2007
NZ 52 SE	1	MD002093	Cinzia Bacilieri	15/10/2007
NZ 52 NE	1	MD002093	Cinzia Bacilieri	16/10/2007
NZ 43 SE	1	MD002098	Sally Radford	07/11/2007
NZ 53 SW	1	MD002096	Sally Radford	08/11/2007
NZ 43 NE	1	MD002099	Cinzia Bacilieri	30/11/2007
NZ 53 NW	1	MD002097	Cinzia Bacilieri	03/12/2007
NZ 44 SW	3A	MD002101	Daniel Van Den Toorn	05/12/2007
NZ 44 SE	3A	MD002100	Daniel Van Den Toorn	05/12/2007
NZ 45 SW	3A	MD002103	Daniel Van Den Toorn	18/12/2007
NZ 46 SW	3A	MD002239	Daniel Van Den Toorn	03/01/2008
NZ 35 NE	3A	MD002105	Sally Radford	03/01/2008
NZ 45 NW	3A	MD002104	Sally Radford	02/01/2008
NZ 37 SE	3B	MD002108	Sally Radford	15/02/2008
NZ 37 SW	3B	MD002109	Sally Radford	10/02/2008
NZ 37 NE	3B	MD002110	Sally Radford /Daniel Van Den Toorn	14/02/2008
NZ 37 NW	3B	MD002111	Sally Radford /Daniel Van Den Toorn	19/02/2008
NZ 46 NW	3B	MD002106	Sally Radford /Daniel Van Den Toorn	19/02/2008
NZ 28 SE	2	MD002113	Melanie Partlett /Cinzia Bacilieri	28/04/2008
NZ 28 NE	2	MD002115	Sally Radford	13/03/2008
NZ 38 NW	2	MD002114	Sally Radford	17/03/2008

NZ 38 SW	2	MD002112	Melanie Partlett /Cinzia Bacilieri	29/04/2008
NZ 29 SE	2	MD002117	Melanie Partlett /Cinzia Bacilieri	08/05/2008
NZ 39 SW	2	MD002116	Melanie Partlett /Cinzia Bacilieri	08/05/2008
NZ 29 NE	2	MD002118	Sally Radford	08/04/2008
NU 20 NW	2	MD002343	Sally Radford	17/04/2008
NU 20 NE	2	MD002120	Sally Radford	18/04/2008
NU 21 NW	2	MD002124	David Knight	16/07/2008
NU 21 NE	2	MD002122	David Knight	16/07/2008
NU 20 SE	2	MD002119	Cinzia Bacilieri	23/04/2008
NU 22 SW	2	MD002125	David Knight	16/07/2008
NU 22 SE	2	MD002126	David Knight	16/07/2008
NU 21 SE	2	MD002123	Sally Radford	13/05/2008
NU 21 SW	2	MD002121	Sally Radford	01/05/2008
NU 22 NW	4	MD002127	David Knight	21/05/2008
NU 13 SE	4	MD002129	Sally Radford	19/05/2008
NU 23 SW	4	MD002128	Sally Radford	20/05/2008
NU 14 SW	4	MD002133	David Knight	23/05/2008
NU 13 NW	4	MD002132	Sally Radford	20/06/2008
NU 04 SE	4	MD002134	David Knight	24/06/2008
NU 04 NE	4	MD002135	David Knight	28/05/2008
NU 13 NE	4	MD002131	Cinzia Bacilieri	26/06/2008
NT 95 NE	4	MD002139	Cinzia Bacilieri	30/05/2008
NU 04 NW	4	MD002136	Sally Radford	02/06/2008
NU 03 NE	4	MD002351	David Knight	23/06/2008
NU 13 SW	4	MD002350	Cinzia Bacilieri	09/07/2008

No archaeological features were mapped and recorded in quarter sheets NU 23 NW and NZ 46 NW.

