



# Clearance Cairns, Low Gillerthwaite, Ennerdale, Cumbria

## Archaeological Excavation Report

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## Contents

List of Figures .....	v
List of Plates .....	v
Summary .....	vii
Acknowledgements .....	viii
<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 Scope of work .....	1
1.2 Location, Topography and Geology .....	1
1.3 Archaeological and historical background .....	1
<b>2 EVALUATION AIMS AND METHODOLOGY .....</b>	<b>4</b>
2.1 Aims .....	4
2.2 Methodology .....	4
<b>3 LANDSCAPE SURVEY .....</b>	<b>6</b>
3.1 Cairnfield EF XIV .....	6
<b>4 EXCAVATION RESULTS .....</b>	<b>8</b>
4.1 Introduction and Presentation of Results .....	8
4.2 General Soils and Ground Conditions .....	8
4.3 Cairn EF404 .....	8
4.4 Feature EF408 (Fig 11) .....	10
4.5 Cairn EF407 .....	11
<b>5 RADIOCARBON DATING .....</b>	<b>15</b>
5.1 Environmental Sampling and Results .....	15
<b>6 DISCUSSION .....</b>	<b>17</b>
6.1 Excavation objectives and results .....	17
6.2 Discussion .....	17
6.3 Conclusion .....	18
<b>BIBLIOGRAPHY .....</b>	<b>20</b>
<b>APPENDIX A CONTEXT INVENTORY .....</b>	<b>22</b>
<b>APPENDIX B SITE SUMMARY DETAILS .....</b>	<b>23</b>
<b>APPENDIX C 2016 EXCAVATION PROJECT DESIGN – EF 408 .....</b>	<b>24</b>

APPENDIX D	2017 EXCAVATION PROJECT DESIGN –EF 406.....	32
APPENDIX E	RADIOCARBON DATING CERTIFICATES .....	39

## List of Figures

- |        |  |
|--------|--|
| Fig.1  | Site location  |
| Fig.2  | General Plan of River Liza Site Group EFXIV (after LUAU 1998)            |
| Fig 3  | Location of Monuments on Orthophotograph Survey Base                     |
| Fig 4  | Location of Monuments on Contour Survey Base                             |
| Fig.5  | Aerial survey, 2016, showing location of topographic survey, 1995 - 1997 |
| Fig.6  | Aerial survey from Google 2003 (©Google Earth 2016)                      |
| Fig.7  | Hillshade View 2016, showing location of topographic survey, 1995 - 1997 |
| Fig.8  | LiDAR 2009, showing location of topographic survey (©Environment Agency) |
| Fig.9  | Detail Plan and Profiles of Cairn EF404                                  |
| Fig.10 | Sections through Cairn EF 404  |
| Fig.11 | Section through Cairn EF408  |
| Fig.12 | Detail plan and Sections through Cairn EF407                             |

## List of Plates

- Plate 1: Quadrant trench of Cairn EF404, following the removal of the turf
- Plate 2: Post-excavation view of Cairn EF404, facing east with a 2m and 1m scale
- Plate 3: South-east-facing section of Feature EF408, with 2m and 1m scale
- Plate 4: Quadrant trench of Cairn EF407 following the removal of turf
- Plate 5: Excavation of the south-western quadrant of cairn EF407a, facing east
- Plate 6: Cairn EF407a facing west, with 2m and 1m scales





## Summary

Between March 2016 and September 2017 OA North were appointed by the Forestry Commission to undertake the excavations of two clearance cairns that form part of a larger group under threat of destruction due to a change in the course of the River Liza in the Ennerdale Valley, Cumbria (NY 14911 13895). Cairn EF404 was excavated in March 2016, with the excavation of cairn EF406 undertaken in September 2017. Both cairns were excavated to agreed project designs (OA North 2016; 2017). This report sets out the results of the excavations in the form of a short document, outlining the findings.

The excavation has provided us with tentative evidence to suggest that clearance activity was taking place in the Ennerdale Valley from at least the early Bronze Age. It has revealed possible evidence to suggest that these cairns were being constructed in a more systematic method than is typically associated with clearance cairns, with the apparent use of a ring of larger retaining stones near the centre. Furthermore, the evidence indicates a later period of stone clearance during the Iron Age, when the cairnfield was expanded.

A comparison of aerial images taken over the last two decades reveals the alarming rate of erosion of the northern bank of the river and highlights the scale of the threat posed to the cairnfield. If the current pace of erosion continues it is possible that the cairnfield could be destroyed within the next decade.

## Acknowledgements

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The fieldwork was directed by Andy Phelps, with the assistance of Peter Schofield and Aidan Parker. The drone survey was completed by Jamie Quartermaine, who also managed the project. The environmental analysis was undertaken by Mairead Rutherford and Denise Druce and the figures were prepared by Mark Tidmarsh and Anne Stewardson. Thanks are also extended to the teams of OA staff that processed the environmental samples and prepared the archive.

## 1 INTRODUCTION

### 1.1 Scope of work

- 1.1.1 In 1995 a survey by Lancaster University Archaeological Unit (now Oxford Archaeology North) identified and recorded a small cairnfield of nine cairns in Ennerdale on a small east/west promontory, adjacent to the lower flood plain of the River Liza. The cairnfield was subsequently designated as a scheduled monument (SM 1408244). Since that date, the river has eroded a significant portion of the northern bank, leading to the partial or complete destruction of three cairns (EF405, EF408 and EF409). In response to this threat, the Lake District National Park Authority (LDNPA), in consultation with Historic England, resolved to undertake a programme of excavation to record one of the cairns before it is also destroyed by fluvial action.
- 1.1.2 The potential of such an excavation was recognised as being of immense value as considerable survey work has been undertaken across West Cumbria recording the prehistoric upland landscapes, and particularly some extensive cairnfields (Quartermaine and Leech 2012), but very few have been excavated, and even fewer have reliable radiocarbon dates.
- 1.1.3 In early 2016 OA North were appointed by the Forestry Commission to undertake the excavations of one of the cairns (Cairn EF404) at threat of destruction; the work was carried out in March 2016. The excavation of a second cairn (Cairn EF406) was commissioned the following year, and was undertaken in September 2017. Both cairns were excavated to agreed project designs (OA North 2016; 2017). This report sets out the results of the excavations in the form of a short document, outlining the findings.

### 1.2 Location, Topography and Geology

- 1.2.1 The cairnfield lies within the Ennerdale Valley, upon the northern bank of the River Liza (NGR 314890, 513863) within an area of unimproved rough pastureland, which, prior to 2006, was partially covered by forestry plantation (Fig 1). The underlying bedrock geology consists of igneous Granite known as the Ennerdale Intrusion, overlain by superficial deposits of alluvial sands, silts, clays and gravels lain down within river channels and across flood plains (British Geological Survey 2017).

### 1.3 Archaeological and historical background

- 1.3.1 **Introduction:** our knowledge of upland settlement within the western areas of the Lake District has been significantly enhanced as a result of the Lake District National Park Survey (LDNPS) which has examined over 68km<sup>2</sup> of unimproved fell, particularly on the south-west and Western Fells (Quartermaine and Leech 2012). The main surface evidence for early settlement is the ubiquitous cairnfield, which is found particularly on the marginal lands rising from the coastal plain. These are fossilised relict landscapes resulting from early agricultural activity, and are typically ascribed to the Bronze Age on the basis of a limited number of radiocarbon dates (Richardson

1982) and their spatial association with datable forms of funerary monuments (Walker 1965). Palaeobotanic evidence in conjunction with the physical evidence suggests that there was a population expansion out from the coastal plain during the Bronze Age resulting in the clearance of forest and the formation of the cairnfields (Quartermaine and Leech 2012). The LDNPS programme has shown that there was extensive Bronze Age settlement, on the West and south-west fells, but that this diminished in intensity further inland. The Town Bank and Stockdale survey areas, on the marginal land to the south of Ennerdale, highlighted rich archaeological landscapes and it was anticipated that there could be a similar survival on the marginal lands around Ennerdale. The archaeological work by the National Trust within Wasdale (National Trust 2000) has shown that, although there is prehistoric survival within the upper reaches and higher sides of the valley, for the most part the valley floor demonstrates medieval and post-medieval landscapes. A similar situation is reflected within Miterdale in both physical and documentary evidence (LUAU 2000).

- 1.3.2 **Cairnfields:** the earliest activity in Ennerdale appears to be the small, localised primary cairnfields which have broadly random distributions, no direct association with plots or cultivation terraces, and are constructed of medium and large stones (LUAU 1998). Typologically, these are tentatively assigned to the Bronze Age (2000 BC – 800 BC), although no funerary monuments have been identified from the valley to confirm this assumption. These small cairnfields (EF I, V, IX, XII XIVa and c) (Cairn EF408 is within Cairnfield XIVc) are often in areas of later settlement, and many are found relatively high up the valley sides (*ibid*). They are small in size by comparison with cairnfield remains from other West Cumbrian moorland areas (eg Town Bank and Stockdale Moor (Quartermaine and Leech 2012) and may reflect only limited prehistoric activity. Their location is significant in that they are not within enclosed lands, nor within areas that have been subject to later intensive farming and hence they have survived.
- 1.3.3 In contrast to these smaller cairnfields, a single very large cairnfield, has been located at the immediate head of the Ennerdale valley adjacent to the lake (EF VI) (LUAU 1998, Fig 7). The cairnfield (EF VIb) has a very varied character, incorporating substantial linear elements, be they cairn alignments or stone banks, which are converging towards a large rectangular double compartment stock enclosure, and an adjacent rectangular long house. These elements of the complex would appear to be indicative of activity from the medieval or even later periods.
- 1.3.4 However, there are also substantial numbers of randomly distributed cairns that have no apparent relationship with the stone banks. Some of these are within the area of ridge and furrow, where they still have a broadly random distribution and have not been formed into lines; as such they would appear to pre-date the ridge and furrow. Many of these cairns have central hollows, which have been paralleled at the excavations at Birrel Sike (Richardson 1982), and would appear to be clearance cairns originally set around the trunks of now decayed trees. This, together with the random distribution within this area, would suggest that elements of this cairnfield were a product of stone clearance following the primary forest clearance and, as such, would have been relatively early. The assessment of the spatial distribution across the site would suggest that the cairnfield was a product of more than one episode of stone

clearance and that the earliest stage of this may have been associated with primary forest clearance in the Bronze or Iron Age.

- 1.3.5 ***Iron Age/Roman (800 BC-AD 410):*** the EFXIVc cairnfield is on the immediate opposite side of the River Liza from an enclosed settlement (EF410) and an associated cairnfield and field system (EFXIVb) (LUAU 1998). The relationship between the EFXIVc cairnfield and that on the opposite side of the river is uncertain, but potentially they could be broadly contemporary. The enclosed settlement is potentially of Iron Age date and would originally have been c 57m in diameter and has parallels from the region (Whitrow Beck (WB 163), and Town Bank (TB 805) (Quartermaine and Leech 2012) and Glencoyne in Matterdale (Hoaen and Loney 2003)). The significant aspect of this site is that there is an associated field system (EFXIVb), defined by cairn alignments and stone banks, which does not appear to have developed from an earlier system or been superimposed by subsequent settlement. As such, this potentially suggests that the cairnfield and field system were broadly contemporary with the enclosed settlement. There is no evidence of lynchet formation or terracing but, nevertheless, there is the potential that cultivation was being undertaken.

