# Community Archaeology Landscape Survey Chattlehope Farm, Redesdale 21st September 2019















## 1. Introduction and Acknowledgements

A Level 1 Survey of approximately 43 hectares of land at Chattlehope Farm, Catcleugh, Northumberland was carried out in September 2019 by volunteers from North of the Wall Tynedale Archaeology Group (NOWTAG) and Revitalising Redesdale Landscape Partnership as part of the Lost Redesdale community archaeology project. The results of the survey are discussed in this report.

The potential for archaeological features was first identified by the current landowners, Kate and David Dickinson, who brought this to the attention of the Northumberland National Park Farming Liaison Officer. Following the securing of funding from the National Lottery Heritage Fund, the Revitalising Redesdale (RR) Heritage and Engagement Officer made contact with the landowners in June 2018 to discuss including this site in the Lost Redesdale community archaeology project. A LIDAR survey of the site was carried out in November 2018 as part of the LIDAR Landscapes project, which identified potentially significant features. Following this, a site visit was undertaken by the RR Heritage and Engagement Officer and volunteers from NOWTAG, along with archaeologist Richard Carlton in February 2019. From this visit it was concluded that there was a significant level of potential archaeological interest and that it would be useful to carry out further surveys of this site.

The principal aim of this Level 1 survey was to locate and record features of potential archaeological significance on the farm and identify sites for further investigation. A secondary aim was to provide a useful training opportunity for volunteers in archaeological landscape survey and raise knowledge of, and interest in, the archaeology of Redesdale.

The event was led by a team of members of NOWTAG, comprising Phil Bowyer, Andy Curtis and Martin Green. In all, 13 volunteers took part in the survey, learning and developing skills in archaeological surveying techniques and contributing to our understanding of Redesdale's heritage. Their contribution is much appreciated. Participants included: Phil Bowyer, Andy Curtis, Martin Green, Kate Dickinson, Nina Dickinson, Richard Wilson, Katy Wilson, Alan Gray, Ailsa Graham, Karen Leadbitter, Anne Palmer and Ruth Jones.

Special thanks go to Phil Bowyer, Martin Green and Andy Curtis for their generosity, expertise and patience in training the volunteers and leading the survey.

Special thanks also to Kate, David and Nina Dickinson for their kindness, support and enthusiasm in welcoming us to their farm and hosting this event.

This survey report has been compiled on behalf of Revitalising Redesdale Landscape Partnership and Tynedale North of the Wall Archaeology Group by Phil Bowyer, Andy Curtis and Martin Green.

Karen Collins
Revitalising Redesdale Heritage & Engagement Officer
October 2019

# 2. Summary of survey findings

#### Western end of Chattlehope Farm

LIDAR and aerial photographs suggest that much of the area to the south of the Catcleugh reservoir was ploughland in the medieval era, at least as far up the hillside as the edge of the current forestry plantations. Of course, neither type of image is available of the area before the Reservoir was built, so it is unknown whether this ploughing reached down the hillside as far as the valley floor. The first edition OS map (surveyed 1863) simply shows the whole western survey area as unenclosed rough pasture, with the only enclosed land now being under the reservoir.

This plough ridging averages about 6m width and runs up-and-down the slope, forming several blocks with slightly different orientations. Most of it is gently curving. It must have fallen out of use before 1863 by which time the land was pasture. Notably, several enclosures (both stone-walled and earthen banked) overlie it. This suggests a change in agriculture from predominantly arable, towards a largely pastoral economy. In such a marginal area, the date for cessation of arable farming was probably in the 14<sup>th</sup> century, when climatic deterioration and population reduction (with plague and famine), meant that intense cultivation was no longer possible (or needed). The instability of the border area in late medieval times (14<sup>th</sup> to 17<sup>th</sup> centuries) also made it an unfavourable location for farming. However, it is unlikely to have been such a simple transition and the multiple small blocks of plough ridging may indicate repeated attempts to re-try arable farming: none successful in the long term.

Feature C01 is the remains of a building, of which just dwarf walls remain. It has an eastern rectangular room a little over 4m x 7m in size. The western room is only 4.6m long and its northern wall is indistinct. Possibly this western end became (or always was) part of a small sunken yard (garth) extending northwards from the building. By the building is a curving bank, C03, which defines an area about 25m in diameter which is free from any plough ridging.



Fig 1 C01 Dwarf-walled building

The most likely interpretation of CO1 and CO3 are that they are a medieval farmstead, in use around the 13<sup>th</sup> century, at the same time as the surrounding ploughing (which hence doesn't cross the farmstead). CO1 is the expected size for a medieval longhouse building, with walls of turf, wood,

and/or wattle-and-daub on top of a stone foundation. The roof would have been of heather. These can be of one or two rooms: if the western part was ever a room, it later became part of the small garth by the house used to keep hens and pigs etc.