Additional maps from existing NMP projects:

NZ 44 NW	3	Mapped as part of Project Variation for Durham-Assessment of Archaeological Resource in Aggregate Areas NMP project (Event no. 1454180)		
NZ 36 SE	3	Mapped as part of Hadrian's Wall World Heritage Site NMP Project (Event no. 1360986)		
NZ 36 NE	3	Mapped as part of Hadrian's Wall World Heritage Site NMP Project (Event no. 1360986)		
NT 96 SE	4	Mapped as part of The Till-Tweed NMP Project (Event no. 1378874)		
NU 05 SW	4	Mapped as part of The Till-Tweed NMP Project (Event no. 1378874)		



## APPENDIX 2 AUTODESK MAP LAYERS AND DRAWING CONVENTIONS

Layer Name	Layer content	Attached data tables	Layer colour	Line type
0	None (AutoDesk 2007 requirement)	none	7 (white)	CONTINUOUS
BANK	Closed polygons for features such as banks, platforms, mounds and spoil heaps	MONUMENT	1 (red)	CONTINUOUS
BANKFILL	Solid fill for BANK layer polygons	MONUMENT	1 (red)	
DITCH	Closed polygons for cut features such as ditches, ponds, pits or hollow-ways	MONUMENT	3 (green)	CONTINUOUS
DITCHFILL	Solid fill for DITCH layer polygons	MONUMENT	3 (green)	
EXTENT_OF_AREA	Closed polygons outlining complex or extensive remains such as mining or military installations	MONUMENT	8 (grey)	DASHEDX2
GRID	grid lines at 1km intervals	NONE	7 (white)	CONTINUOUS
MONUMENT_POLYGON	Closed polygons encircling all the features recorded within a single AMIE record	MONUMENT	7 (white)	CONTINUOUS
RIGARREWK	Polyline showing the direction of ploughing in outlines of extant ridge and furrow	MONUMENT	4 (cyan)	CONTINUOUS
RIGARRLEVEL	Polyline showing the direction of ploughing in outlines of levelled or crop mark ridge and furrow	MONUMENT	6 (magenta)	ACAD_ISO03W100
RIGDOTSEWK	Closed polygon defining the furlongs or extent of area of extant ridge and furrow	MONUMENT	4 (cyan)	DOTX2
RIGDOTSLEVEL	Closed polygon defining the furlongs or extent of area of levelled or cropmark ridge and furrow	MONUMENT	6 (magenta)	DOTX2
STRUCTURE	Closed polygons for built features including concrete, metal and timber constructions such as military installations	MONUMENT	9 (grey)	CONTINUOUS
STRUCTUREFILL	Solid fill for STRUCTURE layer polygons	MONUMENT	9 (grey)	
THACHURE	Polyline T-hachure convention to schematize sloped features indicating the top of slope and direction of slope	MONUMENT	5 (blue)	CONTINUOUS

## APPENDIX 3 AUTODESK MAP DATA TABLES

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### MONUMENT DATA TABLE

The Monument Data table consists of five fields that were input directly through AutoDesk Map 2007. The content of these fields follows those that are entered in the National Monuments Record Database AMIE.

FIELD NAME	FIELD CONTENT	Sample data
MONARCH	AMIE Unique Identifier (UID)	1462945
PERIOD	Date of features (EH Thesaurus)	SECOND WORLD WAR
TYPE	Monument type (EH Thesaurus)	AIR RAID SHELTER
EVIDENCE	Form of remains (EH Thesaurus)	STRUCTURE
PHOTO	NMR or other reference for the photograph from which the feature was mapped and the date of photography	RAF 106G/UK/873 6181 1-OCT-1945

Minor differences in methodology are also observable in those maps part of Hadrian Wall's World Heritage Site NMP (NZ 36 NE and NZ 36 SE), Durham Extension NMP (NZ 44 SW) and Till-Tweed NMP (NT 95 SE and NZ NU 05 SW) that fall within the project area. These maps have an additional data table called Monarch (the former name of AMIE database). This comprises just one field that records the AMIE Monument UID.