## 2 EVALUATION AIMS AND METHODOLOGY

### 2.1 Aims

2.1.1 The main research aims of the investigation, were:

- To provide a mitigative record of the cairns before their destruction by the migration of the river;
- To establish the presence / absence of archaeological materials, and to determine their character, extent, and state of preservation, and condition;
- To establish their date and the environmental context for the landscape associated with the cairn;
- To establish the significance of the archaeological deposits and features.

### 2.2 Methodology

2.2.1 The full methodology is outlined in the WSI (*Appendices C and D*) and was adhered to in full, and, as such, was fully compliant with prevailing guidelines and established industry best practice (ClfA 2014a: 2014b: 2014c: Historic England 2015). A programme of field observation accurately recorded the character of deposits within the excavations.

2.2.2 **Survey Methodology:** the original survey of the cairnfield, undertaken in 1995 (LUAU 1998), provided the outline and extent of the cairns, but did not provide a detailed record of the associated topography, which had in any case changed substantially since the earlier survey because of the migration of the river. This prompted a need to undertake a more detailed survey of the cairnfield, specifically to show it in relation to river.

2.2.3 The survey was undertaken by photogrammetry, using imagery taken from a multi-rotor drone, and which generates three dimensional models of the site and topographic surfaces. Survey control was introduced to the photographs by the placement of survey control targets across the site which were located by means of a survey grade GPS.

2.2.4 The photogrammetric processing was undertaken using Agisoft software which provides detailed modelling using the overlap of aerial photographs, creating a very detailed DTM (Digital Terrain Model) across the site. The photographs were then digitally draped over the model to create an accurate three dimensional model of the ground surface. The primary output, however, was an accurate two dimensional textured image, but also a very detailed contour and hill-shade plot of the whole site.

2.2.5 **Excavation Methodology:** the extent of the excavation areas was defined on site, with the cairns divided into quadrants ahead of the excavation of a single quadrant. The turf was carefully removed from the excavation area by manual techniques and stored separately from the spoil, adjacent to the excavation on terram matting. The upper surface of each cairn was then carefully exposed and recorded prior to further excavation.

- 2.2.6 Due to time constraints on site during the excavation of Cairn EF404 it was decided to prioritise the excavation of two sondages in order to allow for the examination of a partial cross-section through the length and width of the cairn. This procedure was repeated during the excavation of EF407, although in this case the double cairn form precipitated the extension of one of the sections to encompass the junction between the two conjoining cairns.
- 2.2.7 All excavations were carried out stratigraphically by hand and was recorded using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results were recorded on *pro-forma* context sheets, and were accompanied by sufficient pictorial record (plans and sections) to identify and illustrate individual features. Primary records were available for inspection at all times.
- 2.2.8 A full and detailed photographic record was undertaken using digital photography using digital SLR cameras of at least 18-megapixel resolution, with all frames including a visible, graduated metric scale where appropriate.
- 2.2.9 Environmental sampling was undertaken in the form of bulk samples collected from any suitable (undisturbed and uncontaminated) deposits or features of demonstrable anthropological origin for the recovery of plant and faunal remains. The composition of the cairn made column samples impractical, however, micro samples were instead taken at recorded locations throughout the profile for pollen analysis. Samples of charcoal were specifically taken for radiocarbon analysis.
- 2.2.10 On completion of the excavation the precise location of all archaeological structures encountered was surveyed by means of photogrammetry using a photographic mast with control located by survey grade GPS. All information was tied in to Ordnance Datum.
- 2.2.11 Prior to departure from site the excavation areas were backfilled sequentially by hand and the turf re-laid on the surface.
- 2.2.12 **Reporting:** the final report (this document) presents, summarises, and interprets the results of the programme and incorporates contributions from specialist environmental researchers. It includes an index of archaeological features identified in the course of the project, with an assessment of the site's development. It also incorporates appropriate illustrations, including copies of the site plans and section drawings all reduced to an appropriate scale.
- 2.2.13 **Archive:** the results of the fieldwork and subsequent report will form the basis of a full archive to professional standards, in accordance with current English Heritage MoRPHE guidelines (Historic England 2015). This archive will be provided in the English Heritage Central Archaeological Services format. A synopsis (normally the index to the archive and the report) should be placed in the Cumbria Historic Environment Record. The artefacts will be deposited with Kendal Museum. The archive will include the raw survey digital data in AutoCAD format.

### 3 LANDSCAPE SURVEY

#### 3.1 Cairnfield EF XIV

- 3.1.1 The 1995-7 landscape survey (LUAU 1998) recorded a series of small cairnfield groups at the low point of the valley and in close association with the present line of the River Liza. There were three distinct groups XIVA, XIVb, and XIVc of which the latter is the subject of the present investigation. Each of the groups were separated from each other by a substantial water channel, wither River Lisa or Low Beck. They each contained a number of medium to large clearance type cairns, some of which had an essentially random distribution, but each also included alignments of cairns to some degree.
- 3.1.2 **EFXIVb:** the largest of the cairnfield groups was on the southern side of the River Liza (Fig 2) and in addition to the cairns and some stone banks, it also included part of an enclosed settlement (EF410) which was described as a homestead on OS mapping. The site group was evidently truncated by the River Liza to the north as only a third of the arc of the enclosed settlement survives, and the group is edged to the east by the gully edge of Low Beck. The site has also sustained damage from forestry machinery as evidenced by deep ruts, and also by the construction of the forestry road through the site.
- 3.1.3 The extant section of bank of enclosure EF410 extends 1.5-2.0m above the internal level and is formed of small to medium stones which have been piled up rather than built and is confirmed by the section through the west end of the bank that has been cut by the river. Inside the north-easternmost point of the arc are the remains of at least three sub-rectangular structures, probably huts, constructed against the bank. The form of the structure is consistent with an Iron Age/Romano-British form of simple enclosed settlement (Quartermaine and Leech 2012, 34).
- 3.1.4 Many of the component cairns of the cairnfield are aligned, often on the same orientations of stone banks and appear to reflect the deposition of clearance stone against the line of former boundaries. The stone boundaries and cairns define the edges of a sub-rectangular plot, within which there are no cairns, and the shape of the plot is largely dictated by the local topography. There is no evidence of any lynchets associated with the plot boundaries and, consequently, no direct evidence of cultivation. The settlement and associated field system, have a relatively cohesive form; there are few extraneous cairns or other features and, as such, there is no evidence that the site was re-used from an earlier period, and it would appear that both elements were a product of a relatively short-lived episode of occupation.
- 3.1.5 **EF XIVc:** the small cairnfield group to the north of the River Liza is on a narrow linear spur truncated by riverine action to both the north and south, and the site has been damaged by forestry activity (Figs 3 and 4). There is one marked alignment of cairns (EF 402, 404, 406 and 407), but otherwise the cairns have a broadly random distribution largely dictated by the topography.
- 3.1.6 **Migration and Realignment:** the character of the cairns of the EFXIVb and EFXIVC cairn groups are broadly similar; both have cairn alignments and these alignments are parallel to each other. It is probable that they were at least broadly contemporary



episodes of agricultural activity. Indeed, it is possible that they were originally parts of the same cairnfield, but were subsequently truncated by a later migration of the river and were divided. The evidence of the truncated sub-circular settlement (EF410) would indicate that it formerly extended at least 38m into the area of the River Liza flood plain (assuming that it was circular) and is not far from the extended line of the XIVc truncated spur. Given that the northern side of the same spur is eroded by river action, it can be suggested that the river formerly had a line to the north of the spur, and then subsequent to the formation of the cairnfield it took a new line cutting through the cairnfield leaving two residual parts.

- 3.1.7 Although the suggested major change in the line of the River Liza would have happened some considerable time in the past, and was likely to have been precipitated by a major flood event, there is also evidence of a more recent, and steady migration of the river. When reviewed in combination with earlier aerial imagery, the aerial survey provided evidence of the migration of the river channel, showing a substantial shift in the river bank towards the north (Figs 5-8). It caused the loss of cairns EF409, EF405 and EF408, although the latter was demonstrated through excavation to have been a natural feature.
- 3.1.8 **Recent Features:** several previously unrecorded linear features were also identified, curving across the valley floor from the north towards the south-east and terminating at the river's northern bank. The features were also visible upon the Lidar data from 2009 but earlier aerial images show the area under forestation. On the ground these features were visible as shallow gullies, filled with tree debris, presumably created during the clearance of the plantation in the early twenty first century to ease access across the land for machinery. They are almost certainly modern features associated with forestry management.

## 4 EXCAVATION RESULTS

### 4.1 Introduction and Presentation of Results

- 4.1.1 The results of both phases of excavation are presented below, and include a stratigraphic description of both trenches. A context register is included at the rear of this report within *Appendix A* (Figs 3 and 4).
- 4.1.2 Context numbers **100-13** were assigned to deposits associated with Cairn EF404, and Contexts **201-6** were assigned to deposits associated within Cairn EF406.

### 4.2 General Soils and Ground Conditions

- 4.2.1 Ground conditions throughout the excavations were generally good, although the surrounding area was poorly drained and uneven underfoot. Where encountered, the natural alluvial gravels were, with close inspection, distinct from the Cairn material above.

### 4.3 Cairn EF404

- 4.3.1 **Introduction:** the initial project design called for the excavation of Cairn EF408, which was located towards the southern end of the cairnfield and was deemed as being at greatest risk of destruction through erosion of the river bank. Initial observations, however, suggested that half of this cairn had already been destroyed, leaving a half section through the feature visible in the remaining river bank. After discussion with the Forestry Commission it was decided to clean up this section for recording; however after cleaning it became clear that this feature was almost certainly of natural origin and the decision was taken to examine a more definite example of a built cairn to the north.
- 4.3.2 Cairn EF404 was identified as a replacement and turf was removed from the north-western quadrant, covering an area of just over 12 sqm. The upper deposit of the cairn was then reduced across this area, and two adjoining sondages were excavated at right angles to provide a cross-section through the cairn.
- 4.3.3 **Results** (Figs 9 and 10): natural alluvial deposits were encountered at a height of 50.72m aOD, consisting of river washed gravels between 10mm and 500mm in diameter set within a loose dark grey brown fine sandy silt matrix (**104**). Due to its similarity to the cairn above, the deposit was excavated to a depth of 0.53m in order to confidently identify it as undisturbed natural. Immediately above the natural alluvial material lay a localised deposit of mid-yellow-brown silt clay (**103**), containing occasional river washed gravels up to 120mm in diameter (Plate 2). This deposit was confined to an area covering 0.85m x 0.15m at the centre of the cairn and extended to a maximum depth of 0.11m. Sealing this deposit was a brownish-orange silty clay, which was a maximum of 0.21m thick (**102**). This deposit filled the natural depression at the south-western end of the undisturbed natural gravels and was observed to contain occasional flecks of charcoal throughout. It was distinguished from the

surrounding deposits by an almost complete absence of gravel inclusions; the deposit was sampled for radiocarbon assay.

