Otterburn Training Area, Northumberland
Options for Change Development

AS90/MLRS Project
construction phase archaeological works 2003-2005

on behalf of
Mowlem plc

for
Ministry of Defence
Otterburn Training Area, Northumberland
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MLRS at Otterburn Training Area

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Report 1280
October 2005

Archaeological Services Durham University
on behalf of
Mowlem plc
for
Ministry of Defence

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1. Summary

The project

1.1 This report presents the results of archaeological investigations conducted during the construction phase of works for the AS90/MLRS Project at the Otterburn Training Area, Otterburn, Northumberland. The investigations comprised watching briefs during 68km of road-widening works including the construction of new stone tracks, passing places, gunspurs, tactical observation posts, vehicle bays, drains, culverts, bridges and echelon areas; trial trench evaluation, excavation and watching briefs at Davyshiel (Central Maintenance Facility/CMF); and trial trench evaluation and watching briefs at Carrick Heights (Electronic Target Range/ETR). A watching brief was also maintained during removal of the perimeter fence at the former Redesdale Camp.

1.2 The works were commissioned by Mowlem plc and conducted by Archaeological Services Durham University.

Results

1.3 Areas of re-deposition and truncation of deposits were identified and the presence or lack of archaeological evidence recorded during the watching brief appears to reflect the agricultural/military operations carried out on the site from the medieval period to the present day. Archaeological material was encountered in few of the areas monitored during the road improvement watching brief, although a truncated section of Dere Street Roman road was identified and recorded near Featherwood.

1.4 Trial trench evaluation at Davyshiel prior to the construction of the CMF enabled the recording of a number of earthwork features of medieval and post-medieval date. A post-medieval corn-drying kiln was also excavated to the north-west of the CMF site. Walls of probable post-medieval date were excavated at the ETR.
2. **Project background**

*Introduction*

2.1 Otterburn Training Area (OTA) occupies over 23,000 hectares of high moorland and rough hill country almost entirely within the Northumberland National Park, adjacent to the England/Scotland border (Figure 1). It is bounded to the west by the A68 trunk road and to the east by the B6341 (NGR centre: NY 860 050). OTA is the largest single live firing area in the UK and has been used for training military personnel since 1911. It is also a working estate with 31 tenanted farms practising traditional hill livestock farming.

*Development proposal*

2.2 The development proposal was to widen approximately 50km of existing roads at the OTA and to construct new sections of road, passing places, gunspurs, tactical observation posts, vehicle bays, drains, culverts, bridges and echelon areas as part of the Ministry of Defence’s Options for Change AS90/MLRS Project. The construction of a Central Maintenance Facility (CMF) was also proposed for land at Davyshiel.

2.3 During the development phase, a variation to the main construction contract was awarded for the construction of an Electronic Target Range (ETR) on land at Carrick Heights.

*Archaeological mitigation measures*

2.4 In agreement with English Heritage and the Northumberland National Park Authority the Ministry of Defence (MoD) undertook to commission a programme of agreed archaeological mitigation measures (“the Agreed Measures”) at the Otterburn Training Area if the Inquiry into the AS90/MLRS Project development proposals found in favour of the MoD. The MoD proposals were approved in 2001 and Archaeological Services Durham University were subsequently commissioned to implement both the pre-construction and construction components of the Agreed Measures.

2.5 The Agreed Measures relating to the archaeological works were set out in a document presented to the Inquiry (MoD/P/8/A, Appendix B) and subsequently ratified in Condition 4.1 of the Secretary of State’s decision. These can be summarised as follows:

- works required prior to construction
- works during construction
- restrictions on the construction contractors’ methods or areas of working
- miscellaneous provisions
- completed measures

2.6 The pre-construction archaeological works were commissioned by RPS Group PLC on behalf of the MoD and comprised excavations, topographic surveys and building surveys (Archaeological Services 2004 & 2005). The construction phase archaeological works were commissioned by Mowlem plc and are reported on here. The locations of the investigations for both phases of work are shown on Figure 2.
2.7 This report is also reproduced as Part V of Archaeological Services Report 1284 (2005), which details the final results of all archaeological investigations undertaken by Archaeological Services on the OTA between 2002 and 2005.

**Objectives**

2.8 The overarching aims of the construction phase works (watching brief) were to provide facilities for professional archaeologists to identify, record and retrieve, as far as possible, archaeological remains that were located in the course of the construction works and to monitor the construction contractor’s adherence to the agreed limitations on working methods in those areas where listed buildings or scheduled ancient monuments were present. The project objectives are presented in more detail in Section 3, below.

2.9 The objective of the additional archaeological works at Davyshiel and Carrick Heights was to excavate, sample and record known archaeological features prior to construction works for the Central Maintenance Facility and Electronic Target Range respectively.

**Specification**

2.10 The various construction phase archaeological works were undertaken in accordance with specifications provided by White Young & Green Consulting Engineers, acting on behalf of the Ministry of Defence (Appendix III).

**Dates**

2.11 The construction phase archaeological works began in May 2003 with the start of the road improvements watching brief, which was completed in June 2004. The CMF works were undertaken in 2003 and 2004 and the ETR works in 2004 and 2005. Archaeological fieldwork for this project was concluded with the end of the ETR watching brief in September 2005.

2.12 This report was prepared between June 2004 and October 2005.

**Personnel**

2.13 Construction phase fieldwork was conducted by Graeme Attwood, Katie Bell, Janet Beveridge, Ed Blinkhorn, Mark Douglas, David Graham, Andy Platell, Sam Roberts, Chris Scurfield and Andy Willis, and was supervised by Alan Rae. This report was prepared by Alan Rae and Duncan Hale with contributions by Andy Willis and illustrations by Linda Bosveld, Janine Fisher, David Graham and Martin Railton. Specialist analyses were conducted by Dr Chris Cumberpatch (ceramics), Louisa Gidney (faunal remains), Jason Mole (lithics) and Dr Charlotte O’Brien (plant remains). The project manager was Duncan Hale.

**Acknowledgements**

2.14 Archaeological Services is grateful for the assistance of the following companies and organisations: the Ministry of Defence, White Young & Green, Mowlem Civil Engineering, CPS Engineering Ltd, RPS Group, the Northumberland National Park Authority and all the tenant farmers.
**Archive**

2.15 The project code is OTA03, for Otterburn Training Area 2003. Site codes have been assigned to works in specific areas. The archive is currently held by Archaeological Services Durham University and will be transferred (together with the pre-construction phase archive) to Miss Lindsay Allason-Jones for curation at the Museum of Antiquities, University of Newcastle upon Tyne, on completion of the project. Defence Estates will issue a form at the end of the project enabling the release of the archive for deposition.

**OASIS**

2.16 Archaeological Services is registered with the Online AccesS to the Index of archaeological investigationS project (OASIS). The OASIS ID number for this programme of investigation is archaeol3-10729.

**Topography and geology**

2.17 The topography and geology of the Training Area can be broadly divided into three sections. The northern part comprises a high plateau of volcanic lavas, typically covered by moor mat-grass and bracken. In the central part there is a high ridge of Fell Sandstone, which forms the watershed between the Coquet and Rede valleys, and is typically covered with a thick blanket of heather. The southern section comprises more recent limestones, shales and thin coal seams. The pasture is better quality in the southern part, particularly on the limestone, although there are also areas of bracken, coarse grasses and heather.
3. **Aims and objectives**

**Overarching aim**

3.1 The overarching aims of the construction phase works (watching brief) were to provide facilities for professional archaeologists to identify, record and retrieve, as far as possible, archaeological remains that were exposed during groundworks in those parts of the development which fell outside the pre-construction excavations and to monitor the construction contractor’s adherence to the agreed limitations on working methods in specific areas.

3.2 The objective of the additional archaeological works at Davyshiel and Carrick Heights was to excavate, sample and record known archaeological features prior to construction works for the Central Maintenance Facility and Electronic Target Range respectively.

**Specific requirements**

3.3 There were specific requirements for monitoring the construction contractor’s adherence to the agreed limitations on working methods in those areas where listed buildings or scheduled ancient monuments were present, as follows:

- restrictions on working widths and the location of the road widening at Todlaw Pike
- location of widening at Deer Law hut circles
- width restrictions and location of widening at Yatesfield
- width restrictions and location of widening at Bellshiel
- location of widening to east of Dere Street north of Middle Golden Pot
- width restrictions and location of widening at Countess Well
- width restrictions and location of widening adjacent to the western part of High Rochester to Bridge of Aln road
- location of widening in the vicinity of Potts Durtrees medieval building
- width restrictions and protection of Watty Bell’s Cairn
- width restrictions and location of widening at medieval structure 2d
- modification of Highshaw Bastle passing place

**Research objectives**

3.4 The research objectives for this project were:

- to integrate the project within the English Heritage national policy framework and its objectives, as outlined within Exploring Our Past (English Heritage 1991a), the Research Agenda (English Heritage 1997) and Policy Statement on implementation (English Heritage 1999)
- to ensure that nationally prepared research-based documents, for example the output of national societies for different archaeological specialisations, are utilised at the individual project level
- to ensure that the project results met the development of regional research initiatives, as outlined within Frameworks for our Past (English Heritage 1996), within the MARS report (Darvill & Fulton 1998), and in...
particular the North-East Regional Research Framework initiative, the development of which is ongoing

- to marry results and interpretations conducted within a developer-funded framework with those conducted in a research framework to address the north-eastern frameworks already made explicit in different formats, for example that for environmental archaeology (Huntley & Stallibrass 1995)

- to address specific research issues arising from individual and organisational contributions, for example to local journals such as Northern Archaeology and Archaeologia Aeliana

- to provide all members of the project team with a framework within which to operate and interpret the archaeological evidence as it comes to light

- to ensure that the methods and sampling strategies adopted, both stated before fieldwork and adapted as the project developed, were appropriate to the research potential of the project

- to ensure that project elements were placed in the context of the overall project and within the framework of archaeological study at a local, regional and national level

- to provide a basis for the overall synthesis of the results for the final report, in particular the academic publication

**Updating research objectives**

3.5 It has not been found necessary to update the specific research objectives as a result of the post-fieldwork assessment process.
4. Previous archaeological works

4.1 The first comprehensive archaeological survey of the Training Area was carried out by the Conservation Group of Otterburn Estate and the Field Research Group of the Society of Antiquaries of Newcastle upon Tyne between 1975 and 1977. Directed by Beryl Charlton, this survey resulted in the production of a gazetteer and review of archaeological remains on the estate (Charlton & Day 1977; Charlton 1996). There is an abundance of archaeological sites of most periods in the Training Area, ranging from Neolithic burial monuments to Roman forts, medieval farmsteads and post-medieval industrial sites, all of which suggest that the area was considerably more densely populated than in recent times.

4.2 Following MoD proposals for the ‘Options for Change’ project, archaeological surveys and evaluations were undertaken at a number of locations in the Training Area in 1995 to 1997, in order to assess the potential archaeological significance of specific areas affected by the road-widening proposals. These investigations were undertaken jointly by Lancaster University Archaeological Unit and The Archaeological Practice, University of Newcastle upon Tyne. The evaluations identified a number of areas where the survival of significant archaeological remains would be threatened by the proposed developments (LUAU/NUAP 1996, 1997).

4.3 Subsequently, in 2002, Archaeological Services undertook the detailed excavation of a number of sites threatened by development for the AS90/MLRS Project, as well as further topographic survey and historic building recording, as shown in Figure 2 and listed below. The results of these investigations are fully described and discussed in Archaeological Services Reports 1096 (2004) and 1284 (2005).

4.4 Locations of 2002 investigations:

Excavation
- Bellshiel Roman Camp, NY 8159 9971
- Bellshiel Layby, NT 8098 0109
- Bellshiel Road, N & S, NT 8124 0058, NT 8139 0021
- Potts Durtrees, NY 8767 9795
- Todlaw Pike, NY 9020 9593
- Dere Street N of Redesdale Camp, NY 8252 9941
- Outer Golden Pot, NT 8044 0725

Topographic survey
- Yatesfield East Settlement, NY 8600 9770
- Watty Bell’s Cairn, NT 8921 0199
- Bellshiel Law Long Cairn, NT 8132 0117

Building survey
- Craig bastle, NY 9372 9988
- Raw bastle, NY 9427 9802
- Ironhouse bastle, NY 9335 9833
5. Methods

Standards

5.1 Archaeological Services abides by the Institute of Field Archaeologists’ (IFA) *Code of Conduct* (1997a) and *Code of Approved Practice* (1997b), and the British Archaeologists and Developers Liaison Group’s *Code of Practice*. The works have been conducted in accordance with specifications provided by White Young & Green Consulting Engineers; approved methods statements prepared by Archaeological Services; and with the IFA *Standard and Guidance* for archaeological field evaluation (2001a), archaeological excavation (2001b) and archaeological watching briefs (2001c).

Fieldwork

5.2 Unless stated otherwise below, each trench was opened by a mechanical excavator fitted with a toothless ditching blade. The development-led stripping, which was closely monitored by archaeologists, was undertaken using a variety of machines, with ditching blades where possible. All topsoil stripping was carried out under close archaeological supervision and spoil was stored alongside the excavations. Modern overburden was removed by machine where encountered. Reinstatement, where necessary, comprised backfilling with excavated spoil and compaction by machine.

5.3 In areas where machining could potentially damage archaeological features close to the surface (for example, the stone walls at the ETR and the corn-drier near the CMF) machine stripping was not used; these sites were de-turfed by hand.

5.4 Archaeological features were identified and cleaned by hand using standard archaeological procedures. Excavation of archaeological deposits was conducted by hand. The excavations were recorded using the Archaeological Services Iconic Formation Process Recording System and our Field Procedures Manual v.4.1 (Archaeological Services 2003).

5.5 Archaeological features were sectioned and excavated, and recorded in plan and section. Plans were typically drawn at a scale of 1:20, sections at a scale of 1:10. All archaeological features, finds and samples were recorded using standard Archaeological Services procedures and forms as contained within the Field Procedures Manual.

5.6 Each stratigraphic matrix was established on site during the course of the excavations.

5.7 The locations of small finds, trench locations and levels were recorded using total station survey instruments. Levels and trench locations have been related to Ordnance Survey datum. The photographic record included bracketed colour transparencies and monochrome 35mm stills, as well as digital photography.

5.8 All excavation work was subject to an environmental sampling strategy, which was agreed with Jacqui Huntley (English Heritage Regional Science Advisor)
prior to the commencement of any site works. 30-litre bulk sediment samples were taken from the fills of cut features as well as any other securely interpreted stratigraphic units (such as buried soils) and waterlogged deposits, which were considered to have potential for preserving palaeoenvironmental or archaeological information. In some instances samples were specifically collected for the recovery of pollen evidence.

5.9 Sampling was conducted by our Environmental Archaeologist (Dr Charlotte O’Brien) and by our field personnel, all of whom have been trained in environmental sampling strategies and procedures.

5.10 Artefactual finds were removed from site to a secure location at the end of each working day. Small finds were recorded and packaged separately from bulk material; they were listed and numbered, and their three-dimensional coordinates recorded. All small finds were appropriately packaged, and removed from site to suitable secure storage at the end of each day.

5.11 It was not considered appropriate for these excavations, where low quantities of finds were anticipated, to employ an on-site finds officer. All field personnel are trained in the recovery, labelling and storage of artefacts.

Post-excavation assessment

5.12 Following the completion of fieldwork all site records were checked and cross-referenced. Context registers have been included in this report (Appendix I).

5.13 All bulk sediment samples were assessed for their potential to provide environmental and economic evidence, as well as their suitability for subsequent $^{14}$C dating. For general biological assessment 5-litre sub-samples have been processed, as below.

5.14 Bulk sediment samples were sub-sampled and processed using a manual flotation technique with both flots (largely plant remains) and residues being retained on 500µm mesh sieves. Flots were examined at up to x50 magnification for botanical remains. The residues were also inspected for fruit stones, nutshells, small bones, pottery sherds, slag etc., and scanned with a magnet for ferrous materials.

5.15 The assessment reports for each site, below, record the general nature of the sediment, the composition of sample flot and residue, the types of plant remains present (e.g. waterlogged and charred, seed/leaf/stem/root types seen and easily identified), the preservation quality of plant remains, and observations on ecological groups represented. Data tables and abundance scores are provided. Recommendations for further work on the samples are provided where appropriate.

5.16 Artefacts have been assessed by specialists in individual types of materials encountered on site rather than through a generic ‘finds specialist’ to ensure an accurate, up-to-date and academically viable report is produced. Specialists were selected on the basis of their modern academic knowledge and their
ability to interpret artefactual assemblages within the wider archaeological context.