## APPENDIX 4 MONUMENT TYPES USED IN THE PROJECT

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AIR RAID SHELTER	FIRING RANGE
AIRCRAFT OBSTRUCTION	FISHPOND
AIRFIELD	FLOOD DEFENCES
ALUM QUARRY	FORT
ANDERSON SHELTER	FORTIFICATION
ANTI AIRCRAFT BATTERY	GATE
ANTI BOAT LANDING OBSTACLE	GRANARY
ANTI SUBMARINE DEFENCE	GUN EMPLACEMENT
ANTI TANK DITCH	HEAVY ANTI AIRCARFT BATTERY
ARMY CAMP	HILLFORT
ARMY CAMP/PRISONER OF WAR CAMP	HOLLOW WAY
ARTILLERY FORT	HOSPITALLERS PRECEPTORY
BANK (EARTHWORK)	IRONSTONE MINE
BARBED WIRE OBSTRUCTION	IRONSTONE WORKINGS
BARRAGE BALLOON SITE	LIME KILN
BATTERY	LIME WORKS
BEACH DEFENCE	LIMESTONE QUARRY
BEACH DEFENCE BATTERY	LINEAR FEATURE
BELL PIT	LONG BARROW
BLAST WALL	MAGAZINE
BOMB CRATER	MILITARY AIRFIELD
BOMBING DECOY	MILITARY BUILDING
BOMBING RANGE MARKER	MILITARY CAMP
BOUNDARY BANK	MILITARY DEPOT
BREASTWORK	MILITARY HEADQUARTERS
BUILDING	MILITARY ROAD
BUILDING PLATFORM	MINEFIELD
CAIRN	MOAT
CASTLE	NARROW RIDGE AND FURROW
CASTLE	NISSEN HUT
CHAPEL	OBSERVATION POST
CIRCULAR ENCLOSURE	OFFICERS QUARTERS
COAL MINING SITE	OPEN CAST MINE
COAST ARTILLERY SEARCHLIGHT	ORDNANCE STORE
COASTAL BATTERY	PATH
COLLIERY	PILLBOX
COMMAND POST	PIT
CROPMARK	PIT ALIGNMENT
CURVILINEAR ENCLOSURE	PLATFORM
DEFENCE OBSTRUCTION	PLOUGH HEADLAND
DITCH	POND
DITCHED ENCLOSURE	PRACTICE TRENCH
DOUBLE DITCHED ENCLOSURE	PRIORY
DOVECOTE	QUARRY
EMERGENCY WATER SUPPLY	RADAR STATION
ENCLOSURE	RADIO TELEGRAPHY STATION
EXTRACTICVE PIT	RAILWAY
FARMSTEAD	RECTILINEAR ENCLOSURE
FIELD BOUNDARY	RIDGE AND FURROW
FILTER BED	ROAD BLOCK
	ROUND BARROW

ROUND HOUSE (DOMESTIC)  
ROYAL OBSERVER CORPS SITE  
SALTERN  
SALTERN MOUND\*  
SAND PIT  
SEAPLANE BASE  
SEARCHLIGHT BATTERY  
SETTLING PIT  
SHRUNKEN VILLAGE  
SIGNAL STATION  
SLIPWAY  
SLIT TRENCH  
SOUND MIRROR  
SPOIL HEAP

SQUARE ENCLOSURE  
STRUCTURE  
SUMMERHOUSE  
TANK TRAP  
TOWER  
TOWN DEFENCES  
TRACKWAY  
TRENCH  
UNDERGROUND MONITORING POST  
WALL  
WATER TANK  
WEAPONS PIT  
WINDMILL  
WRECK

\* Not in AMIE Thesaurus. Recorded in AMIE as SALT WORK.

## APPENDIX 5 EVIDENCE TERMS USED IN THE PROJECT

EVIDENCE Term	EXPLANATION
EARTHWORK	Monument existing as an upstanding earthwork
CROPMARK	Monument visible as a mark in standing crops, parchmarks or soilmarks Cropmark monument that was visible as cropmarks but has been built over
LEVELLED EARTHWORK	Earthwork has been levelled Earthwork monument that has been built over
STRUCTURE	Structure or building still extant Structure or building no longer in situ due to coastal erosion (e.g. a pillbox that is now at the bottom of a cliff) Structure or building may have been covered by sand Structure has been demolished but some remains are visible Structure or building has been demolished and no surface features are visible
DEMOLISHED BUILDING, RUINED BUILDING	Building is demolished but foundations and ground plan are visible
DESTROYED MONUMENT	Monument has been quarried away Earthwork or cropmark monument lost due to coastal erosion
MOVED STRUCTURE*	Structure or building has been moved from a position where it was originally recorded

\* New AMIE term introduced for RCZAS: it relates to features recorded prior to this project from ground inspection but moved from their original position due to coastal erosion or human activities.