- 4.3.4 Overlying deposit **102** lay a mid-grey brown clay silt deposit of moderate compaction (**101**), up to 0.30m thick. It contained abundant quantities of river-washed cobbles varying in size from 100mm to 450mm and probably formed the lower deposit of the cairn. A series of large stones, up to 0.45m in diameter, appeared to be arranged in an arc, with a radius of 1.3m, around the centre of the cairn. These stones were distinguished from the rest of the stones by their larger size and the base of each rested upon the top of deposit (**102**). Layer **101** was overlain by deposit **100**, a dark-brownish-black silt, which formed a very loose matrix around abundant river-washed cobbles up to 400mm in diameter (Plate 10). The deposit, which constituted the uppermost layer of the cairn's construction, contained numerous voids and considerable evidence of rooting from the layer of rough turf, 0.10m thick which had covered the cairn prior to excavation.



Plate 1: Quadrant trench of Cairn EF404, following the removal of the turf





Plate 2: Post-excavation view of Cairn EF404, facing east with a 2m and 1m scale

#### 4.4 Feature EF408 (Fig 11)

- 4.4.1 At the base of the exposed section lay a deposit of large glacial cobbles in a very loose pea gravel matrix (**109**) (Plate 3). This was overlain by a sequence of silty clay deposits varying in colour from pink to orangey-pink and sealed by a lens of iron panning to a combined thickness of 0.5m (**108, 106, 110, 111**). These deposits were sealed by a layer of silty gravel (**112**) with abundant stones throughout, ranging from 10mm to 200mm in size.
- 4.4.2 Deposit (**112**) had been truncated at the western end by what appeared to be the cut of a gully, which had removed all deposits down to the free-draining glacial cobbles. This cut had subsequently silted up with a grey-brown sandy silt (**105**) and a thin deposit of dark-brown peat had formed above it, filling the upper part of the gully. Turf had then formed above, sealing deposit (**112**) and (**113**) beneath it.
- 4.4.3 It was not possible to determine whether the gully had been formed as a natural river channel or had been cut as some form of drain; however, all deposits within it appeared to be of natural origin. A second gully to the east was also noted, which, in combination with the first, had cut away the alluvial deposits on either side of EF 408, leaving a raised area between. Although during the initial landscape survey this feature was thought to be a cairn, the present internal examination suggests that it is of wholly natural origin.



Plate 3: South-east-facing section of Feature EF408, with 2m and 1m scales

## 4.5 Cairn EF407

- 4.5.1 **Introduction:** the project design (*Appendix C*; OA North 2016) called for the excavation of Cairn EF406, a single cairn located some 25m to the north-east of the previously excavated cairn which had been identified as being in imminent danger of destruction by the river. Upon arrival, however, it was determined that the cairn's proximity to the river edge now made its excavation unsafe and a second cairn was selected for excavation. Cairn EF407 was substituted as a good example of a double cairn, which was also at risk of destruction, but which did not present any undue risks to safety.
- 4.5.2 Topsoil was removed from the south-western quadrant of the north-eastern of the two cairns (EF407a) to reveal the upper layer of cairn material. As with the previous cairn, two adjoining sondages were then excavated at right angles to generate a cross-section through the quadrant. The south-western arm of this cross-section was then extended to the south-west to provide a partial cross-section through the south-western cairn (EF407b) in the hope of establishing any relationship between the two.
- 4.5.3 **Results** (Fig 12): natural alluvial gravels varying in size to between 10mm and 500mm in diameter were encountered at a depth of 135.31m aOD, set within a mid-grey-brown soft sandy silt matrix (**206**). At the base of the south-western cairn (EF407b) a spread of mid-brownish-orange fine silt (**207**) was identified, containing common sub-rounded river cobbles and increasing in thickness towards the centre of the cairn to a maximum of 0.24m. Lying above this deposit, and forming the bulk of cairn EF407b, was a layer of mid-red-brown silt (**208**), which again increased in thickness towards the centre of the cairn up to a maximum of 0.33m. The deposit contained occasional sub-rounded river cobbles to a maximum of 225mm in diameter.

- 4.5.4 The base of the north-easterly cairn (EF407 a) was made up principally of a mid-brownish orange silt **204**, identical to deposit **207** in character, which extended to a maximum thickness of 0.34m at its centre and tapered towards the edges of the cairn (Plates 5 and 6). At the cairn's north-western edge, deposit **205**, occupied an identical stratigraphic position and was also identical in character, but measured just 0.11m in thickness, extending beyond the limits of the excavation.
- 4.5.5 Deposits **204** and **205** were sealed by a mid-reddish-brown soft silt (**203**), which constituted the bulk of cairn EF407a (Plate 4). The deposit represented the uppermost layer of the cairn's construction, forming an irregular cone typically 0.17m thick but up to 0.37m thick on the south-western side. The south-western edge of deposit **203** also overlapped the north-eastern edge of the base layer of the south-western cairn (**207**) but did not extend over the upper layer **208**.
- 4.5.6 This pattern of deposition had resulted in a hollow which, despite their proximity, would have clearly distinguished the two cairns from each other. This hollow, however, had been infilled, probably through natural processes, by an accumulation of mid-red-brown silt (**209**) 0.33m thick, and which differed only from **208** and **203** by its relative sparsity of stone. Both cairns had then been sealed by a dark-brownish-black peaty silt (**202**) to a maximum thickness of 0.24m which formed a subsoil for a patchy thin medium-grey-brown silt topsoil (**201**).





Plate 4: Quadrant trench of Cairn EF407 following the removal of turf



Plate 5: Excavation of the south-western quadrant of cairn EF407a, facing east





Plate 6: Cairn EF407a facing west, with 2m and 1m scales



## 5 RADIOCARBON DATING

### 5.1 Environmental Sampling and Results

- 5.1.1 **Quantification:** eleven bulk samples taken during the archaeological investigations at Ennerdale were processed for archaeobotanical remains, specifically identifying suitable material for radiocarbon dating. Following a quick assessment, charcoal fragments from three deposits were selected for radiocarbon dating. Selection was based on the suitability of the material for accurate species identification and on the stratigraphic position of the deposits for each cairn.
- 5.1.2 **Methodology:** given the small amount of soil matrix present within the cairn deposit the samples were generally less than 2 litres in volume. The samples were initially processed by hand flotation in a sink, during which flots were collected on a 250µm mesh, air-dried and examined under a binocular microscope. Residues were passed through a 500µm and 2mm mesh, which were also air-dried and checked for finds and archaeobotanical remains. The flots were scanned under a binocular microscope for the presence of small plant remains, charcoal, and any other remains. The presence of modern roots, invertebrate eggs and modern seeds was also noted to ascertain the likelihood of any contamination. Charcoal fragments were provisionally identified based on characteristics observed in transverse section using a Leica MZ6 binocular microscope at up to x40 magnification.
- 5.1.3 **Assessment:** all eleven samples contained rare to frequent charcoal fragments, with concentrations being notably higher in deposit **102**, of cairn EF404. The charcoal comprised mainly oak (*Quercus* sp) and alder or hazel (*Alnus glutinosa* or *Corylus avellana*). However, a fragment of birch (*Betula* sp) was also observed in deposit **103** (cairn EF404). All the samples contained abundant woody rhizomes, likely to be from bracken. The deep rooted nature of these rhizomes implies that there is a high risk of intrusion and contamination within the cairn deposits.
- 5.1.4 **Radiocarbon Dating Submission:** charcoal recovered from three deposits, two from cairn 404, and one from cairn 407 was submitted for dating. Each fragment was fractured to reveal both radial and tangential sections, which were examined under a Meiji incident-light microscope at up to x400 magnification. Identifications were made with reference to Hather (2000). Where possible, this comprised diffuse porous taxa (*ie* short-lived wood, such as hazel or birch); however, a fragment of mature oak was submitted from deposit **207** (cairn EF407) given that no other material was present. Although it is acknowledged that heartwood from long-lived trees, such as oak, may have a significant age at death (Bowman 1990), it was thought that even an approximate date for this deposit would be useful.
- 5.1.5 The selected samples were measured using the accelerator mass spectrometry (AMS) technique, which allows small quantities of carbon to be dated. This was undertaken at the Scottish Universities Environmental Research Centre (SUERC). The results (*Table 1* and *Appendix D*) have been calibrated using IntCal13 (Reimer *et al* 2013), and OxCal v4.3.2 (Bronk Ramsey 2009, 2017), and the date ranges have been calculated using the maximum intercept method (Stuiver and Reimer 1986).

<b>Cairn</b>	<b>Lab Code (SUERC)</b>	<b>Context</b>	<b>Material</b>	<b>Radiocarbon Age BP</b>	<b>Calibrated date (95.4% probability)</b>
EF404	82573	<b>102</b>	Hazel charcoal	3612 ± 30	2112-1890 cal BC
EF404	82574	<b>103</b>	Birch charcoal	5299 ± 30	4236-4042 cal BC
EF407	82575	<b>207</b>	Oak charcoal	2468 ± 30	767-431 cal BC

Table 1: Date ranges as returned from C14 dating

## 6 DISCUSSION

### 6.1 Excavation objectives and results

6.1.1 The main research aims of the investigation, were:

- To provide a mitigative record of the cairns before their destruction by the migration of the river;
- To establish the presence / absence of archaeological materials, and to determine their character, extent, and state of preservation, and condition;
- To establish their date and the environmental context for the landscape associated with the cairn;
- To establish the significance of the archaeological deposits and features.

### 6.2 Discussion

6.2.1 The hypothesised Cairn EF 408 appears to be a natural feature, composed of a series of glacial and alluvial deposits, subsequently cut to the east and north by a meandering river channel and to the west by a possible man-made curvilinear feature. These events left an area of raised ground, which, prior to excavation, were very similar in appearance to one of the surrounding cairns.

6.2.2 The excavation of Cairn EF404 has provided a relatively rare and important opportunity to study the form and construction of a clearance cairn and appears to reveal three distinct stages in construction. The initial construction may have involved the deposition of the larger stones, possibly in a circle around the centre of the cairn. Such a feature is reminiscent of the prehistoric kerb cairns known from previous excavations of larger funerary cairns, but in this case may have been designed to form a boundary of retaining stones within which smaller stones were then deposited. As further stones were added to the cairn, the stone pile may have over-spilled the retaining stone boundary to form a low mound (**102**). A second and distinct deposition of stone (**101**) appears to have taken place after the consolidation of the original stone pile. Such a structured approach to the construction of clearance cairns is known from other excavated examples in the Lake District, such as at Carrock Fell and at Corney Fell and may challenge the commonly-held perception of clearance cairns as random piles of stone (Johnston 2001, 105-6).

6.2.3 The excavation of Cairns EF407a and b did not reveal the same concentric ring of kerb-type stones identified during the excavation of Cairn EF404. The relationship between Cairn EF407a and Cairn EF407b does, however, indicate that these two cairns were being built concurrently, with the proximity of the two cairns in this case probably being a result of the desire to maximise the amount of land available for agriculture, by grouping the clearance cairns.

6.2.4 The random distribution of the cairns at Low Gillerthwaite is indicative of forest clearance activity, producing small clearings within which grass could be cultivated for animal fodder, and at least one of the remaining cairns has a sunken centre, suggesting

it was formed around the base of a tree. Nevertheless, the present meandering course of the river does raise the question as to how much of the cairnfield has been lost to previous erosion events, leaving us only a fragment of the original distribution.