5.17 Assessments of the excavated material have been completed following the recommendations of Management of Archaeological Projects, Appendix 4 (English Heritage 1991b). Each class of artefact recovered from the site has been examined to determine in particular:

- the quantification, age and description of the artefacts
- the significance of the material within the archaeological context
- the potential of the material for further analysis, including elemental analysis
- any conservation requirements
- the storage requirement
- the discard policy

5.18 The suitability of samples and materials for scientific dating techniques such as $^{14}$C dating have been assessed from specific contexts.
6. Road improvement and associated works: watching brief

Introduction

6.1 A total of 40km of asphalt roads were widened and 28km of new and widened stone tracks were constructed together with passing places, drains, tactical observation posts, vehicle bays, gunspurs, services and 267 new culverts. Six echelon areas were also developed at Stewartshiels, Davyshiel, Headshope, Yatesfield, Leighton Hill and Redesdale. There were two major bridgeworks, one involving demolition of an existing roadbridge and subsequent new construction, the other involving refurbishment of a stone arch roadbridge.

6.2 For construction purposes the road system was divided into 56 sections, as shown in Figure 2, not including the roads associated with the new echelon areas. The watching brief results for each section are provided below. A list of contexts with descriptions and associated finds is provided in Appendix I. The site code was OTA03.

Road A-B

6.3 Road A-B measured 1.1km in length, orientated north to south, and was between 197.17m and 260.41m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge of the existing road. Additional work undertaken in conjunction with the road-widening was the construction of gunspurs 1a and 1c, and concrete culverts C1/1, C1/1e, C1/2 and C1/2a.

6.4 The natural orange/brown boulder clay [3] was reached at a depth of 0.58m below ground level (bgl). Immediately above this was a layer of greyish brown
clay silt [2] 0.35m in depth. The uppermost deposit was a silty clay topsoil [1] 0.23m in depth. No archaeological deposits or artefacts were recovered.

Road B-C

6.5 Road B-C measured 2.6km in length, orientated broadly north-east to south-west, and was between 247.35m and 281.87m OD. The road-widening took place along the north-western edge of the Scheduled Ancient Monument at High Shaw Bastle (SAM20909). The works consisted of 2m of road-widening along the north-western edge of the existing road and 1m of road-widening along the south-eastern edge; additional works comprised the construction of gunspurs 7, 8, 10 and 11, and concrete culverts C1/3, C1/4, C1/5, C1/6, C1/7, C1/8, C1/10, C2/1 and C2/2.
6.6 The natural mottled orange/grey/brown boulder clay \([6]\) was reached at a depth of 0.62m bgl. Immediately above this was a layer of greyish brown clay silt \([5]\) 0.38m in depth. The uppermost deposit was a silty clay topsoil \([4]\) 0.34m in depth. No archaeological features or remains were identified during the course of the groundworks.

**Road C-D**

6.7 Road C-D measured 1km in length, orientated north-west to south-east, and was between 245.29m and 279.48m OD. The works consisted of 2m of road-widening along the south-western edge of the existing road and 1m of road-widening along the north-eastern edge of the existing road. Additional works undertaken in conjunction with the road-widening comprised the construction of gunspurs 14 and 15.

6.8 The natural orange/brown boulder clay \([9]\) was reached at a depth of 0.60m bgl. Immediately above this was a layer of dark grey brown clay silt \([8]\) 0.40m in depth. The uppermost deposit was a silty clay topsoil \([7]\) 0.20m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road D-E**

6.9 Road D-E measured 2.1km in length, orientated north-east to south-west, and was between 224.81m and 240.48m OD. The works consisted of the construction of a new stone road measuring 7m in width. Additional works comprised the construction of gunspurs 16 and 22, and concrete culverts C2/7, C2/7a, C2/7b, C2/7c, C2/7d, C2/7e, C2/8, C2/9, C2/35, C2/36 and C2/37.

6.10 The natural gleyed orange/brown to blue/grey boulder clay \([12]\) was reached at a depth of 0.48m bgl. Immediately above this was a layer of dark brown peat \([11]\) 0.28m in depth. The uppermost deposit was a silty clay topsoil \([10]\) 0.20m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road E-F**

6.11 Road E-F measured 1.1km in length, orientated north-west to south-east, and was between 243.67m and 278.55m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge of the existing road. Additional works comprised the construction of gunspurs 17 and 18, and concrete culverts C2/13, C2/15 and C2/16.

6.12 The natural orange/brown boulder clay \([15]\) was reached at a depth of 0.62m bgl. Immediately above this was a layer of orange/brown clay silt \([14]\), 0.32m in depth. The uppermost deposit was a silty clay topsoil \([13]\) 0.30m in depth. No archaeological deposits or features were identified, and no artefacts recovered.
Road  F-C

6.13 Road F-C measured 2.2km in length, orientated north-east to south-west, and was between 225.77m and 279.77m OD. The works consisted of 2m of road-widening along the western edge of the existing road and 1m of road-widening along the eastern edge. Additional works undertaken in conjunction with the road widening comprised the construction of gunspurs 11b, 12, 13 and 19, and concrete culverts C2/3, C2/4 and C2/5.

6.14 The natural orange/brown boulder clay [18] was reached at a depth of 0.60m bgl. Immediately above this was a layer of greyish brown clay silt [17] 0.35m in depth. The uppermost deposit was a silty clay topsoil [16] 0.25m in depth.

6.15 Evidence for a recent bonfire was found between chainage 760m and 780m. No archaeological deposits or features were identified, and no artefacts recovered.

Road  F-G

6.16 Road F-G measured 2.7km in length, orientated north-west to south-east, and was between 236.39m and 265.96m OD. The road-widening was excavated along the north-eastern edge of the Scheduled Ancient Monument at Tod Law Pike (SM25156). The works consisted of 2m of road-widening along the western edge of the existing road and 1m of road-widening along them eastern edge of the existing road. Additional works comprised the construction of gunspurs 23 and 24, and concrete culverts C2/18, C2/19, C2/20, C2/21, C2/22, C2/23, C2/24, C2/25, C3/1, C3/2, C3/3, C3/4, C3/4a, C3/5, C3/6, C3/7, C3/7a, C3/8, C3/8a and C3/8b.

6.17 The natural orange/brown boulder clay [43] was reached at a depth of 0.45m bgl. Immediately above this was a layer of greyish brown clay silt [42] 0.35m in depth. The uppermost deposit was a silty clay topsoil [136] 0.10m in depth. No archaeological features or remains were recorded during the course of the groundworks.

Road  G-H

6.18 Road G-H measured 1.3km in length, orientated north-east to south-west, and was between 233.46m and 255.14m OD. The works consisted of 2m of road-widening along the eastern edge and 1m along the western edge of the existing road. Additional works undertaken comprised the construction of gunspur 26, and concrete culverts C3/22, C3/23, C/24, C3/25, C3/26 and C3/27. Davyshiel echelon was joined to the eastern side of road G-H by two concrete junctions.

6.19 The natural orange/brown boulder clay [46] was reached at a depth of 0.38m bgl. Immediately above this was a layer of greyish brown clay silt [45] 0.25m in depth. The uppermost deposit was a silty clay topsoil [44] 0.13m in depth. No archaeological deposits or features were identified, and no artefacts recovered.
Road H-J

6.20 Road H-J measured 350m in length, orientated east to west, and was between 214.23m and 231.73m OD. The road traverses west from Otterburn Camp, across the northern end of the proposed CMF works at Davyshiel. The works consisted of a 9m-wide strip along the northern edge of the existing road and 1m of road-widening along the southern edge of the existing road. Additional works comprised the construction of concrete culverts C3/21, C3/21a and C3/21b.

6.21 Some evidence for ridge and furrow remains was noted during the road-widening, with one ridge standing to 0.30m in height. The works also cut into the northern edge of a crop pit, which was filled with 20th century refuse (not retained). A crop pit is a bell-shaped pit excavated for coal extraction; these are often found in groups where there are outcrops of coal-bearing strata. The row of crop pits at Davyshiel are likely to be post-medieval in date, as the area was not being mined at the time of a 1604 survey (Sanderson 1891). The results of investigations in the CMF area are described in Section 6, below.

6.22 The natural orange/brown boulder clay [21] was reached at a depth of 0.35m bgl. Immediately above this was a layer of very dark brown/black peaty soil [20] 0.15m in depth. The uppermost deposit was a silty clay topsoil [19] 0.20m in depth.

Road H-K

6.23 Road H-K measured 1.7km in length, orientated east to west, and was between 233.96m and 270.23m OD. The road-widening was conducted along the northeastern edge of the Scheduled Ancient Monument at Fairney Cleugh (SAM25159). The works consisted of 2m of road-widening along the southern edge of the existing road and 1m of road-widening along the northern edge. Additional works undertaken comprised the construction of gunspur 27, and concrete culverts C3/16, C3/17, C3/18, C3/19, C3/20 and C4/1.

6.24 The natural orange/brown boulder clay [49] was reached at a depth of 0.50m bgl. Immediately above this was a layer of greyish brown clay silt [48] 0.32m in depth. The uppermost deposit was a silty clay topsoil [47] 0.18m in depth. No archaeological features or remains were recorded during the course of the excavation.

Road K-L

6.25 Road K-L measured 1.6km in length, orientated north to south, and was between 238.23m and 294.21m OD. The road-widening was conducted along the eastern edge of a ruined medieval building at Potts Durtrees. A detailed archaeological excavation had already taken place here (Archaeological Services 2004 & 2005).

6.26 The works consisted of 2m of road-widening along the eastern edge and 1m along the western edge of the existing road. Additional works undertaken in conjunction with the road-widening comprised the construction of gunspurs 29 and 31, and concrete culverts C3/13, C3/14, C3/15 and C3/16.
6.27 The natural orange/brown boulder clay [124] was reached at a depth of 0.59m bgl. Immediately above this was a layer of greyish brown clay silt [123] 0.36m in depth. The uppermost deposit was a silty clay topsoil [122] 0.23m in depth. No archaeological deposits or artefacts were recovered.

Road L-L1

6.28 Road L-L1 measured 150m in length, orientated north-east to south-west, and was between 293.48m and 300.34m OD. The road-widening was conducted along the north-western edge of the Scheduled Ancient Monument at Hare Cairn (SAM25062). The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge of the existing road. Additional works undertaken in conjunction with the road widening comprised the construction of gunspur 30.

6.29 The natural orange brown boulder clay [55] was reached at a depth of 0.58m bgl. Immediately above this was a layer of greyish brown peaty clay silt [54] 0.35m in depth. The uppermost deposit was a silty clay topsoil [53] 0.23m in depth. No archaeological features or remains were recorded during the course of the excavation.

Road L-G

6.30 Road L-G measured 1.5 km in length, orientated north-west to south-east, and was between 253.77m and 302.66m OD. The road-widening was conducted along the north-eastern edge of the Scheduled multi-period settlement at Barracker Rigg (SAM25162/01, SAM25162/02, SAM25162/04, SAM25162/05). The works consisted of 2m of road-widening along the north-eastern edge of the existing road and 1m of road-widening along the south-western edge. Additional works comprised the construction of gunspurs 25 and 26, and concrete culverts C3/9, C3/10, C3/11 and C3/12.

6.31 The natural gleyed orange/brown to blue/grey boulder clay [24] was reached at a depth of 0.74m bgl. Immediately above this was a layer of very dark grey/brown peat [41] 0.20m in depth, which had accumulated naturally within a glacial depression 900m from junction G. This was overlain by a layer of light grey clay silt [40] 0.06m in depth, which was overlain by a layer of dark brown peat [23], 0.28m in depth. The uppermost deposit was a silty clay topsoil [22], 0.21m in depth.

6.32 A sondage, 1.2m by 1m and 1.2m in depth, was excavated to the south of the new road edge at chainage 910m in order to expose the stratigraphic sequence. The south-facing section was recorded (Figure 3), and an overlapping column sample collected in monolith tins. 30 litre samples were also retrieved from each of the lower [41] and upper [23] peat deposits and three pieces of timber were recovered from [41] for assessment of their potential to provide archaeological information. The results of the assessment are presented at the end of this Section (para. 6.130-136). The deposits and timbers appear to have accumulated naturally within a glacial hollow, where preservation of plant macrofossils was poor due to periodic drying out of otherwise waterlogged conditions.
6.33 No archaeological features or remains were recorded during the course of the excavation.

**Road K-M**

6.34 Road K-M measured 1.8km in length, orientated east to west, and was between 184.20m and 233.47m OD. The works consisted of 2m of road-widening along the southern edge and 1m along the northern edge of the existing road. Additional works undertaken in conjunction with the road-widening comprised the construction of gunspurs 32 and 33, and concrete culverts C4/2, C4/3, C4/4, C4/5, C4/6, C4/7, C4/8 and C4/9.

6.35 The natural orange/brown boulder clay [52] was reached at a depth of 0.48m bgl. Immediately above this was a layer of greyish brown clay silt [51] 0.25m in depth. The uppermost deposit was a silty clay topsoil [50] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road M-N**

6.36 Road M-N measured 738m in length, orientated north to south, and was between 217.26m and 248.30m OD. The works consisted of 1m of road-widening along the eastern and western edges of the existing road. Additional works undertaken in conjunction with the road widening comprised the construction of gunspurs 35 and 37, and concrete culverts C4/10, C4/11 and C2/12.

6.37 The natural orange/brown boulder clay [127] was reached at a depth of 0.38m bgl. Immediately above this was a layer of dark grey brown silty clay silt [126] 0.20m in depth. The uppermost deposit was a silty clay topsoil [125] 0.18m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road N-P**

6.38 Road N-P measured 600m in length, orientated east to west, and was between 228.73m and 248.30m OD. The works consisted of 2m of road-widening along the southern edge of the existing road and 1m of road-widening along the northern edge. Additional works undertaken in conjunction with the road-widening comprised the construction of gunspurs 39 and 40, and concrete culverts C4/13, C4/14 and C4/15.

6.39 The natural orange/brown boulder clay [130] was reached at a depth of 0.40m bgl. Immediately above this was a layer of dark grey brown silty clay silt [129] 0.25m in depth. The uppermost deposit was a silty clay topsoil [128] 0.15m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road N-Q**

6.40 Road N-Q measured 1.4km in length, orientated north to south, and was between 248.84m and 259.79m OD. The road-widening was conducted along the western edge of the Scheduled Ancient Monument at Yatesfield Hill.
The works consisted of 2m of road-widening along the western edge of the existing road and 1m of road-widening along the eastern edge of the existing road. Additional works undertaken comprised the construction of gunspurs 34 and 38, and concrete culverts C4/16, C4/17 and C4/18.

6.41 The natural orange/brown boulder clay \([134]\) was reached at a depth of 0.38m bgl. Immediately above this on the western side was a layer of redeposited natural and hardcore. This was overlain by thin (0.05m) turf. On the eastern side of the existing road the boulder clay was overlain by hardcore and turf only. No archaeological features or remains were recorded.

**Road Q-S1**

6.42 Road Q-S1 measured 400m in length, orientated north-east to south-west, and was between 259.76m and 222.56m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road. Additional works comprised the construction of concrete culvert C6/1.

6.43 The natural orange/brown boulder clay \([135]\) was reached at a depth of 0.38m bgl. Immediately above this on the western side was a layer of redeposited natural and hardcore. This was overlain by thin (0.05m) turf. On the eastern side of the existing road the boulder clay was overlain by hardcore and turf only. As with the previous road section, it is apparent that the area has been disturbed in the recent past. No archaeological features or remains were identified during the course of the works.

**Road S1-T**

6.44 Road S1-T measured 660m in length, orientated north-east to south-west, and was between 222.85m and 248.37m OD. The works consisted of 2m of road-widening along the eastern edge of the road and 1m of road-widening along the western edge. There were no additional works associated with this road.

6.45 The natural orange/brown boulder clay \([26]\) was reached at a depth of 0.23m bgl. This was overlain by a silty clay topsoil \([25]\) 0.23m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road T-U**

6.46 Road T-U measured 532m in length, orientated north-west to south-east, and was between 225.81m and 231.53m OD. The works consisted of 2m of road-widening along the western edge of the road and 1m of road-widening along the eastern edge of the existing road.

6.47 The natural orange/brown boulder clay \([28]\) was reached at a depth of 0.28m bgl. This was overlain by a silty clay topsoil \([27]\) 0.28m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road U-L**

6.48 Road U-L measured 1km in length, orientated north-west to south-east, and was between 225.19m and 293.24m OD. The works consisted of 2m of road-
widening along the western edge of the existing road and 1m of road-widening along the eastern edge.