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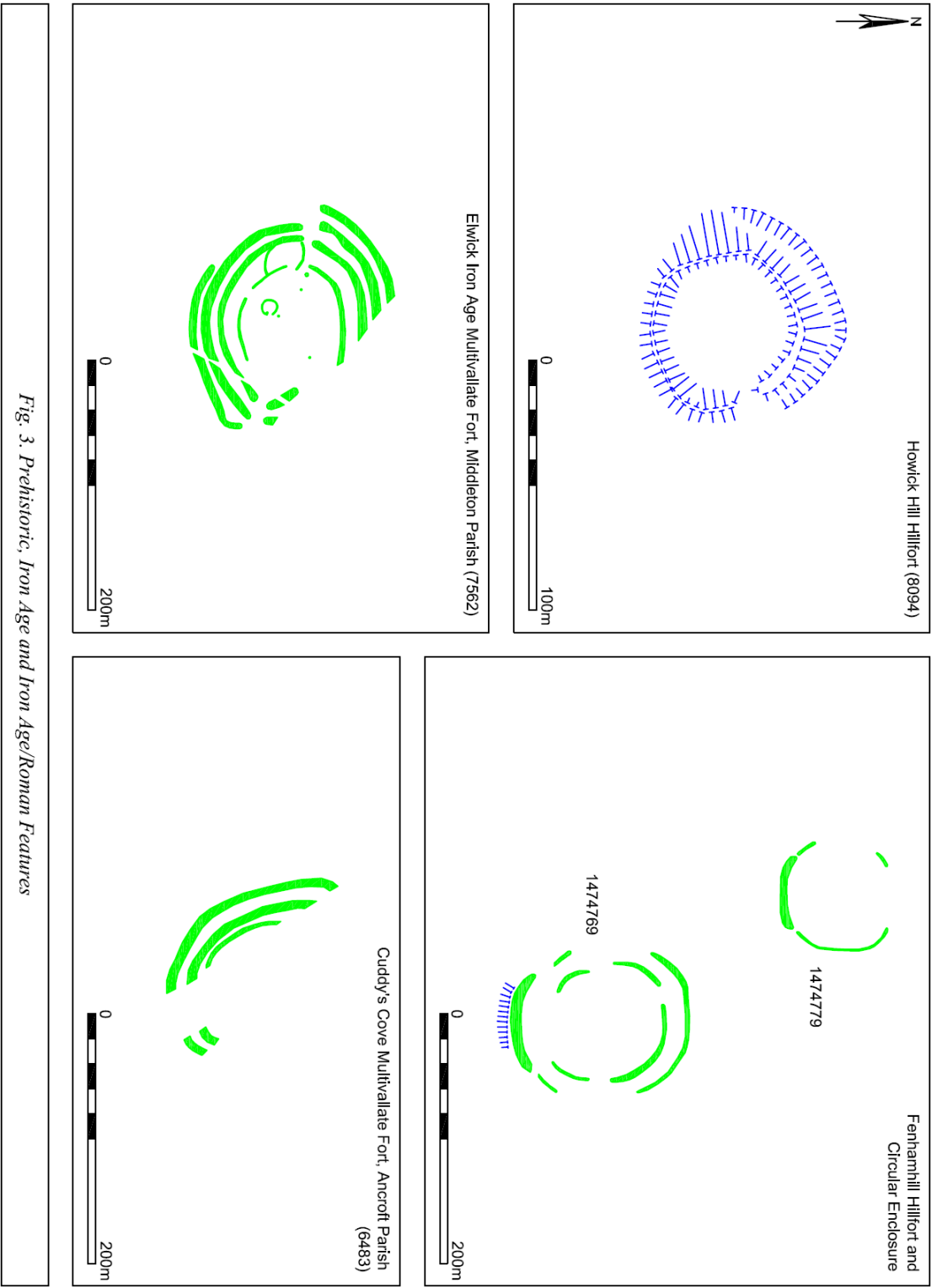