- 6.2.5 While there is a broad consensus that forest clearance was taking place in all areas of the Lake District during the Bronze Age (Quartermaine and Leech 2012, 319) paleoenvironmental data from the Ennerdale Valley is limited and earlier deforestation activity cannot be precluded. Indeed, although natural fires do occur, the charcoal retrieved from deposit **103**, apparently beneath the cairn, might indicate that deforestation through burning was taking place as early as the late Mesolithic.
- 6.2.6 Deposit **102** produced a more substantial quantity of charcoal for the purposes of dating and appears to form the lowest deposit of the cairn. It produced a date of 2112-1890 cal BC, placing it within the early Bronze Age, and this date is more in line with those dates previously attributed to the earliest clearance cairns in the region (Quartermaine and Leech 2012, 320). The date retrieved from deposit **207** provides a less precise date range due to its use of long-lived Oak species; however, it does suggest the reuse of the cairnfield during the Iron Age, which may make it contemporary with the hypothesised Iron Age/Romano British enclosure (EFXIVb) 100m to the south-east, on the southern bank of the river.
- 6.2.7 The three cairnfield groups reveal a mix of cairns with seemingly random cairns, and also cairns following deliberate alignments, which are in some instances associated with stone banks (EFXIVb). There is also a spatial association between the cairns and a simple enclosed settlement, and the alignments of some of these cairns are orientated towards the enclosed settlement. While, the late Mesolithic date of context **103** can be assumed to reflect residual charcoal from earlier clearance episodes, the dates from context **102** in Cairn EF404 and context **207** in Cairn EF407 are both stratified deposits and seem to represent two different clearance episodes. Given that there are two different types of distribution of cairns and two very different dates from the present excavations, it can be suggested that the cairnfield or cairnfields had an extended development extending over at least two phases, of which the latter was associated with a settlement typically dated to the Iron Age (Quartermaine and Leech 2012, 322).

## 6.3 Conclusion

- 6.3.1 The partial excavation of three clearance cairns at Low Gillerthwaite ahead of their destruction through natural erosion has provided us with tentative evidence to suggest that clearance activity was taking place in the Ennerdale Valley from the early Bronze Age. It has revealed possible evidence to suggest that these cairns were being constructed in a more systematic method than is typically associated with clearance cairns, with the apparent use of a ring of larger retaining stones. Furthermore, the evidence indicates a later period of stone clearance during the Iron Age, when the cairnfield was reused.
- 6.3.2 A comparison of aerial images taken over the last two decades reveals the alarming rate of erosion of the northern bank of the river and highlights the scale of the threat

posed to the cairnfield. If the current pace of erosion continues it is plausible to expect the destruction of the cairnfield within the next decade.

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## APPENDIX A CONTEXT INVENTORY

Trench 2							
Context No.	Type	Width (m)	Depth (m)	Description	Length (m)	Finds	Date
100	Layer	2.10	0.21	Dark-Brown Black Silt	2.80	-	-
101	Layer	2.70	0.30	Mid-grey-brown clay silt	2.80	-	-
102	Layer	1.70	0.21	Brownish-orange silty clay	1.95	-	2112-1890 cal BC
103	Layer	0.15	0.11	Mid-yellow-brown silty clay	0.84	-	4236-4042 cal BC
104	Layer	-	0.53+	Dark-grey-brown gravels	-	-	-
105	Layer	-	0.40	Grey-brown sandy silt	1.38+	-	-
106	Layer	-	0.22	Pinky-brown silty clay	3.00+	-	-
107	Layer	1.18+	0.98	Cut of gully		-	-
108	Layer	-	0.26	Orangey-grey silty clay	3.10+	-	-
109	Layer	-	0.50+	Alluvial cobbles with pea gravel	4.30+	-	-
110	Layer	-	0.10	Greyish-pink silty clay	2.30+	-	-
111	Layer	-	0.14	Orange-pink silty clay	1.16	-	-
112	Layer	-	0.60	Reddish-brown silt	2.90+	-	-
113	Layer	-	0.18	Dark-brown silt	4.30+	-	-

EF407							
Context No.	Type	Width (m)	Depth (m)	Description	Length (m)	Finds	Date
201	Layer	0.44	0.12	Mid-grey-brown clay silt	1.00	-	-
202	Layer	-	0.24	Dark-brown black silt/peat	-	-	-
203	Layer	2.50+	0.17	Mid red-brown silt	2.23+	-	-
204	Layer	0.93+	0.34	Mid brown-orange silt	1.08+	-	-
205	Layer	-	0.11	Mid brown-orange silt	0.55+	-	-
206	Layer	-	-	Mid grey brown sandy silt	-	-	-
207	Layer	-	0.24	Mid brown-orange fine silt	3.00+	-	767-431 cal BC
208	Layer	1.36+	0.47	Mid red-brown silt	-	-	-
209	Layer	1.83	0.33	Mid red-brown silt	-	-	-



**APPENDIX B****SITE SUMMARY DETAILS**

**Site name:** Clearance Cairns, Low Gillerthwaite, Ennerdale, Cumbria Archaeological Excavation

**Site code:** L10958

**Grid Reference** NY 14911 13895

**Type:** Excavation

**Date and duration:** Cairn EF404 excavated between 21st and 25th of March 2016, Cairn EF407 excavated between 25th and 29th of September 2017, a total of 10 days

**Summary of Results:** Between March 2016 and September 2017 OA North were appointed by the Forestry Commission to undertake the excavations of two clearance cairns that form part of a larger group under threat of destruction due to a change in the course of the river Liza in the Ennerdale Valley, Cumbria (NY 14911 13895). Cairn EF404 was excavated in March 2016 with the excavation of cairn EF406 undertaken in September 2017. Both cairns were excavated to agreed project designs (OAN 2016 and OAN 2017).

The excavation has provided us with tentative evidence to suggest that clearance activity was taking place in the Ennerdale Valley from at least the early Bronze Age. It has revealed possible evidence to suggest that these cairns were being constructed in a more systematic method than is typically associated with clearance cairns, with the apparent use of a ring of larger retaining stones near the centre. Furthermore, the evidence indicates a later period of stone clearance during the Iron Age, when the cairnfield was expanded.

A comparison of aerial images taken over the last two decades reveals the alarming rate of erosion of the northern bank of the river and highlights the scale of the threat posed to the cairnfield. If the current pace of erosion continues it is plausible to expect the destruction of the cairnfield within the next decade.

**Location of archive:** The archive is currently held at OA, Mill 3, Moor Lane Mills, Moor Lane, Lancaster, LA1 1QD, and will be deposited with Cumbria Historic Environment Record in due course, under the following accession number: To be confirmed.

## APPENDIX C 2016 EXCAVATION PROJECT DESIGN – EF 408

### 1.1 INTRODUCTION TO THE PROJECT

- 1.1.1 In 1995 a survey by Lancaster University Archaeological Unit (now Oxford Archaeology North) identified and recorded a small cairnfield of nine cairns in Ennerdale on a small east/west promontory, adjacent to the lower flood plain of the River Lisa. Since that date the line of the river has fluctuated and its line is now cutting against the southern edge of the promontory, and has destroyed the southernmost of the cairns (EF405). The cairnfield is now a scheduled monument. The Lake District National Park Authority (LDNPA) is wanting to undertake a programme of excavation to record the next nearest cairn (EF 408) to the river before it is also destroyed by fluvial action. The work is potentially of immense value as considerable amount of survey work has been undertaken across West Cumbria recording the prehistoric upland landscapes, and particularly some extensive cairnfields (Quartermaine and Leech 2012) but very few have been excavated, and even fewer have reliable radiocarbon dates. An appropriate excavation programme has the potential to provide a valuable insight into not only this cairnfield but others in Ennerdale and West Cumbria. OA North has been invited to submit a proposal to undertake the proposed excavation works and the post-excavation programme; the present project design is prepared in accordance with a project brief by LDNPA.

### 1.2 ENNERDALE CAIRNFIELDS BACKGROUND

- 1.2.1 **Introduction:** our knowledge of upland settlement within the western areas of the Lake District has been significantly enhanced as a result of the Lake District National Park Survey (LDNPS) which has examined over 68km<sup>2</sup> of unimproved fell, particularly on the south-west and Western Fells (Quartermaine and Leech 2012). The main surface evidence for early settlement is the ubiquitous cairnfield, which is found particularly on the marginal lands rising from the coastal plain. These are fossilised relict landscapes resulting from early agricultural activity, and are typically ascribed to the Bronze Age on the basis of a limited number of radiocarbon dates (Richardson 1982) and their spatial association with datable forms of funerary monuments (Walker 1965). Palaeobotanic evidence in conjunction with the physical evidence suggests that there was a population expansion out from the coastal plain during the Bronze Age resulting in the clearance of forest and the formation of the cairnfields (Quartermaine and Leech 2012). The LDNPS programme has shown that there was extensive Bronze Age settlement, on the West and south-west fells, but that this diminished in intensity further inland. The Town Bank and Stockdale survey areas, on the marginal land to the south of Ennerdale, indicated a considerable wealth of archaeological landscapes and it was anticipated that there could be a similar survival on the marginal lands around Ennerdale. The archaeological work by the National Trust within Wasdale (National Trust 2000) has shown that, although there is prehistoric survival within the upper reaches and higher sides of the valley, for the most part the valley floor demonstrates medieval and post-medieval landscapes. A similar situation is reflected within Miterdale in both physical and documentary evidence (LUAU 2000).
- 1.2.2 **Cairnfields:** the earliest activity in Ennerdale appears to be the small, localised cairnfields which have broadly random distributions, no direct association with plots or cultivation terraces, and are constructed of medium and large stones. Typologically these are tentatively assigned to the Bronze Age (2000 BC – 800 BC), although no funerary monuments have been identified from the valley to confirm this assumption. These small cairnfields (EF I, V, IX, XII XIVa and c) (Cairn EF408 is within Cairnfield XIVc) are often in areas of later settlement, and many are found fairly high up the valley sides. They are small in size by comparison with cairnfield remains from other West Cumbrian moorland areas (eg Town Bank and Stockdale Moor (Quartermaine and Leech 2012) and may reflect only limited prehistoric activity. Their location is significant in that they are not within enclosed lands, nor within areas that have been subject to later intensive farming; hence they have survived.
- 1.2.3 In contrast to these smaller cairnfields, a single very large cairnfield, has been located at the immediate head of the valley adjacent to the lake (EF VI) (Fig 7). The cairnfield (EF VIb) has a very varied character, incorporating substantial linear elements, be they cairn alignments or stone banks, which are converging towards a large rectangular double compartment stock enclosure, and an adjacent rectangular long house.

1.2.4 However, there are also substantial numbers of randomly distributed cairns that have no apparent relationship with the stone banks. Some of these are within the area of ridge and furrow, where they still have a broadly random distribution and have not been formed into lines; as such they would appear to pre-date the ridge and furrow. Many of these cairns have central hollows, which have been paralleled at the excavations at Birrel Sike (Richardson 1982), and would appear to be clearance cairns originally set around the trunks of now decayed trees. This, together with the random distribution within this area, would suggest that elements of this cairnfield were a product of stone clearance following the primary forest clearance, and as such would have been relatively early. The assessment of the spatial stratigraphy across the site would suggest that the cairnfield was a product of more than one episode of stone clearance and that the earliest stage of this may have been associated with primary forest clearance in the Bronze or Iron Age.