The enclosure CO3 was a farmyard and stock enclosure into which livestock could be brought for security and maybe some vegetables grown.

Just up the slope from C01 is a long wide bank C04 running along a contour. This is larger than other banks in the area and probably was the head-dyke of the settlement: i.e. it formed the upper limit of the arable land. In summer livestock would have been kept above the head-dyke to avoid them damaging crops as the arable fields weren't fully fenced. The location of the farmstead C01 close to the head-dyke is typical as it avoided the need to cross arable land when bringing livestock down into the farmstead. It also gave easy access to the uplands which held resources vital to the settlement (peat for fires, heather for roofing, rushes for bedding, etc).

The farmstead with the ploughland and head-dyke, would have been permanently occupied for at least part of its existence, though at other less favourable times it would have been used only in the summer. There may be continuity from the late Iron Age (and Roman era) so the head-dyke and farmstead site may have been set up then; though the building itself, CO3, is clearly not prehistoric.

Above the head dyke are areas where the land has reasonable quality grass and has been cleared of stones. This is suggestive of use in prehistoric periods when the weather was better than later eras; in particular the Bronze Age around 1,500BC when arable farms could be sited at altitudes above the later head-dykes. In support of this, the survey found a possible round-house site, C06. This was a level platform, scooped into a gentle hill slope, a little over 6m in diameter. At its edge in places were signs of a gully for rainwater. It lay beside one of the areas of good grass. On the other side of the grassy area was another, less certain, round-house site.



Fig 2 C06 Scooped Platform

This pattern of undefended roundhouses beside cleared grassy areas is typical of Bronze Age farming. Later on, in the Iron Age, roundhouses would have been in a stockaded enclosure, and there would probably have been cord rig (1m wide plough ridges) nearby, as at Rattenraw.

In the Bronze Age cord-rig was probably not in general use, so a cleared but un-ridged grassy area above the head-dyke suggests it was the site of a Bronze Age farm that went out of use when the climate deteriorated in the Iron Age. Lower down the hillside, below the head-dyke, there may have been Iron Age farmsteads, but medieval ploughing would have destroyed the evidence of their existence.

CO5 is puzzling. It consists of an L-shaped stony bank, partly around a heap of earth and large stones. On one side of this heap there is a rough line of stones. The heap could be a cairn of stones cleared from the land or for a prehistoric burial. However, the adjacent bank and the line of stones make it a possibility that this is a collapsed building of some sort. No such building appears on the first edition OS map (1863), or on any later edition, so it cannot be modern.



Fig 3 C05 Curving bank with possible cairn

Similarly feature C08 doesn't have a clear explanation. It consists of a group of boulders in an area of wet tussocky grass. They form an approximate oval, but with some stones missing. They are in an area of medieval plough ridging, so smaller stones will have been cleared, just leaving these larger ones which were beyond medieval equipment to shift, so would have been ploughed around. There are other similar isolated boulders nearby. Possibilities are that they are the remains of a burial cairn or stone circle (in the Bronze Age these were often quite small) disturbed by later medieval ploughing. Alternatively they may have been a group of erratic boulders deposited naturally as the glaciers retreated around 12,000 BC.

### **East of Chattlehope Farm**

The area of rough pasture on the east side of Chattlehope farm above Catcleugh dam occupies a steep north-facing slope becoming flatter further north above the plain of the River Rede. A series of trackways cross this area running west to east, some of which appear as hollow-ways (C10, C15 & C17) indicating prolonged use as a means of communication along the slope south of the river. Some of these may be relatively modern. In several places boulders or small outcrops appear along their course or to indicate stream crossings.

Bab's Wood plantation (a star-shaped enclosure to the east of Red Cleugh) is one of several of that shape in the area, shown on the 1<sup>st</sup> edition OS map with trees inside, possible a remnant of the

original alder woodland of the riverside. Its shape provides maximum shelter for animals outside the enclosure on the formerly tree-less hillside.

To its west side is a large sub-rectangular enclosure of sod-cast banks (C12), probably made for stock and relatively modern. Its western bank and south-west corner are less well defined for some reason although there is no sign of ploughing in this area.