6.49 The natural orange/brown boulder clay [30] was reached at a depth of 0.30m bgl. This was overlain by a silty clay topsoil [29] 0.30m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road T-V**

6.50 Road T-V measured 2.2km in length, orientated north-east to south-west, and was between 250.56m and 307.81m OD. The road was widened by 2m on the western side and concrete culverts C6/2, C6/3, C6/4, C6/5, C6/7, C6/8, C6/9, C6/10 and C6/11 were constructed.

6.51 The natural orange/brown boulder clay [139] was reached at a depth of 0.32m bgl. Immediately above this was a layer of dark greyish brown clay silt [13] 0.19m in depth. The uppermost deposit was a silty clay topsoil [137] 0.13m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road V-W**

6.52 Road V-W measured 200m in length, orientated east to west, and was between 308.94m and 313.00m OD. The works consisted of 2m of road-widening along the northern edge of the existing road.

6.53 The natural orange/brown boulder clay [142] was encountered at 0.28m bgl. Immediately above this was a layer of very dark greyish brown clay silt [141] 0.18m in depth. The uppermost deposit was a silty clay topsoil [140] 0.10m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road W-X**

6.54 Road W-X measured 500m in length, orientated north to south, and was between 313.15m and 329.29m OD. The road was widened by 2m along its eastern edge.

6.55 The natural orange/brown boulder clay [145] was reached at a depth of 0.29m bgl. Immediately above this was a layer of dark greyish brown clay silt [144] 0.18m in depth. The uppermost deposit was a silty clay topsoil [143] 0.11m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road X-Y**

6.56 Road X-Y measured 1.6km in length, orientated east to west, and was between 311.81m and 354.86m OD. The works consisted of the construction of a new stone road measuring 5m in width. Additional works undertaken comprised the construction of eight tactical observation posts: four measured 60m by 5m; two measured 90m by 5m; one measured 105m by 5m; and one measured 50m by 5m.
6.57 The natural gleyed orange/brown to blue/grey boulder clay [157] was reached at a depth of between 0.50m and 0.75m bgl. Immediately above this was a layer of very dark brown peaty silty clay [156] between 0.38m and 0.62m in depth. The uppermost deposit was a silty clay topsoil [155] 0.12m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road Y-AA

6.58 Road Y-AA measured 530m in length, orientated east to west, and was between 352.10m and 352.07m OD. The works consisted of 2m of road-widening along the northern edge of the existing road. Additional works comprised the construction of five tactical observation posts: one measured 15m by 5m; two measured 35m by 5m; one measured 25m by 5m; and one measured 45m by 5m linked to the northern end of junction BB.

6.59 The natural orange/brown boulder clay [160] was reached at a depth of 0.36m bgl. Immediately above this was a layer of very dark brown peaty silty clay [159] 0.23m in depth. The uppermost deposit was a silty clay topsoil [158], 0.13m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road BB-CC

6.60 Road BB-CC measured 527m in length, orientated north-west to south-east, and was between 337.43m and 347.21m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road to chainage 350m, and 2m of road-widening along the western edge of the existing road to chainage 527m. Additional works undertaken in conjunction with the road-widening comprised the construction of concrete culverts C5/3 and C5/4.

6.61 The natural orange/brown boulder clay [179] was reached at a depth of 0.38m bgl. Immediately above this was a layer of very dark brown peaty silty clay [178] 0.28m in depth. The uppermost deposit was a silty clay topsoil [177] 0.10m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road Q-GG

6.62 Road Q-GG measured 2.3km in length, orientated north-west to south-east, and was between 258.77m and 336.34m OD. The works consisted of 2m of road-widening along the western edge of the existing road and 1m of road-widening along the eastern edge. Additional works undertaken comprised the construction of gunspurs S1, S3 and S5, and concrete culverts C7/2, C7/3, C7/4, C7/5, C7/6, C7/7, C7/7a and C7/8.

6.63 The natural gleyed orange/brown to blue/grey boulder clay [58] was reached at a depth of 0.38m bgl. Immediately above this was a layer of grey brown peaty clay silt [57], 0.18m in depth. The uppermost deposit was a silty clay topsoil [56] 0.20m in depth. No archaeological deposits or features were identified, and no artefacts were recovered.
Road GG-NN

6.64 Road GG-NN measured 2.6km in length, orientated north-east to south-west, and was between 324.76m and 336.34m OD. The works consisted of 2m of road-widening along the northern edge and 1m of road-widening along the southern edge of the existing road. Additional works comprised the construction of concrete culverts C7/1, C8/7, C8/8, C8/9, C8/10, C8/11, C8/12 and C8/13.

6.65 The natural gleyed orange/brown to blue/grey boulder clay [61] was reached at a depth of 0.48m bgl. Immediately above this was a layer of greyish brown clay silt [60] 0.35m in depth. The uppermost deposit was a silty clay topsoil [59] 0.13m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road DD-FF

6.66 Road DD-FF measured 1.9km in length, orientated north-west to south-east, and was between 279.84m and 310.14m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge of the existing road. Additional works comprised the construction of gunspurs S2 and S4 and concrete culverts C7/9, C7/10, C7/11 and C7/12.

6.67 The natural orange/brown boulder clay [64] was reached at a depth of 0.52m bgl. Immediately above this was a layer of greyish brown clay silt [63] 0.35m in depth. The uppermost deposit was a silty clay topsoil [62] 0.17m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road R-EE

6.68 Road R-EE measured 1.5km in length and was between 229.82m and 286.69m OD. The works consisted of 2m of road-widening along the northern edge of the existing road and 1m along the southern edge. Additional works undertaken comprised the construction of concrete culverts C7/13, C7/14, C7/16 and C7/17.

6.69 Natural orange/brown boulder clay [67] was reached at a depth of 0.48m bgl. Immediately above this was a layer of greyish brown clay silt [66] 0.25m in depth. The uppermost deposit was a silty clay topsoil [65] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road DD-R1

6.70 Road DD-R1 measured 700m in length and was between 250.10m and 275.43m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge of the existing road. Additional works comprised the construction of concrete culverts C7/15 and C7/19.

6.71 The natural orange/brown boulder clay [70] was reached at a depth of 0.50m bgl. Immediately above this was a layer of greyish brown clay silt [69] 0.27m
in depth. The uppermost deposit was a silty clay topsoil [68] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts were recovered.

Road R2-GG

6.72 Road R2-GG measured 3.8km in length, orientated broadly north-west to south-east, and was between 252.52m and 340.10m OD. The works consisted of 2m of road-widening along the eastern edge and 1m along the western edge of the existing road. Additional works undertaken comprised the construction of concrete culverts C7/21, C7/22, C7/23, C7/24, C7/25, C7/26, C7/27, C7/28, C7/29, C7/30, C7/30a and C7/32.

6.73 The natural orange/brown boulder clay [73] was reached at a depth of 0.58m bgl. Immediately above this was a layer of greyish brown clay silt [72] 0.35m in depth. The uppermost deposit was a silty clay topsoil [71] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG5-GG23 (Stewartshiels echelon area)

6.74 Road GG5-GG23 measured 1.3km in length, orientated north-west to south-east, and was between 264.11m and 320.45m OD. The works consisted of 2m of road-widening along the eastern edge and 1m of road-widening along the western edge of the existing road. Additional works comprised the construction of concrete culvert C7/34.

6.75 Natural orange/brown boulder clay [76] was reached at a depth of 0.58m bgl. Immediately above this was a layer of greyish brown clay silt [75] 0.35m in depth. The uppermost deposit was a silty clay topsoil [74] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG14-FF (Stewartshiels echelon area)

6.76 Road GG14-FF measured 1.1km in length, orientated east-west, and was between 265.07m and 308.53m OD. The works consisted of 2m of road-widening along the northern edge of the existing road and 1m along the southern edge of the existing road. Additional works undertaken in conjunction with the road-widening comprised the construction of concrete culvert C7/36.

6.77 The natural orange/brown boulder clay [79] was reached at a depth of 0.58m bgl. Immediately above this was a layer of greyish brown clay silt [78] 0.35m in depth. The uppermost deposit was a silty clay topsoil [77] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG1-GG12 (Stewartshiels echelon area)

6.78 Road GG1-GG12 measured 500m in length, orientated north-west to south-east, and was between 304.95m and 308.53m OD. The works consisted of 2m of road-widening along the western edge of the existing road and 1m of road-
widening along the eastern edge. Additional works undertaken comprised the construction of concrete culverts C7/38 and C7/39.

6.79 The natural orange/brown boulder clay [82] was reached at a depth of 0.52m bgl. Immediately above this was a layer of greyish brown clay silt [81] 0.30m in depth. The uppermost deposit was a silty clay topsoil [80] 0.22m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road GG11-GG2 (Stewartshiels echelon area)**

6.80 Road GG11-GG2 measured 600m in length, orientated east-west, and was between 320.40m and 325.10m OD. The works consisted of 2m of road-widening along the southern edge of the existing road and 1m along the northern edge. Additional works comprised the construction of thirteen vehicle bays and concrete culverts C7/37, C7/43, C7/44, C7/45 and C7/46.

6.81 The natural orange/brown boulder clay [85] was reached at a depth of 0.50m bgl. Immediately above this was a layer of greyish brown clay silt [84] 0.31m in depth. The uppermost deposit was a silty clay topsoil [83] 0.19m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road GG12-FF2 (Stewartshiels echelon area)**

6.82 Road GG12-FF2 measured 460m long, orientated east-west, and was between 309.07m and 325.10m OD. The works consisted of 2m of road-widening along the northern edge and 1m along the southern edge of the existing road. Additional works undertaken comprised the construction of concrete culverts C7/40, C7/41 and C7/42.

6.83 The natural orange/brown boulder clay [88] was reached at a depth of 0.49m bgl. Immediately above this was a layer of greyish brown clay silt [87] 0.34m in depth. The uppermost deposit was a silty clay topsoil [86] 0.15m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road GG26-GG38 (Stewartshiels echelon area)**

6.84 Road GG26-GG38 was 400m long, orientated north-east to south-west, and was between 270.27m and 273.57m above sea level. The works consisted of the construction of a new stone road measuring 7m in width. Additional works comprised the construction of eleven vehicle bays.

6.85 The natural orange/brown boulder clay [91] was reached at a depth of 0.50m bgl. Immediately above this was a layer of greyish brown clay silt [90] 0.35m in depth. The uppermost deposit was a silty clay topsoil [89] 0.15m in depth. No archaeological deposits or features were identified, and no artefacts recovered.
Road GG26-GG37 (Stewartshiels echelon area)

6.86 Road GG26-GG37 measured 400m in length, orientated east-west, and was between 296.03m and 288.23m OD. The works consisted of the construction of a new stone road 7m wide.

6.87 The natural orange/brown boulder clay [94] was reached at a depth of 0.52m bgl. Immediately above this was a layer of greyish brown clay silt [93] 0.37m in depth. The uppermost deposit was a silty clay topsoil [92] 0.15m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG25-GG36 (Stewartshiels echelon area)

6.88 Road GG25-GG36 measured 407m in length, orientated north-south, and was between 296.03m and 302.08m OD. The works consisted of the construction of a new stone road 7m wide.

6.89 The natural orange/brown boulder clay [97] was reached at a depth of 0.50m bgl. Immediately above this was a layer of greyish brown clay silt [96] 0.35m in depth. The uppermost deposit was a silty clay topsoil [95] 0.15m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG15-GG24 (Stewartshiels echelon area)

6.90 Road GG15-GG24 measured 208m in length, orientated north-east to south-west, and was between 304.32m and 306.08m OD. The works consisted of the construction of a new stone road measuring 7m in width.

6.91 The natural orange/brown boulder clay [100] was reached at a depth of 0.56m bgl. Immediately above this was a layer of greyish brown clay silt [99] 0.35m in depth. The upper deposit was a silty clay topsoil [98] 0.21m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG24-GG27 (Stewartshiels echelon area)

6.92 Road GG24-GG27 measured 425m in length, orientated north-west to south-east, and was between 308.29m and 327.18m OD. The works consisted of the construction of a new stone road 7m wide.

6.93 The natural orange/brown boulder clay [121] was reached at a depth of 0.59m bgl. Immediately above this was a layer of greyish brown clay silt [120] 0.39m in depth. The uppermost deposit was a silty clay topsoil [119] 0.20m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road GG22-GG21 (Stewartshiels echelon area)

6.94 Road GG22-GG21 measured 385m in length, orientated north-west to south-east, and was between 322.50m and 335.18m OD. The works consisted of the construction of a new stone road 7m wide.
6.95 The natural orange/brown boulder clay [103] was reached at a depth of 0.57m bgl. Immediately above this was a layer of greyish brown clay silt [102] 0.35m in depth. The uppermost deposit was a silty clay topsoil [101] 0.22m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road FF3-GG11 (Stewartshiels echelon area)**

6.96 Road FF3-GG11 measured 80m in length, orientated north-east to south-west, and was between 319.89m and 323.27m OD. The works consisted of the construction of a new stone road 7m wide.

6.97 The natural orange/brown boulder clay [106] was reached at a depth of 0.60m bgl. Immediately above this was a layer of greyish brown clay silt [105] 0.37m in depth. The uppermost deposit was a silty clay topsoil [104] 0.23m in depth. No archaeological deposits or features were identified, and no artefacts were recovered.

**Road GG3-GG35 (Stewartshiels echelon area)**

6.98 Road GG3-GG35 was 1.1km long, orientated east-west, and was between 300.35m and 325.17m OD. The works consisted of the construction of a new stone road 7m wide.

6.99 The natural orange/brown boulder clay [109] was reached at a depth of 0.58m bgl. Immediately above this was a layer of greyish brown clay silt [108] 0.35m in depth. The uppermost deposit was a silty clay topsoil [107] 0.23m in depth. No archaeological deposits or features were identified and no artefacts were recovered.

**Road GG31-GG34 (Stewartshiels echelon area)**

6.100 Road GG31-GG34 measured 1.5km in length, orientated east-west, and was between 307.37m and 333.10m OD. The works consisted of the construction of a new stone road 7m wide.

6.101 The natural orange/brown boulder clay [112] was reached at a depth of 0.55m bgl. Immediately above this was a layer of greyish brown clay silt [111] 0.35m in depth. The uppermost deposit was a silty clay topsoil [110] 0.20m in depth. No archaeological deposits or features were identified and no artefacts were recovered.

**Road GG34-GG4 (Stewartshiels echelon area)**

6.102 Road GG34-GG4 measured 1.3km in length, orientated north-east to south-west, and was between 272.10m and 331.18m OD. The works consisted of the construction of a new stone road 7m in width.

6.103 The natural orange/brown boulder clay [115] was reached at a depth of 0.54m bgl. Immediately above this was a layer of greyish brown clay silt [114] 0.31m in depth. The uppermost deposit was a silty clay topsoil [113] 0.23m in depth. No archaeological deposits or features were identified and no artefacts were recovered.
**Road GG32-GG33 (Stewartshiels echelon area)**

6.104 Road GG32-GG33 measured 200m in length, orientated east-west, and was between 316.21m and 318.06m OD. The works consisted of the construction of a new stone road 7m wide.

6.105 The natural orange/brown boulder clay \[118\] was reached at a depth of 0.58m bgl. Immediately above this was a layer of greyish brown clay silt \[117\] 0.35m in depth. The uppermost deposit was a silty clay topsoil \[116\] 0.23m in depth. No archaeological deposits or features were identified and no artefacts were recovered.

**Road NN-PP**

6.106 Road NN-PP measured 630m in length, orientated north-east to south-west, and was between 208.66m and 217.68m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road. Additional works comprised the construction of culvert C8/6.

6.107 The natural orange/brown boulder clay \[148\] was reached at a depth of 0.36m bgl. Immediately above this was a layer of very dark grey brown peaty clay silt \[147\] 0.25m in depth. The uppermost deposit was a silty clay topsoil \[146\] 0.11m in depth. No archaeological deposits or features were identified and no artefacts found.

**Road PP1-SS**

6.108 Road PP1-SS measured 1.74km in length, orientated north-west to south-east, and was between 207.58m and 259.72m OD. The works consisted of 5m of road-widening along the western edge of the existing road (chainage 0-550m) and 5m of road-widening along the eastern edge of the existing road (chainage 550m-1740m). Additional works comprised the construction of gunspurs 42 and 43, and concrete culverts C8/1, C8/2, C8/3, C8/14 and C8/15.

6.109 Sandstone bedrock \[151\] was reached at a depth of 0.22m bgl. Immediately above this was a layer of dark brown/grey clay silt \[150\] 0.13m in depth. The uppermost deposit was a silty clay topsoil \[149\] 90mm in depth. No archaeological deposits or features were identified and no artefacts recovered.