1.2.5 **Iron Age/Roman (800 BC-AD 410):** the EFXIVc cairnfield is on the immediate opposite side of the River Lisa from an enclosed settlement (EF410) and an associated cairnfield and field system (EFXIVb). The relationship between the EFXIVc cairnfield and that on the opposite side of the river is uncertain, but potentially they could be broadly contemporary. The enclosed settlement is potentially of Iron Age date and would originally have been c57m in diameter and has parallels from the region (Whitrow Beck (WB 163), and Town Bank (TB 805) (Quartermaine and Leech 2012) and Glencoyne in Matterdale (Hoan and Loney 2003)). The significant aspect of this site is that there is an associated field system (EF XIVb), defined by cairn alignments and stone banks, which does not appear to have developed from an earlier system or been superimposed by subsequent settlement. As such this potentially suggests that the cairnfield and field system were broadly contemporary with the enclosed settlement, although the settlement and elements of the field system may be later phases of an extended development. There is no evidence of lynchet formation or terracing but nevertheless there is the potential that cultivation was being undertaken.

### 1.3 OXFORD ARCHAEOLOGY NORTH

1.3.1 **Landscape Archaeology:** OA North has considerable experience in the field of landscape survey work, particularly in the uplands of Northern England and Wales. Numerous surveys have been undertaken across the region and North Wales since 1982, and has taken the form of rapid identification surveys of large areas of unimproved land as well as detailed surveys of specific landscapes. In particular OA North (formerly LUAU) has undertaken extensive surveys across West Cumbria which culminated in a monograph publication on the cairnfields of the Lake District (Quartermaine and Leech 2012). OA North undertook two programmes of survey in Ennerdale, a detailed survey of the Forest Enterprise holdings in 1995 and an identification survey of the National Trust holdings in 2003, and the results of both were combined into the report of 2003 (OA North 2003).

1.3.2 OA North has particular expertise to be able to undertake the proposed excavation work and analysis. Jamie Quartermaine (Senior Project Manager) has either directed or managed all the previous survey programmes and has very considerable familiarity with the archaeology of the valley. In particular Jamie is a leading authority on the development of cairnfields both from the Lake District and elsewhere in the UK. OA North employs three palaeoenvironmentalists who have the relevant expertise to be able to undertake pollen and macrofossil analysis of the deposits within the cairn. Jamie has considerable survey experience and is a qualified commercial UAV pilot and would be able to undertake a rapid topographic survey of the site in advance of the proposed excavation.

## 2. AIMS OF THE PROGRAMME

2.1 The primary aims of the project are as follows:

- To provide a mitigative record of the cairn before it is destroyed by the migration of the river.
- To establish the presence / absence of archaeological materials, and to determine their character, extent, and state of preservation, and condition.
- To establish their date and the environmental context for the landscape associated with the cairn.

- To establish the significance of the archaeological deposits and features.

### 3. METHODOLOGY

#### 3.1 STAGE 1: PROJECT PREPARATION

- 3.1.1 **Topographic Survey (Optional):** the detailed survey of the cairnfield was undertaken in 1995 and provided for the outline and extent of the cairns and the promontory; however, the topography has changed substantially since the survey because of the migration of the river. It is therefore recommended that a new UAV survey of the cairnfield be undertaken which would provide a detailed contour record of the archaeological monuments and the topography of the environs. It is considered that this would provide an effective context for the proposed archaeological monuments and can be undertaken very rapidly over the course of a single site visit.
- 3.1.2 It is proposed to record the sites and general environs by means of aerial photography, which, using specialist photogrammetric software, can be used to create accurate three dimensional models of the site and topographic surfaces and will use a UAV, which is a small multi-engined model helicopter and provides photography from any altitude up to approximately 200m height. Survey control is introduced to the photographs by the placement of survey control targets across the site which are located by means of survey grade GPS or total station.
- 3.1.3 The photogrammetric processing will be undertaken using Agisoft software which provides detailed modelling using the overlap of up to 300 photographs, and creates a very detailed DTM (Digital Terrain Model) across the site. The photographs are then digitally draped over the model to create an accurate three dimensional model of the ground surface. The primary output, however, is an accurate two dimensional image which can be used to generate accurate plans or profiles. A very detailed contour plot of the whole site will be generated from the DTM, and will use typically 10cm contour separation and is capable of comprehensively showing the archaeological features and the surrounding topography.

#### 3.2 CAIRN EXCAVATION

- 3.2.1 The following section outlines a methodology for the undertaking of the excavation of the clearance cairn. The extent of the excavation areas will be defined on site and it is proposed that the cairn be divided into quadrants and that two diagonally opposite quadrants will be excavated. This will leave exposed sections which can be drawn, and sampled for palaeobotanic assessment (taking a core through the exposed section using Kubiena tins). The cairn was recorded by OA North as being 5m x 3.5m and 0.8m in height. At the end of the excavation the cairn will be backfilled and the turf will be relaid.
- 3.2.2 **Site Preparation and Preliminary Survey:** prior to the commencement of any work, a risk assessment will be compiled by the OA North Project Director. The initial element of the fieldwork will comprise the establishment of survey control by means of GPS, and the vegetation will be reduced / thinned over the cairn and across the immediate environs. At that stage a pre-excavation survey of the cairn will be undertaken using photographs taken from a mast with respect to survey markers placed on site.
- 3.2.3 **Turf Clearance and Excavation:** at the outset the turf will be carefully removed from the excavation areas by manual techniques and the turf will be stored separately from the spoil and adjacent to the excavation on terram.
- 3.2.4 All excavation will be carried out using exclusively manual techniques. Spoil from the excavation will be stored adjacent to the excavation area. Structural remains will be cleaned to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site. It is not anticipated that excavation in any of the trenching will proceed below a depth of 1.2m, although should this be considered necessary, then the trench will be widened sufficiently to allow the sides to be stepped in or battered back to a safe angle of repose.
- 3.2.5 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of

- the evaluation will be recorded on *pro-forma* context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.
- 3.2.6 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using digital photography using digital SLR cameras of at least 16 megapixel resolution. All frames will include a visible, graduated metric scale unless being used for photogrammetry. Photographs records will be maintained on special photographic *pro-forma* sheets.
- 3.2.7 **Planning:** on completion of the excavation the precise location of all archaeological structures encountered will be surveyed by means of photogrammetry using a photographic mast with control located by survey grade GPS. This process will ultimately generate scaled plans within an AutoCAD system, and the drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum.
- 3.2.8 **Backfilling:** the excavation areas will be backfilled by hand on completion of the excavation.
- 3.2.9 **Finds policy:** finds recovery and sampling programmes will be in accordance with best practice (following current Institute of Field Archaeologists guidelines) and subject to expert advice in order to minimise deterioration. OA has close contact with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, who are readily available for consultation.
- 3.2.10 **Sieving:** because of the potential for recovering lithics it is proposed to sieve the excavated material in order to recover any small artefacts. This will include recovering bones of fish and small mammals. OA North has an in-house faunal specialist, who will be consulted at the outset and in the course of the programme.
- 3.2.11 Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate.
- 3.2.12 Human remains are not expected to be present, but if they are found they will, if possible, be left *in situ* covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the *Burials Act 1857*.
- 3.2.13 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.
- 3.2.14 **Environmental sampling for plants, macrofossils, faunal and pollen:** the recovery of adequate samples of environmental material can provide useful information for an understanding of processes acting upon the site and for placing the site within a wider ecological context. In particular it is important to be able to recover pollen samples from peats in association with the cairn that will provide an insight into the environment before and after the construction of the cairn. The value of this work was highlighted by the immensely valuable programme of excavation undertaken by Donald Walker on cairns in the Barnscar cairnfield (Walker 1965), and which was able to establish that the cairn construction was part of a process of woodland clearance. A very experienced in-house palynologist will assess the potential for undertaking further analysis of the peats.
- 3.2.15 Bulk sediment samples of *c* 40 litres will be collected from any suitable (undisturbed and uncontaminated) deposits or features of demonstrable anthropological origin for the recovery of plant and faunal remains. In addition a core will be taken through the exposed section, using Kubiena tins, for subsequent analysis.
- 3.2.16 The bulk samples will be examined for their potential for bones of fish and small mammals and the flots will be examined by the OA North in house faunal specialist, who will then assess the potential of

undertaking analysis on the faunal assemblage. This analysis is presented as an option as there is uncertainty as to whether there will such material will be recovered from the cairn deposits.

- 3.2.17 ***Samples for scientific dating:*** should deposits, or material within deposits, suitable for radiocarbon assay be encountered, samples will be taken wherever possible. These would include well-stratified artefacts and ecofacts, but also suitable material collected from environmental samples through flotation and, in the case of ceramics, from any bulk sieving, wet sieving and hand-collection. Samples for dendrochronological or archaeomagnetic dating would be taken in conjunction with specialist advice, for example if any core structural stones demonstrably associated with a hearth were identified during the course of archaeological site works.

- 3.2.18 ***Geoarchaeological Assessment:*** OA North employs experienced geoarchaeologists who have considerable experience of undertaking soils and geoarchaeological analysis, and developing soils sampling strategies. Carl Champness, MSc, BA, AIFA will be consulted for the potential for undertaking soils micromorphological analysis and other sampling strategies at the site. The fieldwork would be undertaken by Mairead Rutherford BSc, MSc (palynologist / geomorphologist) and who would, along with Carl, prepare the assessment report. The costs for the soils analysis are presented as an option.

### **3.3 SHOVEL PIT TESTING (PRESENTED AS AN OPTION)**

- 3.3.1 Shovel pit testing is typically undertaken when the ground is grass covered, and when there are no soil-exposures that might reveal artefacts in the topsoil. Subject to the exposure of the ground within the exposed river section or other ground disturbance such as from mole activity it is probable that a programme of shovel pit testing will be undertaken and the strategy will be refined in the light of discussions with LDNPA.

- 3.3.2 Small shovel pits (0.25m x 0.25m in size) would be excavated to a maximum depth of 300mm, and typically represents the size of a sod of ground lifted by a shovel blade and would be located every 20m on an approximate grid across the area. The sod would be broken up and examined by eye for lithics and other artefacts and would be passed through a coarse hand sieve. Those shovel pits that produce artefacts would be located using a survey grade GPS and the artefacts would be retained for subsequent analysis.

- 3.3.3 The locations of the shovel pits would be superimposed onto base OS mapping and would be superimposed with topographic survey. All artefacts from the test pits would be analysed and the date range of each would be assessed and correlated back to the locational information and would be combined within a GIS. The three-dimensional coordinates of the pits would be sorted according to period and the distribution of artefacts for each of the main periods would be displayed. Any significant grouping of artefacts within a limited date range may be an indicator of an archaeological site.

### **3.5 REPORT PRODUCTION**

- 3.5.1 ***Archive:*** the results of the management programme will form the basis of a full archive to professional standards, in accordance with current English Heritage MoRPHE guidelines (The Management of Research Projects in the Historic Environment 2006). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing of any features, finds or other data recovered. This archive will be provided in the English Heritage Central Archaeological Services format. A synopsis (normally the index to the archive and the report) should be placed in the Cumbria Historic Environment Record. The artefacts will be deposited with Kendal Museum. The archive will include the raw survey digital data in AutoCAD format.