Fig. 3. Prehistoric, Iron Age and Iron Age/Roman Features

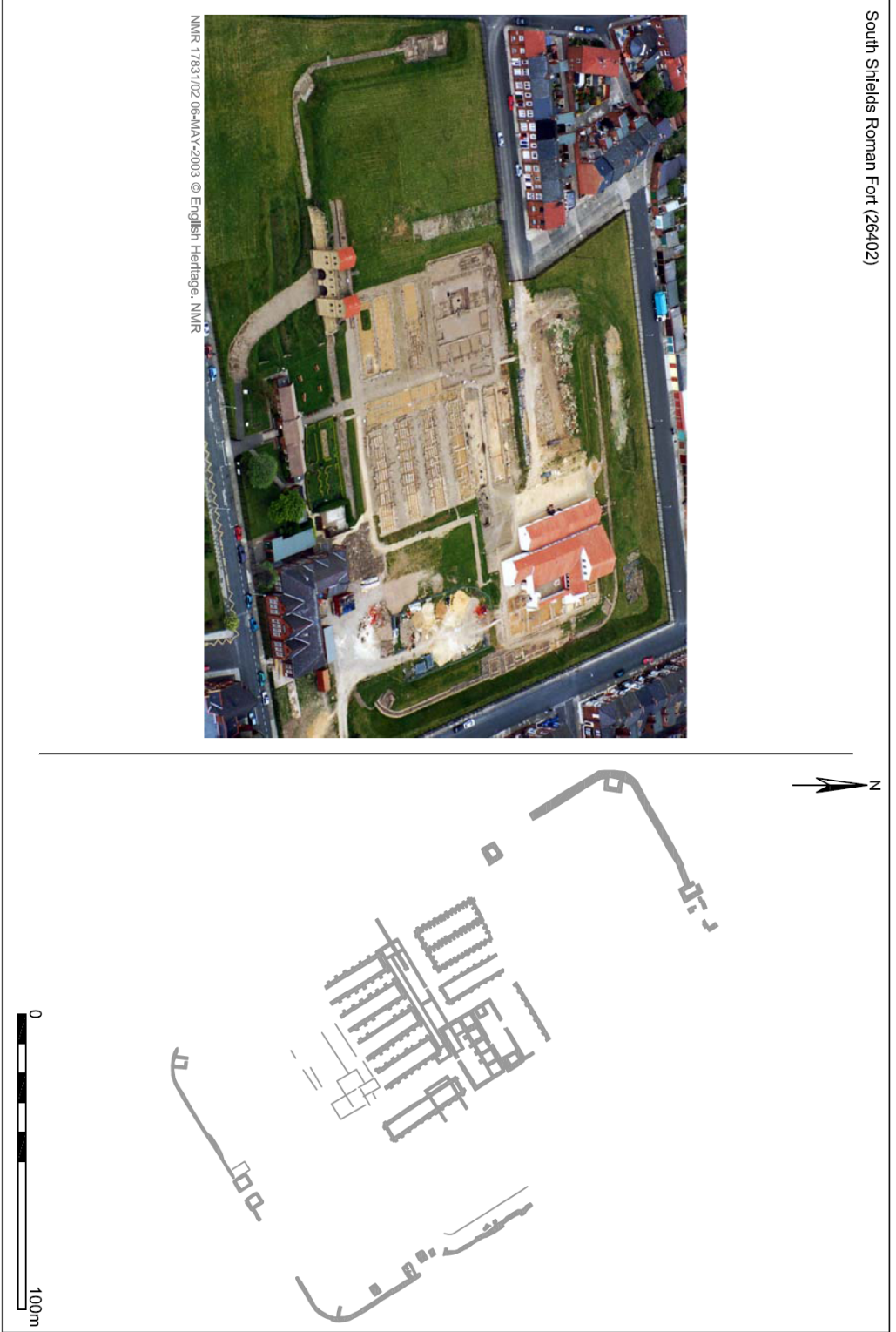