**Road SS-UU**

6.110 Road SS-UU measured 1.2km in length, orientated north-west to south-east, and was between 256.81m and 304.12m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge. Additional works comprised the construction of gunspurs 44, 45 and 46, and concrete culvert C8/4.

6.111 Natural orange/brown boulder clay \[163\] was reached at a depth of 0.34m bgl. Immediately above this was a layer of greyish brown peaty clay silt \[162\] 0.24m in depth. The upper deposit was a silty clay topsoil \[161\] 0.10m in depth. No archaeological deposits or features were identified, and no artefacts recovered.
Road UU-WW

6.112 Road UU-WW measured 2km in length, orientated north-west to south-east, and was between 307.25m and 324.56m OD. The works consisted of 2m of road-widening along the eastern edge and 1m along the western edge of the existing road. Additional works undertaken comprised the construction of concrete culverts C9/5, C9/6, C9/7, C9/8 and C9/9.

6.113 The natural orange/brown boulder clay [166] was reached at a depth of 0.37m bgl. Immediately above this was a layer of greyish brown peaty clay silt [165] 0.25m in depth. The uppermost deposit was a silty clay topsoil [164] 0.12 m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

Road WW-XX

6.114 Road WW-XX measured 800m in length and was located south and north-east of Featherwood, at between 324.59m and 347.22m OD. The works consisted of 2m of road-widening along the eastern edge of the existing road and 1m of road-widening along the western edge. Additional works undertaken comprised the construction of concrete culverts C10/4, C10/5, C10/6, C10/7, C10/8, C10/9 and C10/10.

6.115 The natural orange/brown boulder clay [170] was reached at a depth of 0.29m bgl. Immediately above this was a layer of greyish brown clay silt [168] 0.17m in depth. The uppermost deposit was a silty clay topsoil [167] 0.12m in depth.

Dere Street foundation remains near Featherwood

6.116 Towards the southern limit of road WW-XX, at NT 8160 0355, a single layer of sub-rounded and sub-angular stones between 0.2m and 0.6m in size and
0.20m in thickness was revealed (Figure 4). The layer [169] measured up to 4m north-south and 2.5m east-west. It was immediately above the boulder clay [170], and was overlain by topsoil [167]. This material almost certainly comprised the truncated foundation layer for Dere Street Roman road, as previously excavated 4km to the south in 2002 (Archaeological Services 2004, 53-58).

6.117 No other archaeological deposits or features were identified in this stretch of road and no artefacts were recovered.

**Road XX-AB**

6.118 Road XX-AB measured 2.5km in length, orientated north-west to south-east, and was between 347.28m and 461.50m OD. The works consisted of 3m of road-widening along the eastern edge of the existing road and the construction of concrete culverts C10/1, C10/2, C10/4, C11/17, C11/18, C11/19 and C11/20.

6.119 The natural orange/brown boulder clay [173] was reached at a depth of 0.27m bgl. Immediately above this was a layer of greyish brown peaty clay silt [172] 0.15m in depth. The uppermost deposit was a silty clay topsoil [171] 0.12 m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Road AB-AC**

6.120 Road AB-AC measured 1.3km in length, orientated north-west to south-east, and was between 458.83m and 498.96m OD. The works consisted of 3m of road-widening along the eastern edge of the existing road to chainage 900m, and 3m of road-widening along the western edge to chainage 1327m. Additional works undertaken comprised the construction of concrete culverts C11/1a, C11/1, C11/2, C11/3, C11/4, C11/5, C11/6, C11/7, C11/8, C11/9, C11/10, C11/11, C11/12, C11/13, C11/14 and C11/15.

6.121 The natural orange/brown boulder clay [176] was reached at a depth of 0.24m bgl. Immediately above this was a layer of greyish brown peaty clay silt [175] 0.14m in depth. The uppermost deposit was a silty clay topsoil [174] 0.11 m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Davyshiel echelon area**

6.122 Davyshiel echelon area required the construction of 730m of new stone roads, linking a series of vehicle parks and repair areas on the eastern side of road G-H, at between 225.00m and 244.99m OD. Additional works undertaken in conjunction with these were the construction of concrete culverts C3/28, C3/29, C3/30, C3/31, C3/32, C3/33 and C3/35.

6.123 The natural gleyed orange/brown to blue/grey boulder clay [33] was reached at a depth of 0.38m bgl. Immediately above this was a layer of dark brown peat [32] 0.28m in depth. The uppermost deposit was a silty clay topsoil [31]
0.10m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Headshope echelon area**

6.124 Headshope echelon area consisted of the construction of 750m of new stone roads, linking a network of vehicle parks and repair areas, on the western side of junction A, at between 193.63m and 236.46m OD. Additional works undertaken here comprised the construction of concrete culverts C1/1a, C1/1f, and gunspur 1b.

6.125 The natural gleyed orange/brown to blue/grey boulder clay [36] was reached at a depth of 0.40m bgl. Immediately above this was a layer of orange/brown silty clay [35] 0.27m in depth. The uppermost deposit was a silty clay topsoil [34] 0.13m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Yatesfield echelon area**

6.126 Yatesfield echelon area required the construction of 1.2km of new stone roads, linking a network of vehicle parks and repair areas, on the eastern side of road M-N, at between 212.00m and 238.20m OD. Additional works undertaken in conjunction with these were the construction of concrete culverts C4/19, C4/20, C4/21, C4/22 and C4/23.

6.127 The natural gleyed orange/brown to blue/grey boulder clay [39] was reached at a depth of 0.38m bgl. Immediately above this was a layer of dark brown peat [38] 0.28m in depth. The uppermost deposit was a silty clay topsoil [37] 0.10m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**Leighton Hill echelon**

6.128 Leighton Hill echelon consisted of 1.01km of new stone laid over the existing roads, linking a network of vehicle parks and repair areas at between 238.28m and 267.17m OD. Additional works undertaken here comprised the construction of concrete culverts C2/26, C2/27, C2/28, C2/29, C2/30, C2/31, C2/32 and C2/33.

6.129 The natural gleyed orange/brown to blue/grey boulder clay [133] was reached at a depth of 0.37m bgl. Immediately above this was a layer of dark brown peaty silty clay [132] 0.25m in depth. The uppermost deposit was a silty clay topsoil [31] 0.12m in depth. No archaeological deposits or features were identified, and no artefacts recovered.

**The environmental evidence**

**Methods**

6.130 Two contexts from Road L-G were sampled for plant macrofossil assessment. Contexts [41] and [23] comprised peat deposits separated by a layer of silt [40] within a glacial hollow. Context [41], the lower peat deposit, also contained a number of pieces of timber.
6.131 A sondage, 1.2m by 1m and 1.2m in depth, was excavated to the south of the new road edge at chainage 910m in order to expose the stratigraphic sequence. The south-facing section was recorded (Figure 3), and an overlapping column sample collected in monolith tins. 30 litre bulk samples were also retrieved from each of the lower [41] and upper [23] peat deposits and three pieces of timber were recovered from [41] for further analysis.

6.132 Five litres of each bulk sample were manually floated and sieved through a 500µ mesh. The residues were retained, described and scanned using a magnet for ferrous fragments. The flots were dried slowly and scanned at x 40 magnification for waterlogged and charred botanical remains. Identification of these was undertaken by comparison with modern reference material held in the Environmental Laboratory at Archaeological Services University of Durham. Total numbers of remains per species were logged and the results were interpreted in their archaeological and palaeoecological contexts. Plant taxonomic nomenclature follows Stace (1997).

**Results: bulk samples**

6.133 The samples produced flots which were composed of very highly humified, detrital plant material. The only identifiable plant macrofossil was an uncharred sedge seed in context [23]. The contents of the residues and flots are listed in Table 1.

### Table 1. Contents of the residues and flots from OTA03.

<table>
<thead>
<tr>
<th>Context</th>
<th>23</th>
<th>41</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume processed (ml)</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Volume of flot (ml)</td>
<td>40</td>
<td>600</td>
</tr>
<tr>
<td>Volume of flot assessed (ml)</td>
<td>40</td>
<td>200</td>
</tr>
<tr>
<td>Flot matrix (relative abundance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decomposed plant material</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Waterlogged remains (total counts)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(w) Carex spp biconvex nutlet (Sedges)</td>
<td>1</td>
<td>-</td>
</tr>
</tbody>
</table>
(w: wetland)

Relative abundance is based on a scale from 1 (lowest) to 5 (highest).

**Results: timber samples**

Sample 1
Section of trunk from the base of a *Betula* sp (Birch) tree.
Diameter 80mm. Length 0.25m.
Bark present.
Suitable for radiocarbon dating.
No working marks.
Tree rings not easily distinguishable but approximate age of tree 30-50 years.

Sample 2
Section of trunk or large branch of a *Betula* sp (Birch) tree.
Diameter 0.14m. Length 0.4m.
Small section of bark present.
Suitable for radiocarbon dating.
No working marks.
Tree rings not easily distinguishable but approximate age of tree 50-80 years.

Sample 3
Section of trunk or large branch of a *Betula* sp (Birch) tree.
Diameter 0.16m. Length 0.45cm.
Bark absent.
Suitable for radiocarbon dating.
No working marks.
Tree rings not easily distinguishable but approximate age of tree >80 years.

6.134 The large volume of detrital plant material and the single sedge seed reflect the waterlogged environment in which the material accumulated. The absence of any other uncharred seeds may indicate that the sediment underwent periods of drying out. From the unworked timber samples, it is likely that the trees were growing *in situ*, in which case the local vegetation would have been a wet, acid, birch woodland.

6.135 Based on the preservation state of plant macrofossils in the deposits it is considered very likely that pollen grains will also have suffered differential preservation; this favours preservation of the hardiest grains only and would not enable the vegetation history of the site to be determined. Pollen assessment of the monolith samples has therefore not been undertaken.

6.136 Given the virtual absence of identifiable plant remains and the unworked nature of the timber samples no further work is recommended on these samples.
7. Central Maintenance Facility: evaluation and watching brief at Davyshiel

Introduction

7.1 The Central Maintenance Facility (CMF) development, which is located at Davyshiel to the west of Otterburn Camp and to the east of Hopefoot Road, covered an area of 44,000sqm at between 209.79m and 220.45m OD east to west, and 215.72m to 218.56m OD north to south (Figure 2).

7.2 An archaeological watching brief was to be undertaken during topsoil stripping within the footprint of the CMF between June and September 2003. As this was within a designated Archaeological Landscape Area, containing medieval ridge and furrow field systems centred on a derelict medieval and early post-medieval farmstead, nine trial trenches were excavated prior to the soil-strip and watching brief, in order to evaluate and record specific archaeological features (Figure 5). The site code for these works, as for the road improvement works, was OTA03.

7.3 An archaeological watching brief was also maintained during the excavation of cable trenches to the north and south of the CMF in February 2005.

7.4 RPS features DS15 and 16, to the north of the CMF and presumed to be associated with the aforementioned farmstead, were excavated in September and October 2004 (below, Section 8) prior to proposed tree-planting to screen the CMF.

Evaluation trenches (Figures 6-13)

7.5 The trenches were excavated by Katie Bell and Mark Douglas. Specialist analyses were conducted by Jason Mole (lithics) and Dr Chris Cumberpatch (ceramics). The trenches were located in order to sample the following features:

Table 2. OTA03 CMF evaluation trenches (DS feature numbers taken from LUAU/NUAP 1997, as shown on Figure 5)

<table>
<thead>
<tr>
<th>Trench</th>
<th>Dimensions</th>
<th>Orientation</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.8 x 1.5m</td>
<td>NW-SE</td>
<td>DS81, NE-SW sod-cast dyke</td>
</tr>
<tr>
<td>2</td>
<td>7.4 x 1.5m</td>
<td>NW-SE</td>
<td>as above</td>
</tr>
<tr>
<td>3</td>
<td>7.8 x 1.5m</td>
<td>NW-SE</td>
<td>as above, and DS109</td>
</tr>
<tr>
<td>4</td>
<td>7.5 x 1.5m</td>
<td>NE-SW</td>
<td>DS82, NW-SE sod-cast dyke</td>
</tr>
<tr>
<td>5</td>
<td>16.7 x 1.5m</td>
<td>NW-SE</td>
<td>DS56 ridge and furrow</td>
</tr>
<tr>
<td>6</td>
<td>13.5 x 1.5m</td>
<td>NW-SE</td>
<td>DS118 ridge and furrow</td>
</tr>
<tr>
<td>7</td>
<td>11.6 x 1.5m</td>
<td>NW-SE</td>
<td>DS118 ridge and furrow</td>
</tr>
<tr>
<td>8</td>
<td>15.5 x 1.5m</td>
<td>NW-SE</td>
<td>DS118 ridge and furrow</td>
</tr>
</tbody>
</table>

7.6 Each trench was excavated by machine with a toothless bucket under strict archaeological supervision, and cleaned and recorded by hand. All trench plans show the trenches after initial removal of topsoil, prior to the cutting of sections through upstanding features. A list of contexts with descriptions and
associated finds is provided in Appendix I; stratigraphic matrices are provided in Appendix II.

**Trench 1**

7.7 Trench 1 (Figure 6) measured 6.8m by 1.5m, orientated north-west to south-east, and was excavated in order to record a north-east to south-west aligned sod-cast dyke DS81. Trenches 1-3 all sampled this prominent boundary feature. The surface level of Trench 1 was between 211.70m and 212.25m OD.

7.8 The natural orange/brown boulder clay [305] was reached at a depth of 0.20m. Immediately above this was a layer of grey/brown silty clay [304] 0.13m in depth. Overlying [304] was a mottled dark grey/orange/brown silty clay [F303] forming the make-up deposit for the bank, 0.43m in depth and orientated north-east to south-west. This was overlain by a dark grey/brown peaty silty clay topsoil [300] 0.07m in depth. No artefacts were recovered from the evaluation trench.

7.9 The bank [F303] contained frequent sub-rounded and sub-angular stone blocks up to 200mm across, increasing in frequency towards the top of the bank. Some of these stones will have been upcast from the boulder clay during excavation of the ditch, while others will almost certainly have been thrown onto the bank during clearance of the adjacent cultivation strips.

7.10 At the north-western end of the trench layer [304] was cut by an existing drainage ditch [F302], 1.0m wide and aligned north-east to south-west, extending beyond the limits of the trench. Ditch [F302] was filled by very dark grey/brown clay silt [301], which was not fully excavated due to waterlogging. The original medieval/post-medieval excavation of the ditch provided the material for the adjacent bank [F303]. This drainage ditch and others in this area have been both widened and deepened over the last 30-40 years (tenant farmer, pers.comm.), thereby removing their original profiles. The LUAU/NUAP report (1997, 28) suggests that the ditch originally followed the course of a natural streamlet.

**Trench 2**

7.11 Trench 2 (Figure 6) measured 7.4m by 1.5m, orientated north-west to south-east, and was excavated in order to record the north-east to south-west aligned sod-cast dyke, DS81. The surface level of Trench 2 was between 214.70m and 215.20m OD.

7.12 The natural orange/brown boulder clay [403] was reached at a depth of 0.21m. Immediately above this was a layer of grey/brown silty clay [402] 0.11m in depth. Overlying [402] was a mottled dark grey/orange/brown silty clay [F401] forming the make-up deposit for the bank, 0.41m in depth and orientated north-east to south-west. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [400] measuring up to 0.10m in depth. Again, the make-up of the bank contained frequent sub-rounded and sub-angular stone blocks up to 200mm in size, increasing in frequency towards the
top. No other archaeological deposits or remains were identified and no artefacts were recovered.

**Trench 3**

7.13 Trench 3 (Figure 7) measured 7.8m by 1.5m, orientated north-west to south-east, and was also excavated in order to evaluate the north-east to south-west aligned sod-cast dyke DS81. This trench also sampled the location of a possible circular feature DS109, previously recorded on a topographic survey (LUAU/NUAP 1997, 28). The surface level of Trench 3 was between 215.90m and 216.30m OD.

7.14 The natural orange/brown boulder clay [503] was reached at a depth of 0.19m. Immediately above this was a layer of grey/brown silty clay [502], 0.11m in depth. Overlying context [502] was a dark grey/orange/brown silty clay [F501] forming the make-up deposit for sod-cast dyke, 0.40m in depth and orientated north-east to south-west. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [500] 0.08m in depth. No evidence for the possible circular structure was identified. This feature was previously recorded as cutting the ridge and furrow remains and was interpreted as possibly being a watering hole or sheepwash (LUAU/NUAP 1997, 28). No other archaeological deposits or remains were identified, and no artefacts recovered.