- 3.5.2 ***Analysis and Report:*** OA North accords with best practice for the analysis of the excavation results in accordance with the guidelines of MoRPHE. This would involve a brief assessment of the data-set generated by the excavation, followed by a review of the excavation archive; this process will be undertaken in close consultation with the client. The report format will be agreed at this stage. The Harris Matrix, largely produced during the excavation programmes will be completed and checked as part of this assessment phase. The proposed programme anticipates assessment of the artefactual evidence and of the site stratigraphy leading to the production of a final report.



- 3.5.3 **Palaeoenvironmental Assessment (optional):** subject to the results of the evaluation an assessment of any environmental samples will be undertaken by the in-house palaeoecological specialist, who will examine the potential for further analysis. The assessment would examine the potential for macrofossil, arthropod, palynological and general biological analysis. A programme of detailed analysis may be recommended subject to the results of the assessment, but the extent and requirements of such work can not be determined at this early stage of the project.
- 3.5.4 **Absolute Dating (optional):** subject to the availability of material from secure contexts, it may be appropriate to undertake radiocarbon dating of sampled organic material. Absolute dating will be particularly useful for the interpretation of archaeological remains from which no other dating material is available, and for palaeoecological material. Sufficient dates will be required to improve the reliability and accuracy of dating. The actual number required will be subject to the results of the trenching. The dates will be taken by the OA North palaeobotanist (Denise Druce), who will undertake the initial processing of the dates and submit them to the radiocarbon laboratory.
- 3.5.5 **Final Report:** the final report will present, summarise, and interpret the results of the programme and will incorporate specialist reports on artefact assemblages and environmental reports. It will include an index of archaeological features identified in the course of the project, with an assessment of the site's development. It will incorporate appropriate illustrations, including copies of the site plans and section drawings all reduced to an appropriate scale. The report will consist of a statement of acknowledgements, lists of contents, executive summary, introduction summarising the brief and project design and any agreed departures from them, methodology, interpretative account of the site and associated structures, gazetteer of features, a complete bibliography of sources from which data has been derived, and a list of further sources identified during the programme of work.
- 3.5.6 The report will incorporate appropriate illustrations, including copies of the site plans, detailed survey plans of each excavation area, the results of the topographic survey, the test pitting, and maps of the wider landscape (from earlier surveys), all reduced to an appropriate scale. The site mapping will be based upon the CAD base. The report will be accompanied by photographs and historic illustrations illustrating the principal elements of the landscape.
- 3.5.7 **Editing and submission:** the report will be subject to the OA North's stringent editing procedure; then a draft will be submitted to LDNPA for consultation. Following acceptance of the report, four bound copies and CD copies of the report (and digital copy in PDF and Word formats) will be submitted to LDNPA. A summary of the work will be provided for OASIS.
- 3.6 OTHER MATTERS**
- 3.6.1 **Access:** it is assumed that there will be vehicular access onto the valley road and pedestrian access to the sites. Access will also need to be provided for a welfare unit which will be located off the valley road.
- 3.6.2 **Health and Safety:** full regard will be given to all constraints during the survey, as well as to all Health and Safety considerations. The OA North Health and Safety Statement conforms to all the provisions of the SCAUM (Standing Conference of Unit Managers) Health and Safety manual. Risk assessments are undertaken as a matter of course for all projects, and will anticipate the potential hazards arising from the project. A specific risk assessment is provided to address the specific issues relating to children under the age of 16.
- 3.6.3 **Insurance:** insurance in respect of claims for personal injury to or the death of any members of the public in the course of the project will be covered by OA North, who has insurance cover which complies with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made there under. For all other claims to cover the liability of OA North in respect of personal injury or damage to property by negligence of OA North. The insurance cover is as follows:
- £10 million public liability
  - £10 million employers liability
  - £5 million professional indemnity

#### 4. WORK TIMETABLE

- 4.1 The excavation work will extend over five working days and can be undertaken at times in spring to suit the requirements of the client.

Task	Duration
Topographic Survey	1 day
Excavation	4 days
Assessment of Archive	1 day
Processing of samples	2 days
Radio carbon dating / Post Excavation	5 weeks

#### 5. RESOURCES

##### 5.1 OA NORTH PROJECT TEAM

- 5.1.1 The excavation will be directed by Jeremy Bradley (Project Officer) and the survey will be undertaken by Peter Schofield (Project Officer), under the guidance of the project manager, Jamie Quartermaine.
- 5.1.2 **Project Management:** the project will be under the project management of **Jamie Quartermaine, BA Surv Dip MIFA** (OA North Project Manager) to whom all correspondence should be addressed. Jamie is a very experienced landscape surveyor, who has undertaken or managed literally hundreds of surveys throughout Northern England since 1984, and has considerable experience of working on similar projects to that proposed. He has managed a major recording programme of Lyme Park, Cheshire, and very detailed surveys of the South West Fells including areas such as Barnscar and Burnmoor. He has also undertaken surveys of Lowther Park, Cumbria, Rufford Park, Lancashire and has also managed the recording programme of Lathom Hall and Park, Lancashire and the survey of the Forest of Bowland for United Utilities. He has been a project manager since 1995 and has managed over 250 very diverse projects since then, which are predominantly survey orientated, but of all periods from the Palaeolithic to the twentieth century.
- 5.1.3 Jamie is a qualified land surveyor (Topographic Sciences Diploma Glasgow University) and has an exhaustive knowledge and understanding of surveying techniques. In particular he undertook the original surveys of the cairnfield in 1998 and managed the subsequent identification survey centred on Ennerdale. He has considerable familiarity with the archaeology of Ennerdale and the cairnfield in question.
- 5.1.4 **Excavation Director:** the excavations will be directed by **Jeremy Bradley BA Hons** (OA North Project Officer) who has a wide range of archaeological experience, gained over the last 20 years, on both rural and urban sites, and on evaluations and open-area excavation, including large infra-structure projects such as the Wasdale (2012) pipeline. Other projects Jeremy has directed include three campaigns of field work at Furness Abbey Presbytery between 2009-11 and other medieval sites such as Clitheroe Castle sites and Penrith New Squares. Jeremy worked as a Project Officer for Humber Field Archaeology between 1999-2005, which involved supervising all levels of archaeological excavation, post-excavation analysis on sites in Hull, east Yorkshire and North Lincolnshire.
- 5.1.5 **Project Surveyor:** all survey work will be undertaken by **Peter Schofield** (OA North Project Officer). Peter works full time on landscape surveys across the north-west. He has undertaken surveys at Hardknott Forest, Cumbria, Hartley Fold Estate, Cumbria, Ennerdale Valley, West Cumbria, a major programme of landscape survey across nine upland areas in North Wales, Little Asby Common for the Friends of the Lake District, and the Holwick and Force Garth surveys, Teesdale. With the exception of Jamie Quartermaine, he is our most experienced landscape archaeologist.





## APPENDIX D 2017 EXCAVATION PROJECT DESIGN –EF 406

### 1.1 INTRODUCTION TO THE PROJECT

- 1.1.1 In 1995 a survey by Lancaster University Archaeological Unit (now Oxford Archaeology North) identified and recorded a small cairnfield of nine cairns in Ennerdale on a small east/west promontory, adjacent to the lower flood plain of the River Lisa. Since that date the line of the river has fluctuated and its line is now cutting against the southern edge of the promontory, and has destroyed the southernmost of the cairns (EF405). The cairnfield is now a scheduled monument. The Lake District National Park Authority (LDNPA) is wanting to undertake a programme of excavation to record the next nearest cairn (EF 406) to the river before it is also destroyed by fluvial action. The work is potentially of immense value as considerable amount of survey work has been undertaken across West Cumbria recording the prehistoric upland landscapes, and particularly some extensive cairnfields (Quartermaine and Leech 2012) but very few have been excavated, and even fewer have reliable radiocarbon dates. An appropriate excavation programme has the potential to provide a valuable insight into not only this cairnfield but others in Ennerdale and West Cumbria. OA North has been invited to submit a proposal to undertake the proposed excavation works and the post-excavation programme; the present project design is prepared in accordance with a project brief by LDNPA.

### 1.3 ENNERDALE CAIRNFIELDS BACKGROUND

- 1.3.1 **Introduction:** our knowledge of upland settlement within the western areas of the Lake District has been significantly enhanced as a result of the Lake District National Park Survey (LDNPS) which has examined over 68km<sup>2</sup> of unimproved fell, particularly on the south-west and Western Fells (Quartermaine and Leech 2012). The main surface evidence for early settlement is the ubiquitous cairnfield, which is found particularly on the marginal lands rising from the coastal plain. These are fossilised relict landscapes resulting from early agricultural activity, and are typically ascribed to the Bronze Age on the basis of a limited number of radiocarbon dates (Richardson 1982) and their spatial association with datable forms of funerary monuments (Walker 1965). Palaeobotanic evidence in conjunction with the physical evidence suggests that there was a population expansion out from the coastal plain during the Bronze Age resulting in the clearance of forest and the formation of the cairnfields (Quartermaine and Leech 2012). The LDNPS programme has shown that there was extensive Bronze Age settlement, on the West and south-west fells, but that this diminished in intensity further inland. The Town Bank and Stockdale survey areas, on the marginal land to the south of Ennerdale, indicated a considerable wealth of archaeological landscapes and it was anticipated that there could be a similar survival on the marginal lands around Ennerdale. The archaeological work by the National Trust within Wasdale (National Trust 2000) has shown that, although there is prehistoric survival within the upper reaches and higher sides of the valley, for the most part the valley floor demonstrates medieval and post-medieval landscapes. A similar situation is reflected within Miterdale in both physical and documentary evidence (LUAU 2000).
- 1.3.2 **Cairnfields:** the earliest activity in Ennerdale appears to be the small, localised cairnfields which have broadly random distributions, no direct association with plots or cultivation terraces, and are constructed of medium and large stones. Typologically these are tentatively assigned to the Bronze Age (2000 BC – 800 BC), although no funerary monuments have been identified from the valley to confirm this assumption. These small cairnfields (EF I, V, IX, XII XIVa and c) (Cairn EF408 is within Cairnfield XIVc) are often in areas of later settlement, and many are found fairly high up the valley sides. They are small in size by comparison with cairnfield remains from other West Cumbrian moorland areas (eg Town Bank and Stockdale Moor (Quartermaine and Leech 2012) and may reflect only limited prehistoric activity. Their location is significant in that they are not within enclosed lands, nor within areas that have been subject to later intensive farming; hence they have survived.
- 1.3.3 In contrast to these smaller cairnfields, a single very large cairnfield, has been located at the immediate head of the valley adjacent to the lake (EF VI) (Fig 7). The cairnfield (EF VIb) has a very varied character, incorporating substantial linear elements, be they cairn alignments or stone banks,

which are converging towards a large rectangular double compartment stock enclosure, and an adjacent rectangular long house.