A nice find is what appears to be a scooped enclosure (C11) of prehistoric form (Iron Age) occupying high ground (around 270m), above the plantation enclosure, protected on the west side by the steep valley of Red Cleugh. The slope of the hillside is scooped away in two areas to the south resulting in two consecutive steeper slopes with a flatter area below. To the east side a substantial earthen bank has been added with a clear entrance. Within the enclosure, adjacent to the modern fence, is a possible site of a single roundhouse. Below, near the field gate, is the site of a possible small rectangular building although this may be later. This area has been disturbed by access through the gate and construction of the plantation wall and there is no clear northern boundary to the settlement.



Fig 4 C11 Scooped settlement

East of the scooped settlement, also south of the plantation, are a series of low grassy banks which appear to be part of a small, possibly rectangular-shaped enclosure extending below the modern wall (C16). The continuation of these banks within the plantation is not obvious. Two banks running out from its corners on the south side suggest it may have been a sheepfold providing shelter for stock and demolished when the plantation wall was built. However, a much older and different use can't be excluded. A possibly cup-marked boulder nearby (C18) suggests Bronze Age influence and satellite images show what may be cord-rig ploughing along the slope to the south, although we couldn't identify this on the ground.

Cairns due east of the plantation (C19 & C20) may indicate agricultural clearance in this area, although ploughing there is unclear, and their use for burials can't be excluded.



Fig 5 C18 Cup-marked stone

Two large rectilinear banked enclosures, C12 and C21, about 250m apart with similar dimensions of approximately 70m x 55m were recorded. Although by form they could be either medieval or post-medieval, additional features visible adjacent to the eastern enclosure, C21, suggested a post-medieval date as more likely. Towards the northern end of the interior of enclosure C21 is a curving stony bank, C22, that appears to be overlain by the enclosure bank at its E and W ends. This stony bank appears to be associated with an area of broad rig and furrow, typical of medieval ploughing, visible on LIDAR immediately north of the enclosure. Tussocky grass covering this area prevented visibility of the broad rig and furrow at the time of survey. A second feature pointing towards a more probable post-medieval date for the enclosure is a 1m wide, up to 0.5m high earthen bank running between the NE edge of enclosure C21 and farmstead site C27 the visible remains of which appear to be post-medieval.



Fig 6 C21 Rectilinear enclosure, looking north. Western end of curving stony bank C22 is visible just south of the higher northern bank of the enclosure.

A few metres to the east of enclosure C21 lies a 6m x 3m x 0.25m high stony rectilinear feature that is suggestive of the remains of a possible shieling structure. Along with the area of broad rig and furrow nearby this would support the probability of medieval activity here prior to subsequent postmedieval habitation and settlement.



Fig 7 C26 Possible shieling building

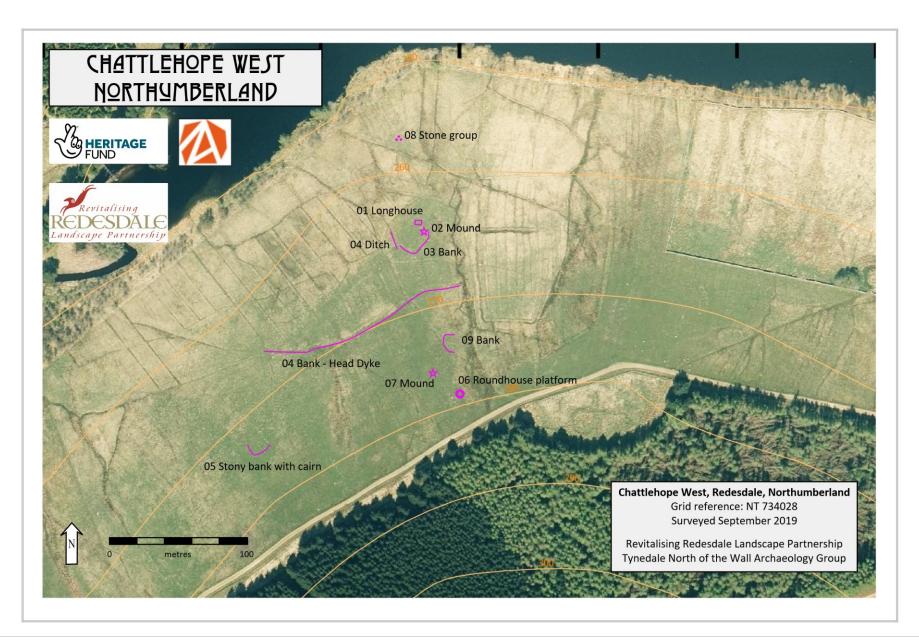
A further 250m east of enclosure C21 lies a third similar sized rectilinear enclosure which we did not have time to survey. However an initial visit did identify that within this enclosure were remains of a smaller circular enclosure and a rectangular feature suggestive of a shieling building. These may well also be indicative of medieval activity at sites subsequently subject to post-medieval usage.