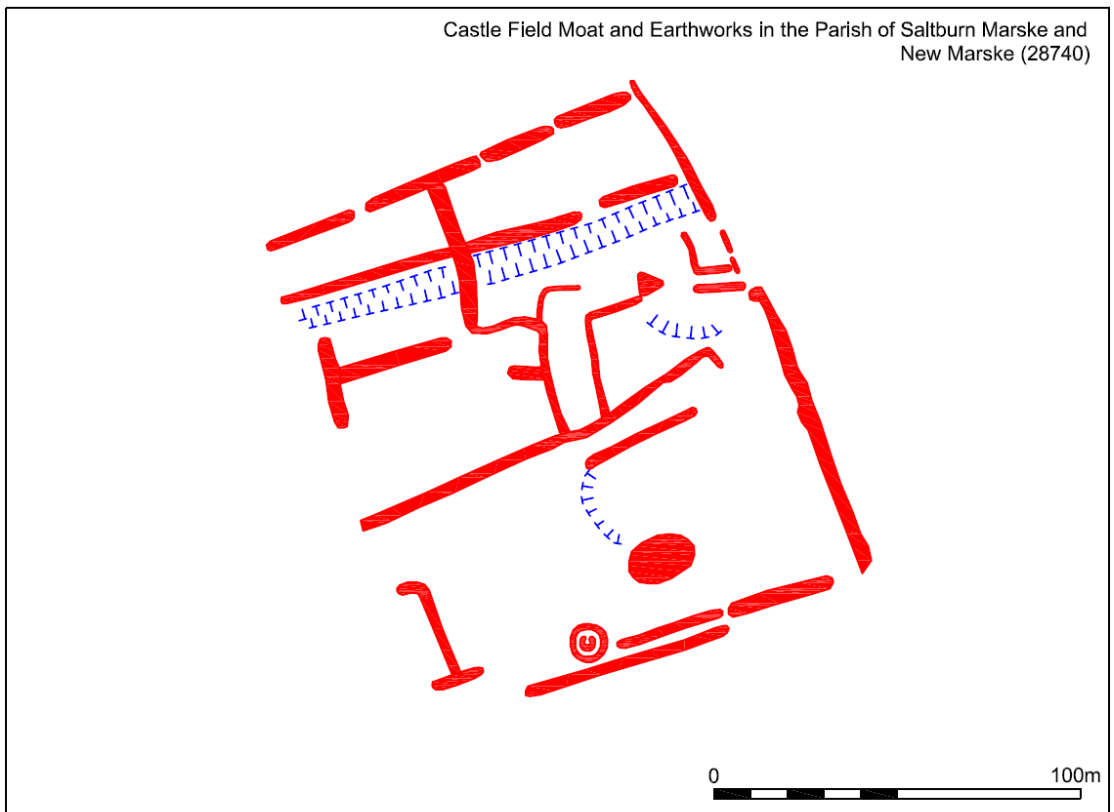
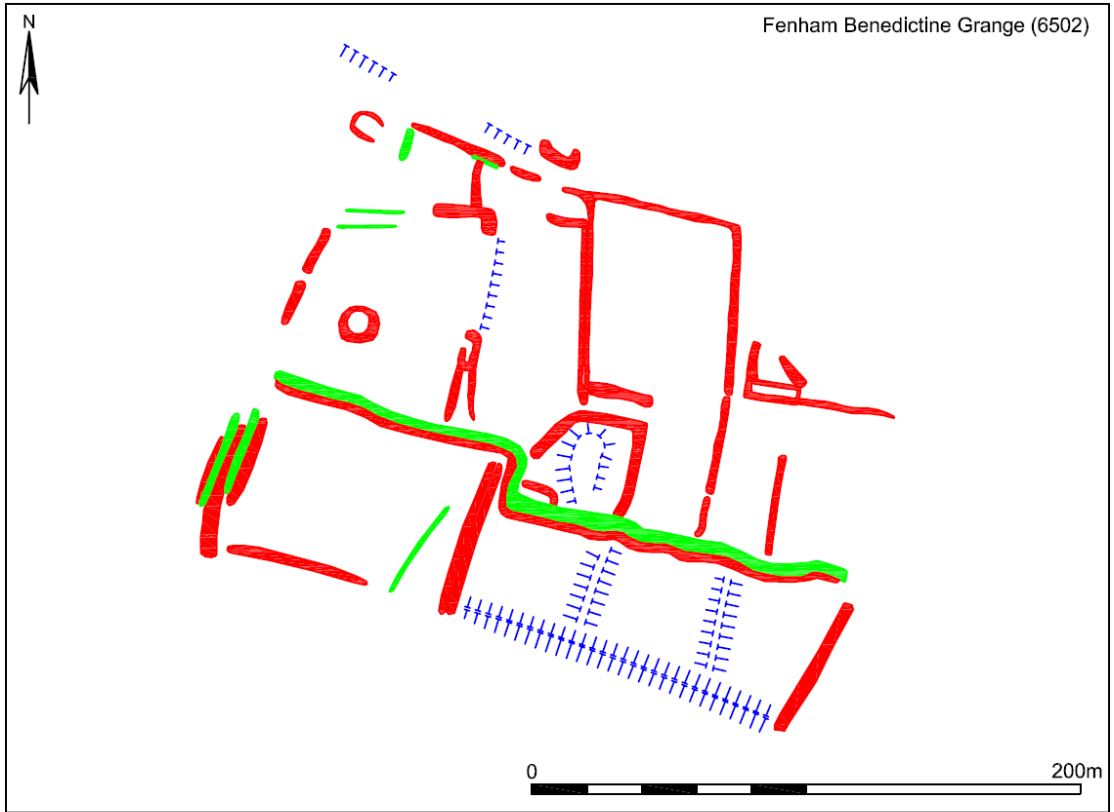