- 1.3.4 However, there are also substantial numbers of randomly distributed cairns that have no apparent relationship with the stone banks. Some of these are within the area of ridge and furrow, where they still have a broadly random distribution and have not been formed into lines; as such they would appear to pre-date the ridge and furrow. Many of these cairns have central hollows, which have been paralleled at the excavations at Birrel Sike (Richardson 1982), and would appear to be clearance cairns originally set around the trunks of now decayed trees. This, together with the random distribution within this area, would suggest that elements of this cairnfield were a product of stone clearance following the primary forest clearance, and as such would have been relatively early. The assessment of the spatial stratigraphy across the site would suggest that the cairnfield was a product of more than one episode of stone clearance and that the earliest stage of this may have been associated with primary forest clearance in the Bronze or Iron Age.
- 1.3.5 **Iron Age/Roman (800 BC-AD 410):** the EFXIVc cairnfield is on the immediate opposite side of the River Lisa from an enclosed settlement (EF410) and an associated cairnfield and field system (EFXIVb). The relationship between the EFXIVc cairnfield and that on the opposite side of the river is uncertain, but potentially they could be broadly contemporary. The enclosed settlement is potentially of Iron Age date and would originally have been c57m in diameter and has parallels from the region (Whitrow Beck (WB 163), and Town Bank (TB 805) (Quartermaine and Leech 2012) and Glencoyne in Matterdale (Hoan and Loney 2003)). The significant aspect of this site is that there is an associated field system (EF XIVb), defined by cairn alignments and stone banks, which does not appear to have developed from an earlier system or been superimposed by subsequent settlement. As such this potentially suggests that the cairnfield and field system were broadly contemporary with the enclosed settlement, although the settlement and elements of the field system may be later phases of an extended development. There is no evidence of lynchet formation or terracing but nevertheless there is the potential that cultivation was being undertaken.

### 1.3 OXFORD ARCHAEOLOGY NORTH

- 1.3.3 **Landscape Archaeology:** OA North has considerable experience in the field of landscape survey work, particularly in the uplands of Northern England and Wales. Numerous surveys have been undertaken across the region and North Wales since 1982, and has taken the form of rapid identification surveys of large areas of unimproved land as well as detailed surveys of specific landscapes. In particular OA North (formerly LUAU) has undertaken extensive surveys across West Cumbria which culminated in a monograph publication on the cairnfields of the Lake District (Quartermaine and Leech 2012). OA North undertook two programmes of survey in Ennerdale, a detailed survey of the Forest Enterprise holdings in 1995 and an identification survey of the National Trust holdings in 2003, and the results of both were combined into the report of 2003 (OA North 2003).
- 1.3.4 OA North has particular expertise to be able to undertake the proposed excavation work and analysis. Jamie Quartermaine (Senior Project Manager) has either directed or managed all the previous survey programmes and has very considerable familiarity with the archaeology of the valley. In particular Jamie is a leading authority on the development of cairnfields both from the Lake District and elsewhere in the UK. OA North employs three palaeoenvironmentalists who have the relevant expertise to be able to undertake pollen and macrofossil analysis of the deposits within the cairn. Jamie has considerable survey experience and is a qualified commercial UAV pilot and would be able to undertake a rapid topographic survey of the site in advance of the proposed excavation.

## 2. AIMS OF THE PROGRAMME

- 2.1 The primary aims of the project are as follows:
- To provide a mitigative record of the cairn before it is destroyed by the migration of the river.
  - To establish the presence / absence of archaeological materials, and to determine their character, extent, and state of preservation, and condition.

- To establish their date and the environmental context for the landscape associated with the cairn.
- To establish the significance of the archaeological deposits and features.

### 3. METHODOLOGY

#### 3.1 STAGE 1: PROJECT PREPARATION

3.1.1 **Topographic Survey (Optional):** the detailed survey of the cairnfield was undertaken in 2016; however, the topography has changed substantially since the previous year because of the migration of the river and undertaking a new survey will provide a record of the change. It is therefore recommended that a new UAV survey of the cairnfield be undertaken which would provide a detailed contour record of the archaeological monuments and the topography of the environs. It is considered that this would provide an effective context for the proposed archaeological monuments and can be undertaken very rapidly over the course of a single site visit.

3.1.4 It is proposed to record the sites and general environs by means of aerial photography, which, using specialist photogrammetric software, can be used to create accurate three dimensional models of the site and topographic surfaces and will use a UAV, which is a small multi-engined model helicopter and provides photography from any altitude up to approximately 200m height. Survey control is introduced to the photographs by the placement of survey control targets across the site which are located by means of survey grade GPS or total station.

3.1.5 The photogrammetric processing will be undertaken using Agisoft software which provides detailed modelling using the overlap of up to 300 photographs, and creates a very detailed DTM (Digital Terrain Model) across the site. The photographs are then digitally draped over the model to create an accurate three dimensional model of the ground surface. The primary output, however, is an accurate two dimensional image which can be used to generate accurate plans or profiles. A very detailed contour plot of the whole site will be generated from the DTM, and will use typically 10cm contour separation and is capable of comprehensively showing the archaeological features and the surrounding topography.

#### 3.2 CAIRN EXCAVATION

3.2.19 The following section outlines a methodology for the undertaking of the excavation of the clearance cairn. The extent of the excavation areas will be defined on site and it is proposed that the cairn be divided into quadrants and that a single quadrant will be excavated. This will leave exposed sections which can be drawn, and sampled for palaeobotanic assessment (taking a core through the exposed section using Kubiena tins). At the end of the excavation the cairn will be backfilled and the turf will be relaid.

3.2.20 **Turf Clearance and Excavation:** at the outset the turf will be carefully removed from the excavation areas by manual techniques and the turf will be stored separately from the spoil and adjacent to the excavation on terram.

3.2.21 All excavation will be carried out using exclusively manual techniques. Spoil from the excavation will be stored adjacent to the excavation area. Structural remains will be cleaned to define their extent, nature, form and, where possible, date. It should be noted that no archaeological deposits will be entirely removed from the site. It is not anticipated that excavation in any of the trenching will proceed below a depth of 1.2m, although should this be considered necessary, then the trench will be widened sufficiently to allow the sides to be stepped in or battered back to a safe angle of repose.

3.2.22 All information identified in the course of the site works will be recorded stratigraphically, using a system adapted from that used by the Centre for Archaeology Service of English Heritage. Results of the evaluation will be recorded on *pro-forma* context sheets, and will be accompanied with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

- 3.2.23 A full and detailed photographic record of individual contexts will be maintained and similarly general views from standard view points of the overall site at all stages of the evaluation will be generated. Photography will be undertaken using digital photography using digital SLR cameras of at least 16 megapixel resolution. All frames will include a visible, graduated metric scale unless being used for photogrammetry. Photographs records will be maintained on special photographic *pro-forma* sheets.
- 3.2.24 **Planning:** on completion of the excavation the precise location of all archaeological structures encountered will be surveyed by means of photogrammetry using a photographic mast with control located by survey grade GPS. This process will ultimately generate scaled plans within an AutoCAD system, and the drawings will be generated at an accuracy appropriate for 1:20 scale, but can be output at any scale required. Sections will be manually drafted as appropriate at a scale of 1:10. All information will be tied in to Ordnance Datum.
- 3.2.25 **Backfilling:** the excavation areas will be backfilled by hand on completion of the excavation.
- 3.2.26 **Finds policy:** finds recovery and sampling programmes will be in accordance with best practice (following current Institute of Field Archaeologists guidelines) and subject to expert advice in order to minimise deterioration. OA has close contact with Ancient Monuments Laboratory staff at the University of Durham and, in addition, employs in-house artefact and palaeoecology specialists, with considerable expertise in the investigation, excavation, and finds management of sites of all periods and types, who are readily available for consultation.
- 3.2.27 **Sieving:** because of the potential for recovering lithics it is proposed to sieve the excavated material in order to recover any small artefacts. This will include recovering bones of fish and small mammals. OA North has an in-house faunal specialist, who will be consulted at the outset and in the course of the programme.
- 3.2.28 Finds storage during fieldwork and any site archive preparation will follow professional guidelines (UKIC). Emergency access to conservation facilities is maintained by OA North with the Department of Archaeology, the University of Durham. Samples will also be collected for technological, pedological and chronological analysis as appropriate.
- 3.2.29 Human remains are not expected to be present, but if they are found they will, if possible, be left *in situ* covered and protected. If removal is necessary, then the relevant Home Office permission will be sought, and the removal of such remains will be carried out with due care and sensitivity as required by the *Burials Act 1857*.
- 3.2.30 Any gold and silver artefacts recovered during the course of the excavation will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act, 1996.
- 3.2.31 **Environmental sampling for plants, macrofossils, faunal and pollen:** the recovery of adequate samples of environmental material can provide useful information for an understanding of processes acting upon the site and for placing the site within a wider ecological context. In particular it is important to be able to recover pollen samples from peats in association with the cairn that will provide an insight into the environment before and after the construction of the cairn. The value of this work was highlighted by the immensely valuable programme of excavation undertaken by Donald Walker on cairns in the Barnscar cairnfield (Walker 1965), and which was able to establish that the cairn construction was part of a process of woodland clearance. A very experienced in-house palynologist will assess the potential for undertaking further analysis of the peats.
- 3.2.32 Bulk sediment samples of c 40 litres will be collected from any suitable (undisturbed and uncontaminated) deposits or features of demonstrable anthropological origin for the recovery of plant and faunal remains. In addition a core will be taken through the exposed section, using Kubiena tins, for subsequent analysis.
- 3.2.33 The bulk samples will be examined for their potential for bones of fish and small mammals and the flots will be examined by the OA North in house faunal specialist, who will then assess the potential of undertaking analysis on the faunal assemblage. This analysis is presented as an option as there is uncertainty as to whether there will such material will be recovered from the cairn deposits.

- 3.2.34 **Samples for scientific dating:** should deposits, or material within deposits, suitable for radiocarbon assay be encountered, samples will be taken wherever possible. These would include well-stratified artefacts and ecofacts, but also suitable material collected from environmental samples through flotation and, in the case of ceramics, from any bulk sieving, wet sieving and hand-collection.
- 3.3 **REPORT PRODUCTION**
- 3.3.1 **Archive:** the results of the management programme will form the basis of a full archive to professional standards, in accordance with current English Heritage MoRPHE guidelines (The Management of Research Projects in the Historic Environment 2006). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing of any features, finds or other data recovered. This archive will be provided in the English Heritage Central Archaeological Services format. A synopsis (normally the index to the archive and the report) should be placed in the Cumbria Historic Environment Record. The artefacts will be deposited with Kendal Museum. The archive will include the raw survey digital data in AutoCAD format.
- 3.3.2 **Analysis and Report:** OA North accords with best practice for the analysis of the excavation results in accordance with the guidelines of MoRPHE. This would involve a brief assessment of the data-set generated by the excavation, followed by a review of the excavation archive; this process will be undertaken in close consultation with the client. The report format will be agreed at this stage. The Harris Matrix, largely produced during the excavation programmes will be completed and checked as part of this assessment phase. The proposed programme anticipates assessment of the artefactual evidence and of the site stratigraphy leading to the production of a final report.
- 3.3.3 **Palaeoenvironmental Assessment (optional):** subject to the results of the evaluation an assessment of any environmental samples will be undertaken by the in-house palaeoecological specialist, who will examine the potential for further analysis. The assessment would examine the potential for macrofossil, arthropod, palynological and general biological analysis. A programme of detailed analysis may be recommended subject to the results of the assessment, but the extent and requirements of such work can not be determined at this early stage of the project.
- 3.3.4 **Absolute Dating (optional):** subject to the availability of material from secure contexts, it may be appropriate to undertake radiocarbon dating of sampled organic material. Absolute dating will be particularly useful for the interpretation of archaeological remains from which no other dating material is available, and for palaeoecological material. Sufficient dates will be required to improve the reliability and accuracy of dating. The actual number required will be subject to the results of the trenching. The dates will be taken by the OA North palaeobotanist (Denise Druce), who will undertake the initial processing of the dates and submit them to the radiocarbon laboratory.
- 3.3.5 **Final Report:** the final report will present, summarise, and interpret the results of the programme and will incorporate specialist reports on artefact assemblages and environmental reports. It will include an index of archaeological features identified in the course of the project, with an assessment of the site's development. It will incorporate appropriate illustrations, including copies of the site plans and section drawings all reduced to an appropriate scale. The report will consist of a statement of acknowledgements, lists of contents, executive summary, introduction summarising the brief and project design and any agreed departures from them, methodology, interpretative account of the site and associated structures, gazetteer of features, a complete bibliography of sources from which data has been derived, and a list of further sources identified during the programme of work.
- 3.3.6 The report will incorporate appropriate illustrations, including copies of the site plans, detailed survey plans of each excavation area, the results of the topographic survey, the test pitting, and maps of the wider landscape (from earlier surveys), all reduced to an appropriate scale. The site mapping will be based upon the CAD base. The report will be accompanied by photographs and historic illustrations illustrating the principal elements of the landscape.
- 3.3.7 **Editing and submission:** the report will be subject to the OA North's stringent editing procedure; then a draft will be submitted to LDNPA for consultation. Following acceptance of the report, four



bound copies and CD copies of the report (and digital copy in PDF and Word formats) will be submitted to LDNPA. A summary of the work will be provided for OASIS.