**Trench 4**

7.15 Trench 4 (Figure 7) measured 7.6m by 1.8m, orientated north-east to south-west, and was excavated in order to evaluate a north-west to south-east aligned sod-cast dyke DS82 in the northern part of the CMF area. This feature was perpendicular to and smaller than the main boundary feature DS81. The surface level of Trench 4 was between 212.70m and 213.50m OD.

7.16 The natural orange/brown boulder clay [605] was reached at a depth of 0.27m. Immediately above this was a layer of grey/brown silty clay [604] 0.22m in thickness. Overlying [604] was a mottled dark grey/orange/brown silty clay [F603] forming the make-up deposit for the sod-cast dyke, which measured 0.56m in depth and was orientated north-west to south-east. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [600] 0.05m in depth. On the south-western side, the bank [F603] was truncated by a drainage ditch [F602], at least 0.70m wide. The ditch [F602] was filled by very dark grey/brown clay silt [601], which was not fully excavated due to waterlogging. No other archaeological deposits or remains were identified, and no artefacts recovered.

**Trench 5**

7.17 Trench 5 (Figure 8) measured 16.7m by 1.5m, orientated north-west to south-east, and was excavated in order to evaluate north-east to south-west aligned ridge and furrow earthworks, DS 56, parallel to the main boundary feature DS 81. The surface level of Trench 5 was between 215.50m and 215.70m OD.

7.18 The natural orange/brown boulder clay [702] was reached at a depth of 0.28m. Immediately above this was a layer of grey/brown silty clay [701] 0.21m in depth. The uppermost deposit was a dark grey/brown peaty silty clay topsoil
0.07m in depth. The profiles of three furrows were recorded in section, at c.6m intervals. Some of the furrows contained a gravel fill, presumably laid more recently to aid drainage. No other archaeological deposits or remains were identified, and no artefacts recovered.

**Trench 6**

7.19 Trench 6 (Figure 8) measured 13.5m by 1.5m, orientated north-west to south-east, and was excavated in order to evaluate a north-east to south-west aligned ridge and furrow field system, DS 118, to the south of the main boundary feature DS 81. The surface level of Trench 6 was between 216.60m and 216.90m OD.

7.20 The natural orange/brown boulder clay [802] was reached at a maximum depth of 0.20m. Immediately above this was a layer of grey/brown silty clay [801] up to 0.13m thickness. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [800] up to 0.11m in depth. Very shallow undulations noted in the trench section are presumed to reflect former ridge and furrow profiles. No other archaeological deposits or remains were identified, and no artefacts recovered.

**Trench 7**

7.21 Trench 7 (Figure 9) measured 11.6m by 1.5m, orientated north-west to south-east, and was excavated in order to evaluate north-east to south-west aligned ridge and furrow earthworks DS 118 at the southern end of the CMF area. The surface level of Trench 7 was between 216.40m and 216.60m OD.

7.22 The natural orange/brown boulder clay [902] was reached at a depth of 0.22m. Immediately above this was a layer of grey/brown silty clay [901] 0.13m in depth. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [900] 0.09m in depth. Very shallow undulations were noted in the trench section, and these are presumed to reflect former ridge and furrow profiles. A flint flake was recovered from the interface between contexts [901] and [900] (below, para. 7.39), however, no associated features or remains were identified.

**Trench 8**

7.23 Trench 8 (Figure 9) measured 15.5m by 1.5m, orientated north-west to south-east, and was excavated in order to evaluate north-east to south-west aligned ridge and furrow remains DS 118. The surface level of Trench 8 was between 219.60m and 219.90m OD.

7.24 The natural orange/brown boulder clay [1002] was reached at a depth of 0.17m. Immediately above this was a layer of grey/brown silty clay [1001] 0.09m in depth. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [1000] 0.08m in depth. A profile of the ridge and furrow remains was recorded (Figure 9). No other archaeological deposits or remains were identified, and no artefacts recovered.
Trench 9

7.25 Trench 9 (Figure 10) measured 5.0m by 1.5m, orientated north-south, and was excavated in order to record a slight north-east/south-west aligned bank at the north end of the CMF site. The surface level of Trench 9 was between 215.30m and 215.60m OD.

7.26 The natural orange/brown boulder clay [1102] was reached at a depth of 0.28m. Immediately above this was a layer of grey brown silty clay [1101] 0.18m in depth. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [1100] 0.10m in depth. The bank was not identified as a discrete deposit, but rather as a thickening of the silty clay layer [1101]; this appears to have formed as a headland to the ridge and furrow on the north side. No other archaeological deposits or remains were identified and no artefacts recovered.

The CMF watching brief

7.27 An archaeological watching brief was maintained during the soil-strip for the CMF construction and during the excavation of two cable trenches to replace overhead cables. The main CMF watching brief was hindered by the waterlogged nature of the ground and by the use of bulldozers and machines with toothed buckets for the first half of the strip.

7.28 In the north-eastern corner of the CMF area, north of the Otter Burn, 0.2m of turf overlay brown peat to a depth of 0.8m, which in turn overlay well-humified dark brown/black peat to a maximum depth of 1.5m. The peat overlay a white/grey sandy clay.

7.29 Across the rest of the area, natural orange/brown boulder clay [202] was reached at a depth of 0.27m to 0.45m. Immediately above this was a layer of grey/brown silty clay [201] between 0.26m and 0.34m in depth. The uppermost deposit was a dark grey/brown peaty silty clay topsoil [200] 0.11m in depth. Layer [201] contained medieval and post-medieval pottery fragments along with fragments of post-medieval clay-pipe and a lead musket ball.

7.30 Ridge and furrow remains were evident throughout much of the CMF area. Furrows were spaced at between 4-7m intervals and ridges survived to a height of 0.25-0.30m. Typically every second or third furrow had been deepened, and had had plastic pipe laid in, in the last 30-40 years, creating adjacent ridges of upcast spoil; these features are particularly prominent on aerial photographs taken by Tim Gates (*ibid.*). Some furrows contained a gravel fill, presumably also laid more recently to aid drainage. Some features previously recorded on the topographic survey and aerial photographs were not discernible in the field due to the dense bog-grass vegetation cover.
Material filling crop pit

7.31 Context [200] was cut by two crop pits [F204] and [F206], each measuring c.5m in diameter and at least 0.63m in depth, which were filled by a very dark brown peaty clay silt [203] and [205]. The pits had been filled with early to mid-20th century refuse including a metal bedstead, a torch and various glass bottles and jars (not retained). The crop pits are part of a line of at least ten such features here, following the line of the coal outcrop, and are best seen on aerial photographs (for example Gates 1997, TMG16537/26).

**CMF artefacts**

7.32 Few artefacts were recovered during the works at the CMF. The majority of those recovered were found during the soil-strip operation. Occasional modern materials were found throughout the CMF area, particularly within the crop pits; these have been discarded. The approximate findspot locations of retained artefacts are shown on Figure 5.

### Table 3. Artefacts from CMF evaluation and watching briefs

<table>
<thead>
<tr>
<th>Context</th>
<th>SF no.</th>
<th>Quantity</th>
<th>Artefact</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>G</td>
<td>1 sherd</td>
<td>Everted jar / cooking pot rim (29g), coarse sandy buff fabric</td>
</tr>
<tr>
<td>&quot;</td>
<td>E</td>
<td>1 fragment</td>
<td>Clay pipe bowl</td>
</tr>
<tr>
<td>201</td>
<td>B</td>
<td>2 fragments</td>
<td>Clay pipe stem</td>
</tr>
<tr>
<td>&quot;</td>
<td>A</td>
<td>1 sherd</td>
<td>Rod handle (45g), fine buff to brown oxidised sandy ware</td>
</tr>
<tr>
<td>&quot;</td>
<td>C</td>
<td>1 sherd</td>
<td>Body sherd (22g), distinctive orange and grey streaky fabric</td>
</tr>
<tr>
<td>901, T7</td>
<td>D</td>
<td>1</td>
<td>Flint flake</td>
</tr>
<tr>
<td>203/205</td>
<td>-</td>
<td>various</td>
<td>20th century domestic refuse (discarded).</td>
</tr>
</tbody>
</table>
Lithics

7.33 A single flint flake was recovered the trial trench evaluation, Trench 7, context [901]. This piece is not diagnostic of any particular period:

A single flake, with a feathered termination and some possible evidence for trimming or platform preparation. The flint is light brown and is beginning to repatinate in particular on its dorsal side. The lack of a defined bulb of percussion on the ventral side may indicate the use of a soft hammer but may also be the product of an imperfection within the material itself. The broad and short nature of the flake may invite speculation of a Later Neolithic/ Bronze Age date for the flake but this is not conclusive.

7.34 Due to the residual nature of this find no further work is recommended.

Ceramics

7.35 Three sherds of pottery were recovered from contexts [200] and [201] during the machine stripping for the CMF:

[200] Everted jar / cooking pot rim (29g) with groove around outer edge in a coarse sandy buff fabric with a reduced core containing moderate to abundant quantities of rounded quartz grit up to 1mm.

[201] Rod handle (45g) in a fine buff to brown oxidised sandy ware with a reduced core containing moderate quantities of rounded quartz grit up to 0.5mm and occasionally up to 1mm.

[201] Body sherd (22g) in a distinctive orange and grey streaky fabric with dull buff internal and external margins. The fabric contains moderate quantities of fine (up to 0.5mm) quartz grit and occasional large (up to 1.5mm) non-crystalline red ferrous grit. The sherd has small spots of possible splashed glaze externally.

7.36 As noted in earlier reports on pottery from Otterburn (Cumberpatch in Archaeological Services 2004, 64-67), the area is poorly served by established type series but the material from OTA03 would appear to be comparable, at least in general terms, with that from the 2002 excavations at Bellshiel Road and Potts Durtrees. The buff finish would appear to place the material within the wider regional tradition of buff sandy wares, which can be seen in different forms in the north-east region. It is difficult to ascribe a definite date to the sherds from OTA03, but it is probable, on the basis of the wider dating of the buff sandy ware tradition and the vessel forms, that they belong to the later 11th, 12th or 13th centuries. This may be supported by the spots of possible ‘splashed’ glaze on the body sherd, although these are too small for identification to be certain.
7.37 A small fragment of daub or poorly-fired hand-made brick was recovered, unstratified, during machining of the south-eastern part of the CMF.

7.38 No further work is recommended on this limited ceramic assemblage.

**CMF dating**

7.39 The limited occurrences of medieval pot within both the topsoil [200] and B-horizon [201] are likely to be the result of manuring practices and suggest that this land was in cultivation in the medieval period; post-medieval artefacts in the same deposits suggest ridge and furrow cultivation in that period also. The earthen banks in this area appear to be post-medieval in origin as they overlie deposits containing both medieval and post-medieval material ([201] and its equivalent contexts within the trial trenches). The ditches alongside the banks, as they existed during the fieldwork, were modern. Although they undoubtedly followed the courses of earlier ditches, they had been both widened and deepened in recent years, removing the profiles and contents of their earlier forms.

7.40 The flint flake was not found in association with any features, and thus is of limited value, other than to attest to a human presence in the Otterburn Training Area during the Late Neolithic to Early Bronze Age periods.
8. Central Maintenance Facility: excavation of features DS15 and DS16, Davyshiel

Introduction

8.1 The angle of the roads north and west of the CMF contains a number of earthwork and masonry structures of differing periods (Figure 5). The remains of a probable medieval or post-medieval farmstead, field banks and ridge and furrow are evident, as well as more poorly defined earthworks interpreted as a medieval or later corn-drier (DS15) and an associated feature (DS16). These features were recorded during a topographic survey conducted by Lancaster University Archaeological Unit in 1996 (LUAU/NUAP 1996).

8.2 The corn-drier lay at NGR: NY 88809615, outside the CMF footprint but within an area of proposed screen planting. The objective of the archaeological work was to expose, excavate and record the corn-drying kiln, in accordance with a brief prepared by RPS Group. It is now understood that tree-planting will not be undertaken over the actual corn-drier, which will be left partly exposed and fenced off from the area of planting. The excavated structure was therefore backfilled to within 0.3m of the top of the walls and is preserved in situ.

8.3 Archaeological excavation was undertaken between 8th September and 1st October 2004 by Andy Willis and Sam Roberts, supervised by Alan Rae. This report was prepared by Alan Rae. Specialist analysis was conducted by Dr Charlotte O’Brien (plant macrofossils).

8.4 The site code was OMF04, for Otterburn Maintenance Facility 2004.

The excavation

8.5 A trench covering 100sqm was hand-excavated to expose the remains of a sub-circular corn-drying kiln (Figures 11 & 12). Some topsoil removal was undertaken by machine on the western side of the structure, under strict archaeological supervision. The corn-drier was built into the side of a low bank, and consisted of a circular stone-built drying chimney with a linear flue also constructed in stone. The remains of the corn-drier were excavated and recorded by hand. A list of contexts with descriptions and associated finds is provided in Appendix I; the stratigraphic matrix is provided in Appendix II.

8.6 The natural gleyed orange/grey boulder clay [14] was reached at a depth of 220.04m OD except where cut by [F16], the construction cut for the corn-drier [F4]. Cut [F16] was not fully excavated but appeared to continue to the edge of the slope into which the drier had been constructed. Overlying this was a grey/brown clay silt [15] containing small to medium-sized stones, which formed the packing between construction cut [F16] and the corn-drier structure [F4]. The drier measured 6.2m north-east to south-west and 5.4m north-west to south-east, and consisted of six courses of unworked and roughly worked stones and boulders, forming a sub-circular drying chimney with a short linear stoke hole/passage exiting the bowl on its south-western side. The internal base of [F4] was reached at a depth of 219.69m OD and consisted of rough flagstones [F9] forming a floor across the interior of the
structure. The level at the top of [F4] was 220.97m OD, giving a surviving bowl depth of 1.28m.

Corn-drier under excavation

General view of corn-drier looking NE
8.7 Built into the lowest course of the internal face of [F4] were two small niches: [F10] was located in the north-eastern wall; [F11] was located in the south-western wall next to the stoke hole/passage. Neither [F10] nor [F11] continued through the fabric of [F4] and their purpose within the structure is unclear.

8.8 A short wall [F12] of rough stone was built between the passage and the bowl. This may have been built to introduce fuel or regulate the flow of air into the chimney, as it did not completely block the stoke hole/passage, there being a gap of 0.25m between the base of [F12] and the upper surface of the floor [F9]. At the time of excavation this gap was filled by [8], a very dark brown/black organic sandy silt with occasional twigs, which formed the primary fill of [F4]. Above [8] was a compact blue/grey sandy clay fill [7], the secondary fill of [F4], which was overlain by a soft orange/grey sandy clay silt [6], the uppermost fill.

8.9 A short section of additional walling [F13] was present on the internal north face of the bowl. This had been keyed into the bowl structure [F4] and appeared to represent either a repair or consolidation of [F4].

8.10 Continuing south and west from the top of the corn-dryer were two low walls [F17] and [F18], which consisted of two courses of rough stones laid directly onto the surface of the boulder clay [14]. The walls appeared to have been built contemporary with [F4] and to have formed two sides of a walled enclosure, extending beyond the limit of excavation. Above both [F17] and [F18] and the upper fill [6] of the drier was context [3], a layer of rubble which covered the whole trench area. This was in turn overlain by a mottled
orange/grey/brown layer [2]. Uppermost across the whole site was a layer of dark grey/brown silty clay topsoil and turf [1], 0.15m in thickness.

8.11 No artefacts were recovered during the course of the excavation.

The environmental evidence

Methods

8.12 The three fill layers within the stone-lined bowl, contexts [6], [7] and [8], were assessed for plant macrofossil remains. Five litres of each bulk sample were manually floated and sieved through a 500µ mesh. The residues were retained, described and scanned with a magnet for ferrous fragments. The flots were dried slowly and scanned at x 40 magnification for waterlogged and charred botanical remains. Identification of these was undertaken by comparison with modern reference material held in the Environmental Laboratory at Archaeological Services University of Durham. Total numbers of remains per species were logged and the results were interpreted in their archaeological and palaeoecological contexts. Plant taxonomic nomenclature follows Stace (1997).

Results

8.13 The samples produced volumes of flot ranging from 200-350 ml. They contained few charred plant remains, however, uncharred seeds were abundant. These were predominantly from ruderal and wetland habitats. Roots, wood and insect fragments were also present, and a small amount of charcoal was present in the sample from context [6]. The contents of the residues and flots are listed in Table 1 below.
Table 4. Contents of the residues and flots from OMF04.