Fig. 4. Roman Features





*Fig. 5. Medieval Features*

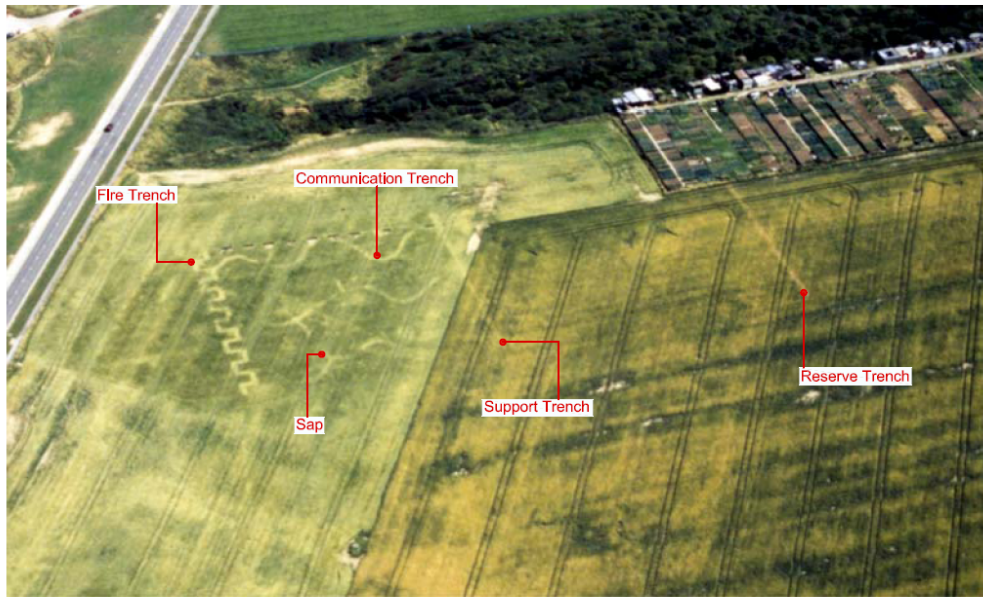
Salt Working Site in the District of Redcar and Cleveland (27783)



RAF CPEJUK/1835 3070 13-NOV-1946 © English Heritage (NMIR) RAF Photography

*Fig. 6. Medieval Features*

First World War Practice Trenches at Marske-by-the-Sea (1458481)



NMR NZ 6223/22 (19846/12) 30-JUL-2001 © English Heritage, NMR

20th Century Airfield Structures at Marske-by-the-Sea (1458559)