### 3.4 OTHER MATTERS

3.4.1 **Access:** it is assumed that there will be vehicular access onto the valley road and pedestrian access to the sites. Access will also need to be provided for a welfare unit which will be located off the valley road.

3.4.2 **Health and Safety:** full regard will be given to all constraints during the survey, as well as to all Health and Safety considerations. The OA North Health and Safety Statement conforms to all the provisions of the SCAUM (Standing Conference of Unit Managers) Health and Safety manual. Risk assessments are undertaken as a matter of course for all projects, and will anticipate the potential hazards arising from the project. A specific risk assessment is provided to address the specific issues relating to children under the age of 16.

3.4.3 **Insurance:** insurance in respect of claims for personal injury to or the death of any members of the public in the course of the project will be covered by OA North, who has insurance cover which complies with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made there under. For all other claims to cover the liability of OA North in respect of personal injury or damage to property by negligence of OA North. The insurance cover is as follows:

- £10 million public liability
- £10 million employers liability
- £5 million professional indemnity

## 4. WORK TIMETABLE

4.2 The excavation work will extend over six working days and can be undertaken at times in spring to suit the requirements of the client.

Task	Duration
Topographic Survey (optional)	1 day
Excavation	6 days
Assessment of Archive	1 day
Processing of samples	2 days
Radio carbon dating / Post Excavation	5 weeks

## 5. RESOURCES

### 5.1 OA NORTH PROJECT TEAM

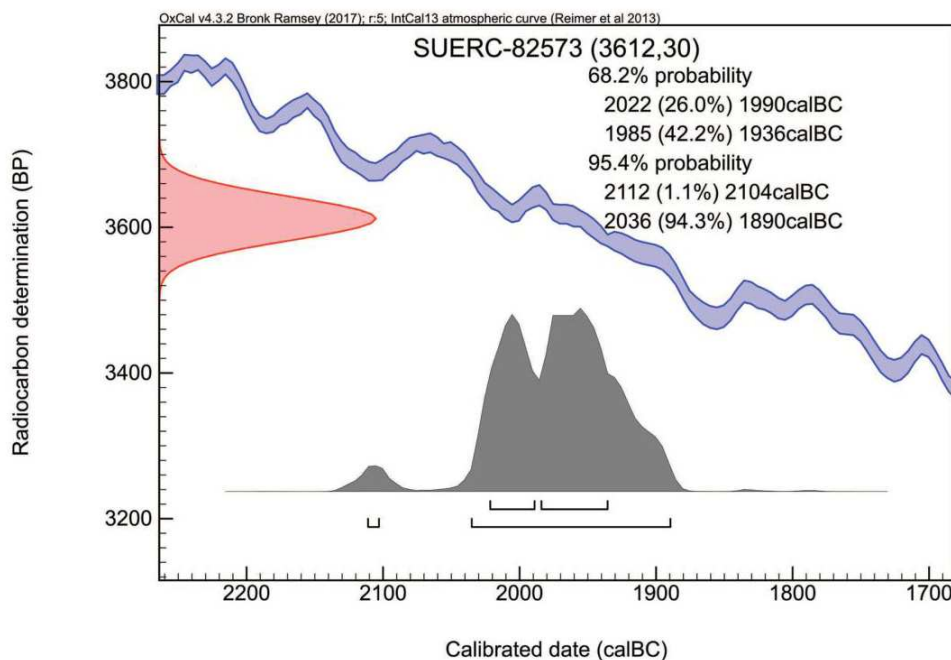
5.1.1 The excavation will be directed by Jeremy Bradley (Project Officer) and the survey will be undertaken by Peter Schofield (Project Officer), under the guidance of the project manager, Jamie Quartermaine.

5.1.2 **Project Management:** the project will be under the project management of **Jamie Quartermaine, BA Surv Dip MIFA** (OA North Project Manager) to whom all correspondence should be addressed. Jamie is a very experienced landscape surveyor, who has undertaken or managed literally hundreds of surveys throughout Northern England since 1984, and has considerable experience of working on similar projects to that proposed. He has managed a major recording programme of Lyme Park, Cheshire, and very detailed surveys of the South West Fells including areas such as Barnscar and Burnmoor. He has also undertaken surveys of Lowther Park, Cumbria, Rufford Park, Lancashire and has also managed the recording programme of Lathom Hall and Park, Lancashire and the survey of the Forest of Bowland for United Utilities. He has been a project manager since 1995 and has managed

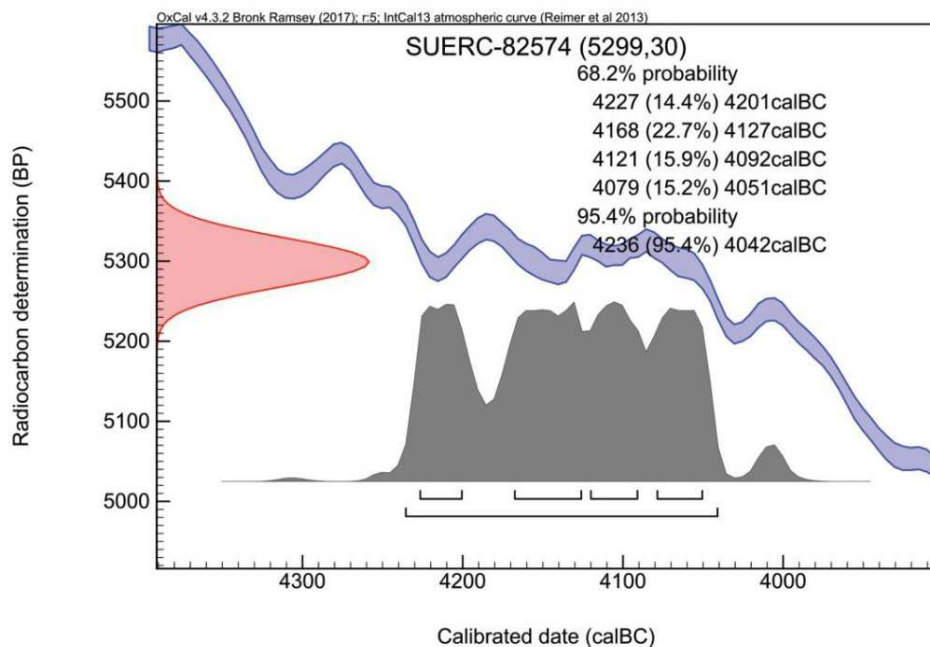
over 250 very diverse projects since then, which are predominantly survey orientated, but of all periods from the Palaeolithic to the twentieth century.

- 5.1.3 Jamie is a qualified land surveyor (Topographic Sciences Diploma Glasgow University) and has an exhaustive knowledge and understanding of surveying techniques. In particular he undertook the original surveys of the cairnfield in 1998 and managed the subsequent identification survey centred on Ennerdale. He has considerable familiarity with the archaeology of Ennerdale and the cairnfield in question.
- 5.1.4 **Excavation Director:** the excavations will be directed by **Jeremy Bradley** BA Hons (OA North Project Officer) who has a wide range of archaeological experience, gained over the last 20 years, on both rural and urban sites, and on evaluations and open-area excavation, including large infra-structure projects such as the Wasdale (2012) pipeline. Other projects Jeremy has directed include three campaigns of field work at Furness Abbey Presbytery between 2009-11 and other medieval sites such as Clitheroe Castle sites and Penrith New Squares. Jeremy worked as a Project Officer for Humber Field Archaeology between 1999-2005, which involved supervising all levels of archaeological excavation, post-excavation analysis on sites in Hull, east Yorkshire and North Lincolnshire.

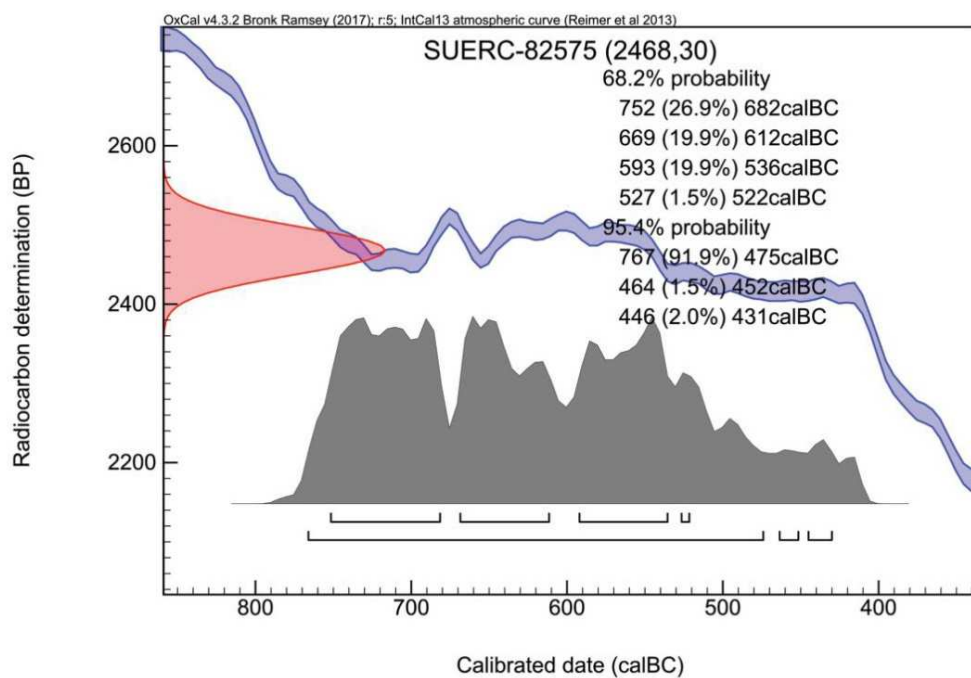
## APPENDIX E RADIOCARBON DATING CERTIFICATES



C14 dating certificate for Primary Deposit (**102**) of Cairn EF404



C14 dating certificate for Deposit (**103**) of Cairn EF404



C14 dating certificate for Deposit (207) of Cairn EF407



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