<table>
<thead>
<tr>
<th>Context</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample</strong></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Volume processed (ml)</strong></td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td><strong>Volume of flot (ml)</strong></td>
<td>200</td>
<td>200</td>
<td>350</td>
</tr>
<tr>
<td><strong>Volume of flot assessed (ml)</strong></td>
<td>200</td>
<td>200</td>
<td>350</td>
</tr>
<tr>
<td><strong>Flot matrix (relative abundance)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charcoal</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Roots</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Insect</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wood</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Charred remains (total counts)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Avena sp grain (Oat species)</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>(x) Poaceae sp (&gt;2mm) (Grass)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td><strong>Waterlogged remains (total counts)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Chenopodium album (Fat-hen)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(a) Chrysanthemum segetum (Corn marigold)</td>
<td>-</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>(r) Atriplex sp (Orache)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>(r) Galeopsis c.f. tetrahir (Hemp-nettle)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(r) Lapsana communis (Nipplewort)</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>(r) Polygonum aviculare (Knotgrass)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(r) Sonchus asper (Prickly sow-thistle)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>(r) Sonchus c.f. oleraceus (Smooth sow-thistle)</td>
<td>-</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(r) Stellaria media (Common chickweed)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>(r) Urtica dioica (Common nettle)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>(t) Rubus idaeus (Raspberry)</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>(w) Carex spp (Sedges - biconvex nutlet)</td>
<td>1</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>(w) Carex spp (Sedges – triogonous nutlet)</td>
<td>-</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>(w) Persicaria lapathifolium (Pale persicaria)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(w) Prunella vulgaris (Self-heal)</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>(x) Asteraceae sp (Daisy family)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(x) Brassicaceae indeterminate (Cabbage family)</td>
<td>-</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>(x) Cirsium spp (Thistle)</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>(x) Poaceae sp (&lt;2mm) (Grass)</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>(x) Potentilla sp (Cinquefoil)</td>
<td>-</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>(x) Ranunculus subgenus Ranunculus (Buttercup)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(x) Rumex spp (Dock)</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>(x) Viola sp (Violet)</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(a: arable weed; c: cultivated plant; r: ruderal; t: trees/shrubs; w: wetland; x: wide niche). Relative abundance is based on a scale from 1 (lowest) to 5 (highest).
8.14 The only charred plant remains which occurred were two oat grains in context [7], and two oat grains and a grass caryopsis in context [8]. These may indicate that oats were dried in the corn-drier or that wild oats were growing near it. The grass may have been harvested with the oats or may also have been growing wild nearby.

8.15 The waterlogged conditions at the site allowed the preservation of a large number of uncharred seeds in all of the contexts. These reflect the natural environment as the corn-drier filled with sediment following its disuse. Most of the seeds were from ruderals such as hemp-nettle, nipplewort, sow-thistles, common nettle and chickweed which most often grow in open, disturbed habitats. Plants which favour damp conditions, including sedges, pale persicaria and self-heal, were abundant. Docks, buttercups, thistles, cinquefoil and grasses were also recorded.

8.16 Seeds of arable weeds such as fat-hen and corn marigold may have grown and been harvested with crops which were dried in the corn drier, or they may have been growing as ruderals in open habitats nearby.

8.17 No further work is recommended on these samples.

Corn-drier discussion

8.18 The virtual absence of charred plant macrofossils within the structure indicates that the bowl was thoroughly cleaned out following its last use as a drying kiln. Oats may have been dried in the corn-drier or may have grown wild nearby. The natural environment at the site following the disuse of the corn-drier was dominated by open, disturbed areas and wetland habitats, as is still the case today.

8.19 Corn-drying kilns recorded within the Coquetdale and Redesdale areas of the Otterburn Training Area, and the wider National Park, consist of two distinct structural styles (Frodsham 2004). The earlier ones are bowl kilns, comprising a stone-lined bowl dug into an earthen bank, normally on the periphery of a small settlement or farm. These are dated to the late-medieval and early post-medieval periods; the Loaning Burn kiln dates from at least the 17\textsuperscript{th} century (Charlton & Day 1982). The later kilns are free-standing, incorporated within a farm complex or corn mill, and date from the late post-medieval period; the example from Barrow Mill dates from the early 19\textsuperscript{th} century (Charlton 1996).

8.20 On structural grounds the bowl kiln excavated at Davyshiel lies within the earlier group, having a similar shape and dimensions to those recorded at Dumbhope, Wanlass Durtrees, Linbrig, Linbriggs, Rennies Burn and Sills Burn (Charlton 1996), and the excavated bowl kiln at Loaning Burn (Charlton & Day 1982). Overall dimensions vary, but all the recorded bowl kilns have an internal bowl diameter of between 3.8m and 4m, an overall diameter of 5.6m to 6m, and a depth of 0.79m to 4m, typically up to 1.25m in depth. In comparison, the free-standing corn dryers had a maximum external bowl diameter of 5.5m. All the bowl kilns recorded are sub-circular in shape with a sub-rectangular stokehole or flue radiating from one side of the structure. At Loaning Burn the stokehole is orientated away from the earthen bank, while at
Davyshiel the stokehole was constructed into the earthen bank. No comparison could be made with the other kilns mentioned as these have not been fully excavated. No evidence for the superstructures of the corn-drying kilns has been found, however, it is assumed that a wooden platform was constructed over the bowl, on top of which was laid a horsehair mat or layer of brushwood, on which the grain was placed for drying. The purpose of the corn-drying kilns was either to dry corn prior to threshing (in climates where a lack of sunlight prevented the ripening of crops) or to dry damp grain before milling.

8.21 The presence of corn-drying kilns in the Coquetdale and Redesdale areas attests to the cultivation and processing of cereal crops in an area not now associated with cereal cultivation, and where present climatic conditions would seriously limit any growing season (Lamb 1977). Bowl kilns of the type excavated at Davyshiel and Loaning Burn suggest that grain cultivation in the upland areas of Northumberland in the late-medieval/early post-medieval period had evolved beyond that needed by the local economy or for immediate subsistence, and that a sufficient surplus was being produced for sale in the wider economy. It has been suggested that the rise in grain production was as a consequence of the Napoleonic Wars (MacDonald 1980), however, the evidence points to a peak in grain production in the mid to late 18th century. The free-standing corn-driers such as that at Barrow Mills are dated from the latter part of the 18th century and the early 19th centuries, and appear to be a direct response to the changing agricultural practices of the Agricultural Revolution rather than any rise in demand for grain (Rackham 1986). Grain production was in decline by the middle of the 19th century and ended in the Coquetdale and Redesdale areas by the early 20th century as the land was given over firstly to sheep-rearing and later to grouse moor and military training.
9. **Central Maintenance Facility: watching brief during excavation of cable trenches**

**Introduction**

9.1 The development comprised the excavation of cable trenches to the north and south of the CMF (Figure 5). The site was bounded by Otterburn Camp to the east and rough grazing to the north, south and west. The cable trenches cut through fields containing ridge and furrow cultivation remains and earthen banks.

9.2 Fieldwork and reporting were conducted by Andy Willis in February 2005. The site code is OTA05, for Otterburn Training Area 2005.

**Trench 1**

9.3 This cable trench was excavated to the south of the CMF and measured 0.5m in width by 1m in depth and 150m in length (Figures 5 & 13). The trench cut through ridge and furrow and field bank remains. The natural orange/brown boulder clay with occasional irregular stones was reached at a depth of 0.45m bgl. Another stiff brown clay deposit with occasional irregular stone inclusions was reached at 0.85m bgl.

Cable trench 1, looking SW

9.4 The cultivation ridges ranged in width from 3.5m to 5m with a maximum height of 0.45m. The furrows between the ridges contained grey/brown silt with occasional small stone inclusions. Two representative sections were recorded across the ridge and furrow (Figure 13): the trench cut diagonally across some remains exposing an elongated section 8m in length (Section 3); Section 4 measured 6m in length.
9.5 Trench 1 cut through a bank feature in two separate places (Sections 1 & 2, Figure 13). It is likely that the bank is a post-medieval field boundary. The bank consisted of grey/brown soft silty sand with occasional small stone inclusions to a maximum depth of 0.65m. No archaeological artefacts were recovered during the excavation of cable trench 1.

Trench 2

9.6 This trench, to the north of the CMF, was excavated along a furrow between two ridges and measured 0.50m in width by 1m in depth and 170m in length (Figures 5 & 13). Natural orange/brown boulder clay with occasional irregular stones was reached at a depth of 0.45m. Stiff brown clay with occasional irregular stone inclusions was reached at 0.85m below the surface. The furrow was filled with grey/brown soft silt with occasional small stone inclusions. No artefacts were recovered during the excavation.

Cable trench 2, looking NNW
10. **Redesdale Camp: watching brief during perimeter fence removal**

_**Introduction**_

10.1 The aim of the watching brief was to enable the recording of any archaeological features encountered during the removal of a section of perimeter fence on the north side of Redesdale Camp. The works were located at NZ 885 825, at a mean elevation of c.180m OD, and were bounded by the demolished Redesdale Camp to the south and open grassland to the east, west and north (Figure 2). The fence removal lay close to a Roman Camp.

10.2 Fieldwork and reporting were undertaken by Andy Willis in February 2005.

_The watching brief_

10.3 The removal of the perimeter fence, which measured 750m in length, was undertaken using a mechanical digger fitted with a grab device. A series of modern post-holes measuring 0.35m by 0.80m was exposed.

10.4 Works to remove the fence did not reveal any archaeological features.

Fence removal operation, looking E
11. **Electronic Target Range: evaluation and watching brief at Carrick Heights**

*Introduction*

11.1 This report presents the results of an archaeological evaluation and watching brief conducted prior to and during the construction of an Electronic Target Range (ETR) at Carrick Heights and Leighton Hill (NGR: NY 908 956), Figures 2 & 14. The development comprised topsoil stripping prior to the construction of four firing points and three target lines, a control building and an access track. The archaeological works comprised the excavation of four evaluation trenches across extant but ruined stone walls and subsequent monitoring during the construction works, in accordance with a brief prepared by White Young Green (Appendix III).

11.2 The study area covered c.6.8 hectares and was bounded to the north by open moorland, to the south-east by the road from Leighton Hide to Heely Dod, and to the south-west by the road from Leighton Hide to Todlaw Pike.

11.3 The objective of the evaluation was to identify, excavate and record two extant dry stone walls in the southern part of the proposed ETR. The aim of the watching brief was to record any archaeological features encountered during groundworks associated with the ETR development.

11.4 The works prior to construction comprised:
- excavation of three sample sections of the boundary wall (RPS 5)
- excavation of one sample section of the boundary wall (RPS 6)

11.5 The works during construction comprised watching briefs, undertaken at all locations where earthmoving took place, with specific awareness of the following:
- the area of the possible clearance cairn (RPS 1)
- the area of scattered stones (RPS 2)
- the line of the possible track (RPS 7)

11.6 The evaluation was undertaken between January and May 2005. The watching brief was undertaken intermittently between October 2004 and September 2005.

11.7 Fieldwork was conducted by Graeme Attwood, Janet Beveridge and Andy Willis, supervised by Alan Rae. This report was prepared by Alan Rae. Specialist analysis was conducted by Dr Charlotte O’Brien (macrofossil analysis).

11.8 The site code is OFR05, for Otterburn Firing Range 2005.

*The evaluation trenches*

*Methods*

11.9 Four trenches were excavated in order to record two extant dry stone field boundary walls within the area of the proposed ETR. The north-south orientated wall (RPS 6) measured 80m in length; the east-west orientated wall
(RPS 5) measured 405m in length. Each trench measured 5m by 3m with the long axis of each trench aligned perpendicular to the wall. Trench locations were ultimately determined by avoiding the most waterlogged areas. An early attempt (March 2005) at excavating the trenches by hand was abandoned due to the rapid rate at which groundwater filled the trenches. The evaluation was re-commenced in May 2005. All the trenches were then excavated using a mechanical excavator equipped with a toothless ditching bucket, under close archaeological supervision, and were cleaned and recorded by hand. A list of contexts with descriptions and associated finds is provided in Appendix I; stratigraphic matrices are provided in Appendix II.

**Trench 1**

11.10 This trench sampled the north-south dry stone wall RPS 6 (Figure 15). Light grey/brown boulder clay [5] was reached at 254.96m OD. Immediately above the boulder clay was a very dark grey/brown, peaty silty clay layer [4], 0.10m in depth. Above context [4] was the dry stone wall [F3], measuring 0.26m in height and 0.92 in width. Overlying and between [F3] was a very dark brown peaty silty clay layer [2], 0.10m in depth; this was overlain by dark grey/brown silty clay topsoil and turf [1], 0.11m in depth.

11.11 The wall was constructed directly onto a peaty clay layer rather than being set in a foundation trench. The wall consisted of a single course of undressed stones measuring 0.45m to 0.68m in length, 0.24 to 0.35m in width, and
between 0.15m and 0.37m in height. These stones formed the two outer faces of the wall with rubble infill forming the core of the wall.

11.12 No other archaeological features were identified, and no artefacts recovered.

**Trench 2**

11.13 This trench, and Trenches 3 and 4, sampled the east-west orientated dry stone wall RPS 5 (Figure 15). Light grey/brown boulder clay [10] was reached at 250.69m OD. Immediately above the boulder clay was a very dark grey/brown, peaty silty clay layer [8], 0.25m in depth. Above context [8] was the dry stone wall [F9], surviving to 0.42m in height, 0.74m in width. Overlying wall [F9] was a very dark brown peaty silty clay layer [7], 0.18m in depth. This was overlain by dark grey/brown silty clay topsoil and turf [6], 0.11m in depth.

11.14 The wall consisted of undressed stones measuring 0.40m to 0.70m in length, 0.25 to 0.38m in width, and between 0.15m and 0.40m in height, forming the two outer faces of the wall, with rubble infill forming the core of the wall. The single remaining course of stone wall sat on top of a single-course offset
foundation of similarly-sized stones. The offset foundation was laid directly onto a peaty clay layer rather than being set in a foundation trench. No other archaeological features were identified, and no artefacts recovered.

**Trench 3**

11.15 Light grey/brown boulder clay [15] was reached at 250.56m OD (Figure 16). Immediately above the boulder clay was a very dark grey/brown peaty silty clay layer [14], 0.23m in depth. Above context [14] was the dry stone wall [F13], 0.46m in height and 0.79m in width. Overlying the wall was a very dark brown peaty silty clay layer [12], 0.16m in depth. This was overlain by dark grey/brown silty clay topsoil [11], 0.10m in depth.

11.16 The wall consisted of a single course of undressed stones measuring 0.35m to 0.57m in length, 0.20 to 0.30m in width, and between 0.10m and 0.40m in height. These stones formed the two outer faces of the wall, with rubble infill forming the core of the wall. The single remaining course of stone wall sat on top of a single course offset foundation of similarly-sized stones. The offset foundation was laid directly onto a peaty clay layer rather than being set in a foundation trench. No other archaeological features were identified, and no artefacts recovered.

**Trench 4**

11.17 Light grey-brown boulder clay [20] was reached at 250.65m OD (Figure 16). Immediately above the boulder clay was a very dark grey/brown, peaty silty clay layer [19], 0.04m in depth. Above context [19] was the dry stone wall [F18], 0.39m in height and 0.74m in width. Overlying wall [F18] was a very dark brown peaty silty clay layer [17], 0.13m in depth. This was overlain by dark grey/brown silty clay topsoil [16], 0.10m in depth.
11.18 The wall consisted of a single course of undressed stones measuring 0.40m to 0.60m in length, 0.20 to 0.30m in width, and between 0.15m and 0.30m in height, forming the two outer faces of the wall, with rubble infill forming the core of the wall. The single remaining course of stone wall sat on top of a single-course offset foundation of similarly-sized stones. The offset foundation was laid directly onto a peaty clay layer rather than being set in a foundation trench. No other archaeological features were identified and no artefacts recovered.

11.19 The watching brief was maintained during all groundworks for the ETR construction. The foundation trenches for the firing points and target lines were all aligned east-west and measured 75m in length and 5m in width; the area stripped for the control building covered 50sqm. All areas were stripped using a 360° excavator equipped with a toothless ditching bucket, under close archaeological supervision.

11.20 In each of the foundation trenches and stripped areas the sequence of topsoil, subsoil and boulder clay was the same. Natural subsoil, a light grey/brown
boulder clay [23] was reached at between 247.16m and 259.59m OD. Immediately above the boulder clay was a very dark grey/brown, peaty silty clay subsoil [22], between 0.10m and 0.25m in thickness. Overlying the subsoil was dark grey/brown silty clay topsoil [21], 0.10m to 0.16m in depth. No archaeological deposits were identified, and no artefacts recovered.