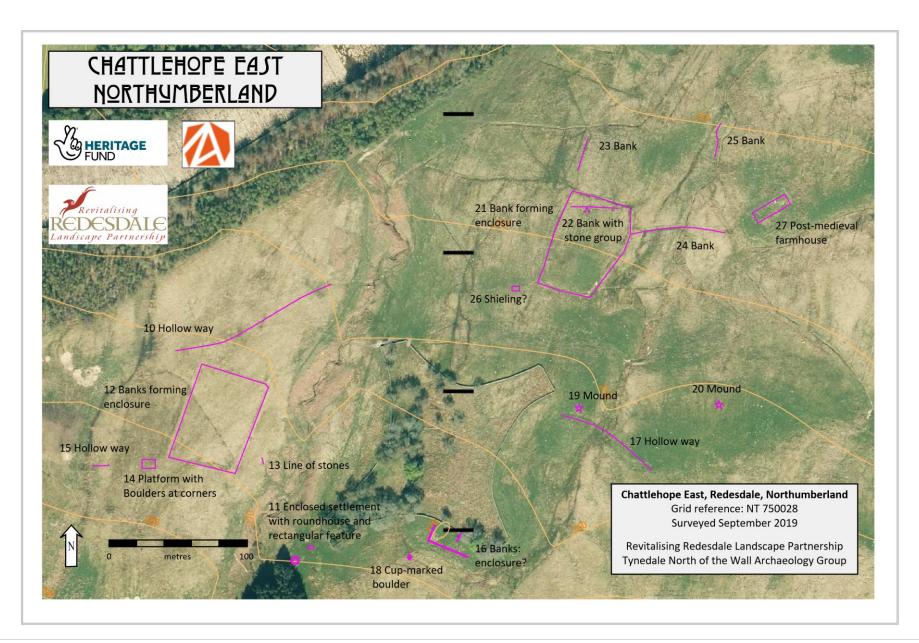
Farmstead site C27 consists of a 4 celled stone building with surrounding stone-built enclosure walls. The eastern cell measures  $10m \times 5m$  with indications of a door at its eastern end. Adjoining cells are  $3m \times 5m$ ,  $5m \times 5m$  and  $6m \times 5m$ . The walls are 1m wide and up to 0.5m high. A substantial stone-built enclosure wall, 1m wide and up to 0.75m high, abuts the NW corner of the farm building running approx 20m west and curving to return east forming a 14m wide yard south of the farm buildings. There is a lower outer wall that runs parallel about 8m to the south adjoining marshy land.

## 4. Further survey objectives

In the single day available volunteers managed to complete the recording of a substantial number of features but there remain several already noticed features requiring full recording and further terrain around the already identified features that still require a systematic walk-over survey in order to check for further as yet unknown features.

The work undertaken thus far indicates that the landscape around Chattlehope Farm contains a wide range of features evidencing human habitation and usage dating back into prehistoric times and offering particular examples of continuity and change through medieval and post-medieval eras.





# **Chattlehope Farm Gazetteer**

# **Survey Record Number C01**

**GPS** NT 73371 / 02871

Site type Earthwork

Site form Rectilinear Structure

Period Medieval?

**Description** Rectangular dwarf-walled structure, either 2 cells or single cell with attached garth. Eastern cell 7.25m x 4.1m. Western cell 4.6m x 4.1m possibly extending northwards to 7.6m if intermittent stones are indicative of a garth. Walls are up to 0.6m high

Images C01



# **Survey Record Number C02**

**GPS** NT 73375 / 02864

Site type Earthwork

Site form Earthen mound

Period Unknown

**Description** Mound 6m (E-W) x 4.3m (N-S) and up to 0.8m high with rounded top. Earthen: no stones on prodding.

## Images C02



## **Survey Record Number C03**

**GPS** Ditch C03A: NT 73351 / 02864 to NT 73356 / 02851

Curving bank C03B: NT 73358 / 02854, NT 73363 / 02850, NT 73369 / 02849, NT 73374 / 02854, NT 73369 / 02854, NT 73569 / 02854, NT 75660 /

73378 / 02859, NT 73378 / 02864

Site type Earthwork

**Site form** Curving bank, with continuation as ditch.

Period Medieval?