*Fig. 7. First World War and 20th Century Features*

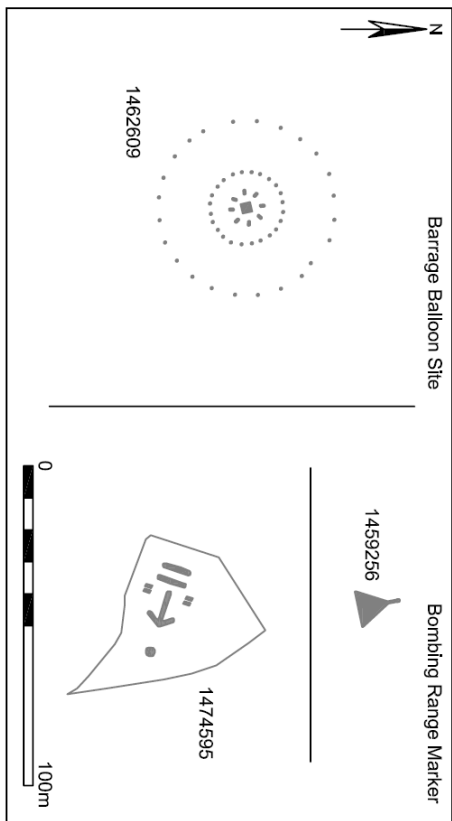
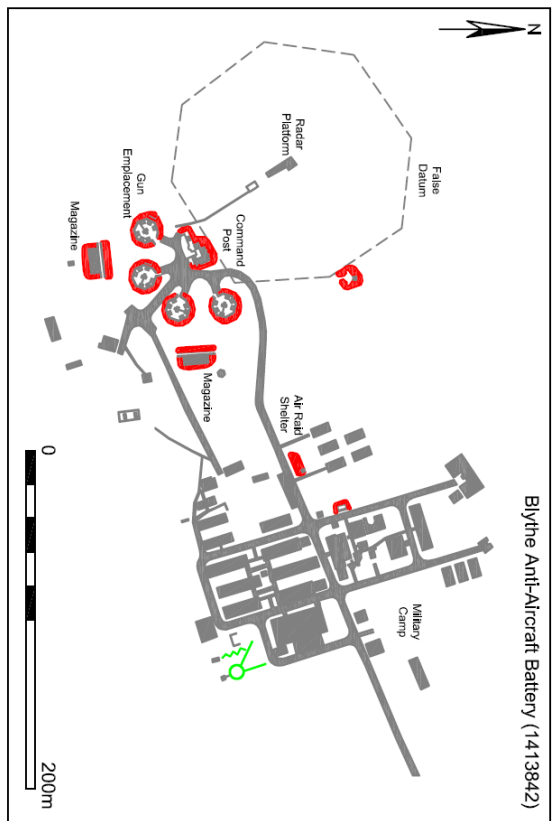
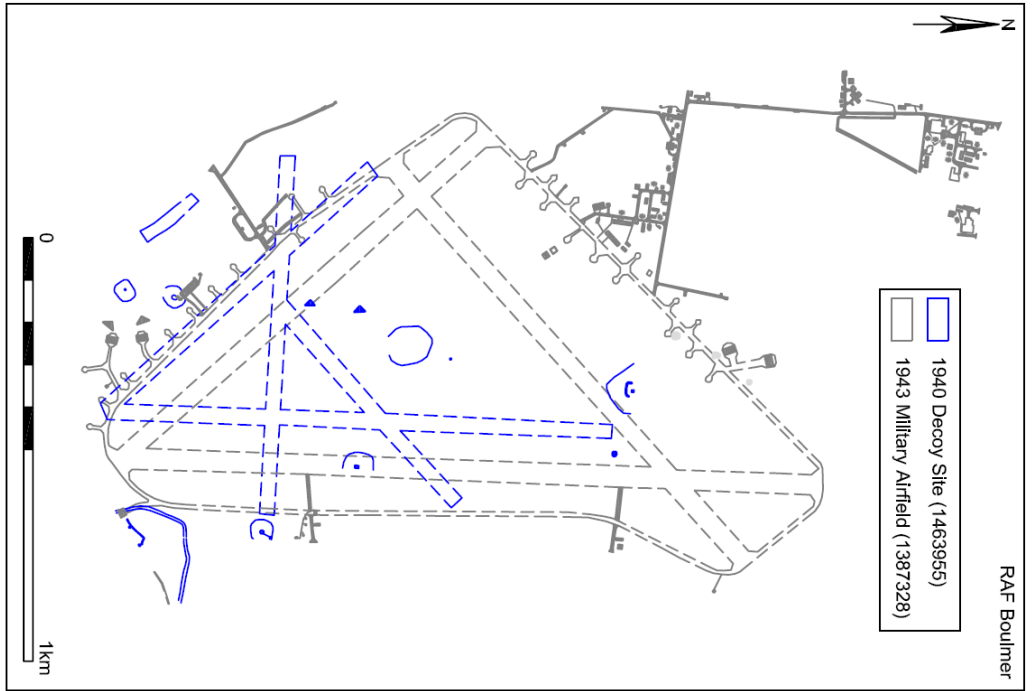


Fig. 7. Second World War Features

Multiple Wrecks on the Mud Flats at Amble-by-the-Sea (907649)



NMIR NU 2605/18 (17737/9) 06-AUG-2002 © English Heritage, NMIR

*Fig. 9. Features of Uncertain Date*