**The artefacts**

11.21 No artefacts were recovered during the course of the evaluation and watching brief.

**The environmental evidence**

**Methods**

11.22 Contexts [4], [8] and [14] from Trenches 1, 2 and 3 respectively were assessed for plant macrofossils. These contexts directly underlay the wall in each trench. 500ml of each were wet-sieved through a 500 µ mesh and scanned at x 40 magnification for waterlogged and charred botanical remains.

**Results**

11.23 The contexts were composed of very well-humified peat. Small fragments of charcoal, monocot roots, mosses and wood were present, but other plant remains were absent. The contents of the samples are listed in Table 5.

<table>
<thead>
<tr>
<th>Table 5. Contents of the samples from OFR05.</th>
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<tbody>
<tr>
<td><strong>Context</strong></td>
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<tr>
<td><strong>Sample</strong></td>
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<td><strong>Volume processed (ml)</strong></td>
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<td><strong>Volume assessed (ml)</strong></td>
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<td><strong>Flot matrix (relative abundance)</strong></td>
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<tr>
<td>Charcoal</td>
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<td>Monocot roots</td>
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<td>Moss fragments</td>
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<td>Insect</td>
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<td>Sand</td>
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<td>Wood</td>
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Relative abundance is based on a scale from 1 (lowest) to 5 (highest).

11.24 The absence of identifiable plant remains reflects the well-humified nature of the peat, which is likely to have accumulated at a slow rate. The samples provide no chronological, palaeoecological or economic information about the site due to the poor preservation of plant remains.

11.25 No further plant macrofossil analysis is recommended and material suitable for radiocarbon dating is absent. Pollen analysis is not recommended as grains are likely either to be absent or differentially preserved.

**Discussion**

11.26 In the absence of other dating evidence from either fieldwork or cartographic sources, the walls RPS 5 and 6 are presumed to be of late post-medieval date, contemporary with the ridge and furrow earthwork remains on the slopes and
the slight hill-top to the east of the firing lanes of the ETR (RPS 4). These earthworks are believed to date from the 18th or 19th centuries on morphological grounds; the swing plough, which was introduced in the 1760s, produced ridge and furrow no more than 5m wide, as here (RPS 2004, 3).

11.27 RPS 5 forms part of the parish boundary between Otterburn and Hepple parishes, while RPS 6 is an enclosure wall.

11.28 Features RPS 1 (a possible clearance cairn), RPS 2 (an area of scattered stones), RPS 3 (a possible mining pit) and RPS 4 (ridge and furrow) were all outside the areas of groundworks and so were not impacted upon by the works. Feature RPS 7 (the course of a possible track) was not expected to be impacted by the works except where crossed by the ETR access track, however, no evidence for the track was identified during the watching brief.
12. References

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IFA 2001c  *Standard and Guidance for an archaeological watching brief*, Institute of Field Archaeologists, Reading


MacDonald, S, 1980  Agricultural response to a changing market during the Napoleonic Wars *Economic History Review*, 2nd series, Volume XXXIII


RPS 2004  *Electric Target Range: environmental statement*, R5002

Sanderson, R P, 1891  *Survey of the Debateable and Border Lands*


Appendix I: Context information

Summary lists of contexts. The symbols in the columns at the right indicate the presence of finds of the following types: P pottery, B bone, M metals, F flint, S slag, O other materials.

Road improvement and associated works: OTA03 watching brief

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CMF: evaluation trenches

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### 902 Natural orange/brown clay
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### 1001 Firm grey/brown silty clay
### 1002 Natural orange/brown clay

#### CMF: DS15/16 corn-drier excavation OMF04

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ETR: evaluation trenches (OFR05)

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Appendix II: Stratigraphic matrices

CMF: evaluation trenches

Trench 1

- Topsoil
  - 300
- Bank
  - F303
  - 304
- Boulder clay
  - 305
- Ditch
  - 301
  - F302

Trench 2

- Topsoil
  - 400
- Bank
  - F401
  - 402
- Boulder clay
  - 403

Trench 3

- Topsoil
  - 500
- Bank
  - F501
  - 502
- Boulder clay
  - 503
CMF: DS15/16 corn-drier excavation OMF04

- Topsoil
- Stone rubble
- Fill layers
- Enclosure walls: F17, F18
- Wall partition: F12
- Wall repair: F13
- Bowl structure: F4, including niches: F10, F11
- Flag floor: F9
- Packing layer: F15
- Construction cut: F16
- Boulder clay: F14
ETR: evaluation trenches

Trench 1
- Topsoil
- Wall RPS 6
- Boulder clay

Trench 2
- Topsoil
- Wall RPS 5
- Boulder clay

Trench 3
- Topsoil
- Wall RPS 5
- Boulder clay

Trench 4
- Topsoil
- Wall RPS 5
- Boulder clay
Appendix III: Project specifications
For road improvement works, prepared by Defence Estates (DE15/4445):

SPECIFICATION FOR ARCHAEOLOGICAL WATCHING BRIEF

1.0 Watching Brief

The watching brief will be undertaken along the entire length of the road widening except where more detailed excavation has already been carried out. The archaeological monitoring and recording will conform to the requirements set out in the IFA Standard and Guidance for Archaeological Watching Briefs (1999).

2.0 Aims and Objectives

The general aim of an archaeological watching brief is to provide facilities for professional archaeologists to identify, record and retrieve as far as possible archaeological remains that may be located in the course of a development.

The specific aims are to observe and record any significant archaeological deposits, layers or features that are exposed during the earthworks in the parts of the development that fall outside the pre-construction excavations, and to monitor the construction contractor's adherence to the agreed limitations on working methods in certain areas.

3.0 Method Statement

Archaeological observation and recording will take place during the removal of topsoil that occurs outside the pre-construction excavations.

All work will conform to the standards in the Appendix. A full and proper record (written, drawn and photographic as required for the excavations) will be made for all work using pro-forma record forms and sheets, and/or text descriptions appropriate to the work and subject to the circumstances prevalent at the development site. In addition, on-site matrices of the stratigraphical site record will be compiled.

The location of each area monitored under archaeological supervision will be shown on a site plan that will be related to the O.S. grid. The grid north as well as the location of the OS bench mark and the site TBM will be clearly marked on these plans.

All archaeological deposits and/or features will be recorded on scaled sections and plans. If no archaeological remains are identified, plans of the area examined, with spot heights, will be produced.

The contractor and/or site manager or other nominated members of the contractors staff will liaise with the archaeologist(s), either in person or by telephone, in order to inform him/her of the construction programme.

The detailed timetable for the observation and recording programme will be discussed and agreed with the Client. It is expected to entail intermittent attendance by the archaeologist(s) over the course of the project.
On arrival on site, the archaeologist(s) will report to the site manager or other identified representative of the Client, and comply with their arrangements for notification of entering and leaving the site.

The archaeologist(s) may advise the temporary suspension of work in limited areas in order to undertake necessary recording in the event of unforeseen discoveries being made. Such a temporary suspension may be advised when the archaeologist(s) consider that significant archaeological features are at risk of destruction without record. Any such arrangement shall be discussed with the Northumberland National Park Authority and agreed with the Client prior to its implementation. The archaeologist(s) shall not cause unreasonable disruption of the work schedules of the client.

The agreed mitigation requirement (no. 43) that relates to the scheme design and working methods of the construction contractor would affect the archaeological contractor insofar as these requirements limit the areas of disturbance. The construction contractor’s compliance with these requirements will be monitored by the archaeological contractor. Instances of non-compliance would be reported immediately to the Project Sponsor. These aspects of the scheme are:

- restrictions on working widths and the location of the road widening at Todlaw Pike
- location of widening at Deer Law hut circles
- width restrictions and location of widening at Yatesfield
- width restrictions and location of widening at Balshtiel
- location of widening to east of Dere Street north of Middle Golden Pot
- location of widening and width restriction at Countess Well
- location of widening and width restriction adjacent to the western part of High Rochester to Bridge of Aln road
- location of widening in the vicinity of Potts Durtrees medieval building
- width restriction and protection of Watty Bell’s Cairn
- location of widening and width restriction at medieval structure 2d
- modification of Highshaw Bastle passing place

The archaeologist(s) will take personal responsibility for checking on a regular basis the progress of work in relevant areas and confirm verbally and/or visually what the programme of work is from day to day.

The archaeologist(s) will keep a record of the date, time and duration of all site visits, the number of staff concerned and any actions taken.

Sufficient and appropriate resources (staff, equipment, accommodation etc) will be used to enable the project to achieve its aims, the desired quality and timetable, and to comply with all statutory requirements. Tenderers should state the day rate for the work, inclusive of post excavation assessment, analysis, archiving and reporting to the standards identified in the Appendix.
4.0 Health and Safety

Health and Safety matters will take priority over archaeological matters. Risk assessment must be carried out in accordance with the Management of Health and Safety at Work Regulations 1992. The archaeological contractor will not be the main contractor on-site and therefore they must ensure that they have a Health and safety briefing from the main contractor and comply with specified site rules.
APPENDIX A

Standards for Excavation in the Watching Brief.

Archaeological contractors will submit their proposed recording system for approval to the planning authority. All individual features will be sample excavated including linear features. Soil samples will be collected under the supervision of a named environmental specialist for assessment for environmental potential, including charcoal, small bones, pollen, mollusca, and macro-environmental material.

a) Proposed excavation director and excavation and research experience. The contractor will be monitored by the Client’s Agent assisted and advised by the Defence Estates, EH and the NNPA. The Tenderer should name the Project Management and senior site personnel, who should be members of the Institute of Field Archaeologists or have equivalent qualifications and experience.

b) Size and structure of excavation team. The staffing will be left to the contractor, but it would be a necessary part of the Project Design that the team should be sufficient to complete the work within the aims of the project. The extent to which archaeological considerations will be allowed to affect the development schedule should also be stated. The on-site personnel should be experienced in this type of work and familiar with the type of terrain and conditions found at Otterburn.

c) Specialist help and reports. The contractors invited to tender will be required to submit a scheme of work which specifies named experts who will supervise specialist aspects of the programme, including any necessary environmental strategy. Tenderers should submit an environmental strategy for the whole project. A detailed strategy for post excavation including assessment, analysis, archiving and reporting consistent with MAP2 will also be required, and only satisfactory strategies will be considered.

d) Treatment of Finds and Samples. Different sampling strategies for the recovery of finds may be employed according to established research objectives and the perceived importance of the strata under investigation.

The location of significant archaeological finds will be recorded in three dimensions.

Provision will be made for the environmental sampling of appropriate features by a named specialist. Provision will be made for samples to provide C14 dating and archaeo-magnetic dating (if appropriate). Other forms of specialist analysis such as the X-raying of metalwork will be identified at the MAP 2 assessment stage and undertaken as appropriate, but the possibility of the need for such work should be considered and reflected in the bid.

All finds and samples will be recorded, collected and labelled according to their individual stratigraphical contexts. Finds will be allocated to the appropriate archaeological context and individual finds trays and waterproof labels will be used to identify unique individual contexts. Each label will be marked with the appropriate context number in waterproof ink and will be securely attached to each tray. All finds and samples will be exposed, lifted, cleaned, conserved, marked, bagged and boxed.

Finds from unstratified contexts, whether located during machine trenching or during hand excavation, will be collected and recorded separately.

e) Human Remains. Should human remains be discovered, the coroner will be informed and the archaeological contractor will obtain a Home Office licence if their removal proves to be necessary.

f) Conservation and storage. Before commencing the fieldwork, the archaeological contractor will confirm in writing to the Client and Client's Agent that arrangements have been made to cover all necessary processing, conservation and specialist analysis, and suitable storage of finds and samples.

Contractors will be required to submit schemes for satisfactory on-site conservation, and subsequent storage, post excavation conservation, archiving and deposition of the excavated material and records in the appropriate museum. Only satisfactory programmes will be considered.

g) Post excavation programme. Contractors will be required to submit costs for a full MAP2-style post excavation process, up to and including archiving and publication. Outline details of the arrangements and costs for post excavation assessment, processing, analysis, archiving, report preparation and publication should be included in the tender submissions. The costs of these phases should be identified and the assumptions on which they are based should be stated (see clause 1.12).

h) Previous work. The contractor will include in the Project Design his proposals for the incorporation of the results of the previous evaluations undertaken in connection with the Options for Change proposals.

i) Publication procedure and programme. Contractors will be required to adhere to the procedures set out in MAP2 as regards dissemination. The following reports will be required:
- the Assessment Report and Updated Project Design (following MAP2 style assessment)
- the academic report(s) (synthesis following full analysis)
- the archive report (fully prepared research archive)
- "Popular Report"

Consideration will need to be given to the form of the report, and tenderers should bear in mind the previous survey and excavation work. The contractor will adhere to the report and recording formats set out in the MoD guidelines as follows;

The report(s) should include a site location plan with NGR references, and also be accompanied by additional plans/map extracts to display the noted and recorded archaeological features as appropriate. The report should be prepared to an adequate standard (see Standard and Guidance for Archaeological Field Evaluations IFA (1999))
The report should be presented in an ordered state prefaced with a contents listing and it should also include an index and cross-referencing where appropriate. Paper copies of the report should be robustly bound within a protective cover or sleeve. The report should contain a title page listing the site and or project name, district and County together with site NGR, the name of the archaeological contractor and client. The report should be page numbered and supplemented with sections and paragraph numbering for ease of reference. Copies of the report will be deposited with the MoD, the defence Estates, the county SMR, the NMR and the Northumberland National Park Authority (NNPA).

j) Arrangements for deposition of original archive. The archaeological contractors, in agreement with the Client, will arrange for the archive and original material to be deposited in the appropriate museum to be agreed with EH and the NNPA. The submitted tender should clearly identify the receiving body for the archive and itemise all associated costs.
2.40 Davyshiel Earthwork

2.41 Condition. The angle of the roads north and west of the CMF contains a number of earthwork and masonry structures of differing periods. The area is rough pasture, where the masonry remains of a probable medieval or post-medieval farmstead with the stone banks of an extensive field system and ridge and furrow can be clearly traced. In addition there are less well-defined earthworks, interpreted as possible medieval or later corn drier (DS15) and its associated fuel store or hut (DS16). The latest features is a series of bomb craters. The corn drier and its associated structures are outside the CMF footprint, but will be affected by the screen planting (as shown on Drwg no. H/211 Revision A, entitled Proposed Woodland Planting Central Maintenance Facility, amended in February 2004 to show the agreed planting areas).

2.42 Site reconnaissance and research. The area was surveyed by Lancaster Archaeological Unit in 1996. The sites were designated DS15 and DS 16 in the LAU survey. DS15 is described as a possible corn-drying kiln, of medieval or post-medieval date, in poor condition, 6m in diameter and 0.2m high. It is a circular dished depression 0.1m – 0.3m deep surrounded by a grassed bank with some in situ stone, 0.2m high at its maximum, cut into rising ground to the west, with a possible 0.3m wide break in the bank's east side. DS16 is described as a possible hut of medieval or post medieval date in poor condition, possibly a fuel store for DS15. It is rectangular, 4m long by 2m wide, and 0.1m high, cut into rising ground to the west with low earthworks to the south and east where some stone shows. It appears to abut DS15 to the north.

2.43 Research Aims. The aim will be to establish the date and function of the features, in order to relate them to the economic development of the area.

2.44 Excavation method and strategy. A single open area excavation trench 10m x 10m should expose the interiors of both structures, enable the enclosing walls/banks and any interior features to be planned and sectioned, and also include sufficient of the area around the structures to ensure that the appropriate context of the features is established.

DF 12.04.2004
For ETR works, prepared by White Young & Green:

**OTA: ELECTRIC TARGET RANGE**

**EXCAVATION AND WATCHING BRIEF**

**PROJECT BRIEF**

1. **Introduction**

1.1 In agreement with English Heritage and the Northumberland National Park Authority the MoD undertakes to commission a programme of agreed archaeological mitigation measures at OTA in accordance with the approved NoPD. The following Project Brief is for the archaeological programme of works that will be required prior to construction and during construction of the Electric target Range.

1.2 The Agreed Measures related to archaeology are set out in the ES. They can be broken down into:

- works required prior to construction
- works during construction

1.3 Using the numbering in the ES, the works required prior to construction are:

- excavation of 3 sample sections of the boundary wall (RPS 5)
- excavation of 1 sample section of the boundary wall (RPS 6)

1.4 The works required during the construction are related to watching briefs and monitoring. Watching briefs and/or archaeological monitoring are required for the earth moving activities, with specific recommendations related to:

- the area of the possible clearance cairn (RPS 1)
- the area of scattered stones (RPS 2)
- The line of the possible track (RPS 7)

1.5 This Project Brief sets out the areas to be investigated and the general standards and methods to be adopted by the archaeological contractors. The Project Design should include itemised costings for each element of the project including the post excavation phase. The archaeological contractor should prepare costings for assessment, analysis, archiving and publication. These should be identified in the costings. The contractor should set out the assumptions on which he bases these costings, including day rates, timetables and the anticipated levels of work involved.

2. **Excavation**

2.1 **Post Medieval Walls (RPS 5 and 6):**

2.2 **Condition.** The features are ruined and robbed post-medieval boundary walls. Only a few courses of the walls survive, with tumbled stones visible on both sides. Current land use is rough grazing. RPS 5 runs roughly east-west across the lanes of the ETR, midway between the 400m and MFP firing positions. It is about 60cm wide and over a 300m long, and its line continues on the east side of the modern road to Wainfordrigg and High Carrick. A modern drainage channel cuts this wall at the eastern edge of the ETR lanes. RPS 6 is a southern spur wall at right angles to RPS 5. It runs about 70m to the top of a knoll before disappearing, reappearing again to the east of the Wainfordrigg road.
2.3 Site reconnaissance and research. A documentary study and a walkover survey were commissioned by the MoD in 2004, and the results incorporated in the ES. The conclusion was that these were post medieval boundary walls, the east-west wall being on the Elsdon parish boundary.

2.4 Research aims of excavation. The aim of the investigation is to record the surviving structure of the walls sufficiently to establish, if possible, the date of construction, the method of construction, and the date and process of destruction. The investigation will also check for evidence of any earlier boundary features under or in the immediate vicinity of the walls. Opportunities should be taken for environmental sampling to elucidate earlier land-use, climate etc. The overall aim of the investigations is to contribute to the understanding of the land-use, enclosure and development of the historic landscape.

2.5 Excavation method and strategy. The ETR construction will remove the east-west wall (RPS 5) where it crosses the ETR lanes because of ricochet risks, and the access track on the east side of the ETR will cut the east-west-wall and the north south wall (RPS 6). The east-west wall RPS 5 should be sectioned in three places: at the western extremity of the ETR works, at the centre of the ETR lanes and at the point where the eastern access track cuts it. The north south wall RPS 6 should be sectioned at the point where the eastern access track cuts it. A sufficient length of wall in each case should be removed so that the research aims set out above can be addressed.

2.6 The trenches will each be 3m X 5m straddling the line of the walls, with the long access of the trench at right angles to the line of the wall. In addition, if features are uncovered which extend beyond the trench, and which would require a wider excavated area to understand, the trench would be extended appropriately after consultation and agreement with the National Park Authority and the Project Sponsor. A contingency for such an eventuality should be identified in the Project Design and costings. The topsoil strip and subsequent excavations of any features revealed would be by hand.

3. Excavations: General Considerations

3.1 The archaeological contractor will submit their proposed recording system for approval to the planning authority. All individual features will be fully excavated including linear features. Soil samples will be collected under the supervision of an environmental specialist for assessment for environmental potential, including charcoal, small bones, pollen, mollusca, and macro-environmental material.

3.2 Duration of the proposed excavations and size of field team. The archaeological contractor will be expected to submit a timetable for the duration of the excavations at each site, dependent upon the decision date.

3.3 Proposed excavation director and excavation and research experience. The excavation contractor(s) will be chosen by tender competition immediately following an Inquiry decision favourable to the MoD. The contractor(s) will be monitored by RPS Consultants, EH and the planning authority. The Project Design should name the Project Management and senior site personnel, who should be members of the Institute of Field Archaeologists or have equivalent qualifications and experience.

3.4 Size and structure of excavation team. The staffing will be left to the contractor, but it would be a necessary part of the Project Design that the team should be shown to be sufficient to complete the work in the timetable required. The on-site personnel should be experienced in this type of work and familiar with the type of terrain and conditions found at Otterburn.
3.5 **Specialist help and reports.** The contractors will be required to submit a scheme of work which specifies named experts who would supervise specialist aspects of the programme, in particular the environmental strategy. A detailed strategy for post excavation including assessment, analysis, archiving and reporting consistent with MAP2 will also be required.

3.6 **Treatment of Finds and Samples.** Different sampling strategies for the recovery of finds may be employed according to established research objectives and the perceived importance of the strata under investigation. Close attention will be given to sampling for date, structure and environment. Bulk sieving may be necessary where there is a low incidence of artefacts.

The location of significant archaeological finds will be recorded in three dimensions.

Provision will be made for samples to provide C14 dating and archaeo-magnetic dating (if appropriate). Other forms of specialist analysis such as the X-raying of metalwork will be identified at the MAP 2 assessment stage and undertaken as appropriate, but the possibility of the need for such work should be considered and reflected in the quotation.

All finds and samples will be recorded, collected and labelled according to their individual stratigraphical contexts. Finds will be allocated to the appropriate archaeological context and individual finds trays and waterproof labels will be used to identify unique individual contexts. Each label will be marked with the appropriate context number in waterproof ink and will be securely attached to each tray. All finds and samples will be exposed, lifted, cleaned, conserved, marked, bagged and boxed according to the United Kingdom for Conservation’s Conservation Guidelines No.2 and First Aid for Finds (second Edition, 1987).

Finds from unstratified contexts, whether located during machine trenching or during hand excavation, will be collected and recorded separately.

3.7 **Human Remains.** Should human remains be discovered, the coroner will be informed and the contractor will obtain a Home Office licence if their removal proves to be necessary.

3.8 **Sponsoring organisation for the proposed excavation.** The sponsoring organisation will be the MoD; the Project Sponsor within the MoD is Lt Col (Retd) R A Newns.

3.9 **Conservation and storage.** Before commencing the fieldwork, the archaeological contractor will confirm in writing to the project sponsor that arrangements have been made to cover all necessary processing, conservation and specialist analysis, and suitable storage of finds and samples.

3.10 **The Contractor will be required to submit schemes for satisfactory on-site conservation, and subsequent storage, post excavation conservation, archiving and deposition of the excavated material and records in the appropriate museum.**

3.11 **Post excavation programme.** The Contractor will be required to submit costs for a full MAP2 style post excavation process, up to and including archiving and publication. Outline details of the arrangements and costs for post excavation assessment, processing, analysis, archiving, report preparation and publication should be included. The costs of these stages should be identified and the assumptions on which they are based should be stated.

3.12 **Publication procedure and programme.** The Contractor will be required to adhere to the procedures set out in MAP2 as regards publication. Consideration will need to be given to the form of the publication. A copy of the final report will be deposited with the MoD, the county SMR and the Northumberland National Park Authority.
3.13 **Arrangements for deposition of original archive.** The archaeological contractor, in agreement with the project sponsor will arrange for the archive and original material to be deposited in the appropriate museum to be agreed with EH and the planning authority, and a copy deposited in the NMR.

4. **Watching Brief**

4.1 The watching brief will be undertaken at all locations where there is earth moving. The archaeological monitoring and recording will conform to the requirements set out in the IFA Standard and Guidance for Archaeological Watching Briefs (1999).

**Aims and Objectives**

4.2 The general aim of an archaeological watching brief is to provide facilities for professional archaeologists to identify, record and retrieve as far as possible archaeological remains which may be located in the course of a development.

4.3 The specific aims are to observe and record any archaeological deposits, layers or features that are exposed during the removal of topsoil in the parts of the development that fall outside of the archaeological excavations (including the removal of the walls where they have not been previously sampled), and in particular the areas of the possible track RPS 7, the possible cairn RPS 1, and the stone scatter RPS2.

**Method Statement**

5.4 Archaeological observation and recording will take place during the removal of topsoil which occur outside of the area excavations.

5.5 A full and proper record (written, drawn and photographic as required for the excavations) will be made for all work using pro-forma record forms and sheets, and/or text descriptions appropriate to the work and subject to the circumstances prevalent at the development site. In addition, on-site matrices of the stratigraphical site record will be compiled.

5.6 The location of each area monitored under archaeological supervision will be shown on a site plan which will be related to the O.S. grid. The grid north as well as the location of the OS benchmark and the site TBM will be clearly marked on these plans.

5.7 All archaeological deposits and/or features will be recorded on scaled sections and plans. If no archaeological remains are identified, plans of the area examined, with spot heights, will be produced.

5.8 Sufficient and appropriate resources (staff, equipment, accommodation etc.) will be used to enable the project to achieve its aims, the desired quality and timetable, and to comply with all statutory requirements. The contractor should state the day rate for the work, and a lump sum to complete it, inclusive of post excavation assessment, analysis, archiving and reporting.

5.9 The construction contractor and/or site manager or other nominated members of the contractor’s staff will liaise with the archaeologist(s), either in person or by telephone, in order to inform him/her of the construction programme.

5.10 The detailed timetable for the observation and recording programme will be discussed and agreed with the project sponsor. It is expected to entail intermittent attendance by the archaeologist(s) over the course of the project.

5.11 On arrival on site, the archaeologist(s) will report to the site manager or other identified representative of the project sponsor, and comply with their arrangements for notification of entering and leaving the site.
5.12 The archaeologist(s) may recommend the temporary suspension of work in limited areas in order to undertake necessary recording in the event of unforeseen discoveries being made. Such a temporary suspension may be requested when the archaeologist(s) consider that significant archaeological features are at risk of destruction without record. Any such arrangement shall be discussed with the lpa and agreed with the project sponsor prior to its implementation. The archaeologist(s) shall not cause unreasonable disruption of the work schedules of the client.

5.13 The archaeologist(s) will take personal responsibility for checking on a regular basis the progress of work in relevant areas and confirm verbally and/or visually what the programme of work is from day to day.

5.14 The archaeologist(s) will keep a record of the date, time and duration of all site visits, the number of staff concerned and any actions taken.

6. **Health and Safety**

6.1 All relevant health and safety legislation and codes of practice will be respected. The archaeologists will provide a risk assessment related to the archaeological work and conform to the health and safety procedures carried out by the construction contractor.

6.2 No personnel will work in deep unsupported excavations. Where the installation of temporary support work and other safety equipment is required, this will be provided by the developer as part of the archaeological agreement. Trenches deeper than 1.25 metres will be stepped, battered back or shored.

6.3 All trenches will need to be cleared for unexploded ordnance by the MoD before excavations deeper than 1 metre are commenced, or before any probes, cores or bores deeper than 1 metre are carried out.

6.4 The archaeologist(s) shall at all times wear a safety helmet, reflective jacket and safety boots.

6.5 The archaeologist(s) will not work unaccompanied in a remote area and will inform the Site Manager of his/her working area each day.

6.6 The archaeologist(s) will remain alert and will take due care not to impede the progress of moving machinery. He/she will stand well back from the turning circle of all mechanical excavators, buckets and cabs.

6.7 When observing deep excavations, the archaeologist(s) will remain at a safe distance from the edge of the excavation, especially in waterlogged or unconsolidated areas.

7. **Monitoring**

7.1 Provision will be made for the Northumberland National Park Authority (NNPA) to monitor the fieldwork during the excavation, and watching brief programmes, and any other aspect of the archaeological project as required, including the post fieldwork analysis and report preparation stages.

7.2 Any variation to the project programme in terms of work or recording, whether on site or off will be fully discussed and agreed with Northumberland National Park Authority in advance.

7.3 Reasonable access to the excavation site and the watching brief area will be given by the client to Northumberland National Park Authority, for monitoring purposes.

8. **Post Fieldwork Methodologies**
8.1 At the end of the fieldwork a MAP 2 assessment will be undertaken to determine the appropriate level for the post-fieldwork analysis and publication. The post fieldwork project assessment will ensure that the following requirements are fulfilled:

- provision of adequate finance
- adequate level of human and technical resources
- nomination of relevant specialists
- pre-determined levels of analysis
- clearly defined project management structure

8.2 The assessment will result in the production of a post excavation assessment report and updated project design which sets out post fieldwork proposal for the approval of the project sponsor, advised by NNPA. No post fieldwork analysis will begin until this process has been undertaken.

8.3 A fully integrated and structured site matrix will be produced such that the site may be accurately and comprehensively phased in relation to other dating evidence. This completed matrix will be incorporated into the final excavation and any other subsequent report.

9. **Final Publication and Dissemination**

9.1 A flexible approach to the ultimate publication strategy is required, as the potential scale and scope of the appropriate publication may not become apparent until the post fieldwork period.

9.2 Two objectives will be met: (i) the production of a research archive and (ii) the production of a report for publication.

9.3 Adequate resources will be allocated to achieve these objectives. The resources will include provision for reviews of the extent to which the objectives are being met, bearing in mind the process of synthesis can often lead to a revision of the original stated aims.

9.4 A final and comprehensive report of the archaeological excavation and monitoring shall be prepared for publication in an appropriate national or local archaeological journal within 1 year of the completion of the archaeological project. The report will include the following:

- A list of contents and of plans and figures used in the report;
- An explanation of the proposed development and the reasons for the archaeological excavation and monitoring of topsoil stripping;
- A non-technical summary that explains the main issues in laymen’s terms;
- An overall statement of the archaeological importance of the site in a local and regional context;
- A general introduction to the project, including details of the site location, the planning applicant, the archaeological contractor and the author(s) of the report;
- The aims and objectives of the project;
- The methodology used in the project;
- The identity of the project manager and of the individuals carrying out the work and their previous archaeological experience;
- A description of the archaeological and historical background and context of the site;
- A description of the geology and topography of the site and the results of any previous archaeological fieldwork in the vicinity;
- The methods used to excavate the site;
• Specialists reports on the finds (if appropriate) including significant dating evidence;
• A palaeoenvironmental assessment of the site (if appropriate);
• A description of the results, with a detailed discussion and interpretation on the reliability of the findings;
• Details of the project timetable, with dates and details of the staff structure;
• Details of the location of the project archive and finds at the time of compilation of the report, and the proposed date and location of their eventual deposition;
• Sufficient illustrations to support the text including figures to show the location of the site in a national, regional and local context; the location of the excavation and of the archaeological monitoring areas; the cultural heritage within a 1km radius of the proposed development site; detailed figures of the excavation trench plans and monitored area plans and selected excavated sections and sufficient interpretive drawings to illustrate the main findings;
• Tabulated lists of contexts and finds, matrices, acknowledgements, a bibliography and a glossary of terms for the non-specialist

9.5 Copies of the project report will be made available to the client, Northumberland National Park, the county Sites and Monuments Record within 18 months of the completion of the archaeological project. A copy of the report will be retained with the site archive.

9.6 A report will be submitted to an appropriate publication within one year of the completion of the archaeological project.

10. Copyright

10.1 The archaeological contractor shall retain full copyright of any commissioned report, tender documents or other documents, under the Copyright, Designs and Patents Acts (1988) with all rights reserved, excepting that it hereby provides an exclusive licence to the MoD and to the Northumberland National Park Authority for the use of such documents in all matters directly relating to the project.

10.2 Information, including drawings and photographs, can be used without charge by the MoD or the NNPA for future publications and displays, on condition that a credit to the contractor(s) is also displayed.

11. Archive and Finds Deposition

11.1 All retained artefacts will be cleaned, conserved and packaged in accordance with the requirements and guidelines of the United Kingdom for Conservation’s Conservation Guidelines No.2 and First Aid for Finds (Second Edition, 1987). Small finds will be boxed separately from the bulk finds.

11.2 Artefacts recovered from the archaeological excavation and watching brief will be taken away from the site at the end of each working day and will be stored in a secure off-site location.

11.3 A contingency will be identified for any unforeseeable finds conservation work which may be required on organic or other material which may be liable to deterioration after recovery.

11.4 Suitable specialists will be used for artefact analysis and environmental analysis.

11.5 Subject to the landowner’s consent and to the guidelines and requirements of MAP 2, all artefacts recovered from the archaeological excavation and watching brief and the archive will be deposited in an appropriate museum to be agreed with Northumberland National Park Authority. All recovered artefacts will be fully catalogued.
11.6 The project archive, comprising all records relating to that project will be retained and will be prepared to at least the minimum acceptable standard defined in MAP2.

11.7 The project manager will ensure that every element of the archive is kept clean and secure and that it is stored in a suitable environment.

11.8 The archive comprising written, drawn, photographic and electronic media, will be fully catalogued, indexed, cross referenced and checked for archival consistency.

11.9 A microfilm or microfiche copy of the project archive will be deposited with the RCHME within six months of the completion of the archaeological project.

12. Staffing and Timetable

12.1 The archaeological contractor should ensure that sufficient experienced staff, including the watching brief team, are available to undertake the work.

13. General Matters

13.1 The provisions of the Treasure Act (1996) will be complied with.

13.2 A contingency sum should be put aside for unforeseeable circumstances. Normal events, such as the range of weather conditions experienced at Otterburn, should be accommodated within the lump sum. Contractors should also make themselves aware of the implications of live firing for access.