**Description** Curving bank, south of mound CO2. It runs mainly E-W, but with both ends turning northwards. Its west end continues north as a ditch, though this may be unrelated. There is a possible entrance through the bank at NT 73374 02854. *Not noted if any stones in bank, or its dimensions.* 

Images C03a, C03b





# **Survey Record Number C04**

**GPS** NT 73401 / 02825, NT 73390 / 02823, NT73376 / 02822, NT 73370 / 028218, NT 73361 / 02812, NT 73352 / 02804, NT 73320 / 02787, NT 73295 / 02780, NT 73290 / 02780, NT 73259 / 02778

Site type Earthwork

Site form Earthen Bank. Possibly a head dyke.

#### **Period** Medieval?

**Description** Curving flat-topped earthen bank, 3.4m to 4.8m wide, 0.3m to 0.55m high extending for more than 150m, running east-west. There is a 1.8m gap at NT 73376 / 02822. On the west side of this gap, another bank joins from the north at right angles. In places there is a ditch on the uphill side of the bank. At NT 73361 / 02812 the bank is cut by a possibly modern N-S ditch and up-cast bank. The east end of the bank terminates at a boggy area. The west end of the bank may continue as a ditch (see LIDAR) curving downslope.

Images C04



## **Survey Record Number C05**

**GPS** NT 73248 / 02710, NT 73250 / 02706, NT 73254 / 02703, NT 73261 / 02706, NT 73264 / 02710

**Site type** Earthwork

Site form Curving bank with possible cairn

Period Unknown

**Description** Curving stone and earth bank. There is an adjacent possible large cairn (or collapsed small structure) on the inside of the curve where the bank curves sharply at NT 73254 / 02703. There is an alignment of stones along the northern edge of this possible cairn. Quality of grass in this area is suggestive of clearance.

Images C05a, C05b





## **Survey Record Number C06**

**GPS** NT 73401 / 02747

**Site type** Earthwork

**Site form** Scooped platform (Possible round house)

Period Prehistoric?

**Description** Platform scooped into gentle hillside. 6.6m (E-W) x 5.6m (N-S). No stones visible, but there are indications of a drip trench. There is a further possible platform nearby. By a cleared area of good quality grass.

Images C06a, C06b





# **Survey Record Number C07**

**GPS** NT 73382 / 02762

Site type Earthwork

Site form Earthen mound

Period Unknown

**Description** Flat-topped earthen mound 3.5m (E-W) x 3.2m (N-S) and 0.15m high

Images C07



## **Survey Record Number C08**

**GPS** NT 73357 / 02931

**Site type** Earthwork

Site form Stone setting

Period Unknown

**Description** Area in tussock grass measuring 4.4m x 2.6m with a group of 7 rounded boulders 0.4m x 0.4m approx. Other very scattered boulders nearby.

Images C08



#### **Survey Record Number C09**

GPS NT 73397 / 02790, NT 73390 / 02789, NT 73389 02783, NT 73393 / 02779, NT 73398 / 02777

Site type Earthwork

Site form Earthen bank

Period Unknown

**Description** Curving earthen bank (forming the western half of a circle) in area of tussocky grass. Cut on west by a N-S drain so that segment missing. To the east is a boggy area.

Images .

# **Survey Record Number C10**

GPS NT 74798 / 02729 to NT 74909 / 02779

**Site type** Earthwork

**Site form** Track way?

**Period** Not Known

**Description** Indistinct linear depression running W-E, max depth 0.3m, likely hollow way, with fords across streams at each end.

Intermediate points at NT 74825 / 02735 (S of flat outcrop), NT 74833 / 02736 (S of boulder), NT 74847 / 02743, NT 74888 02768.

Images C10



## **Survey Record Number C11**

**GPS** NT 74902 / 02579 (centre of scooped enclosure)

**Site type** Earthwork

Site form Enclosed Settlement?

Period Iron Age / Romano-British

**Description** Scooped enclosure on steep slope about 35m N-S x 20m W-E. with enclosing bank on NE side which curves up hillside. Remains of a possible round house, diameter 7m, abuts present-day stone wall at NT 74882 / 02576. At NT 74893 / 02587 there is rectangular enclosure on flatter land, aligned W-E, 4m x 2m, defined by a low earth and stone bank, with a possible entrance on its NE side. Enclosure located on prominent site close to E side of steep stream valley.

Images C11a, C11b





#### **Survey Record Number C12**

GPS NT 74861 / 02706 (mid-point Northern side)

**Site type** Earthwork

Site form Rectilinear banked enclosure

**Period** Medieval / Post-Medieval

**Description** Large banked enclosure approx. 70m x 50m (W side 76m, E side 67m, N side 52m, S side 52m). NT 74816 / 02719 (NW corner), NT 74865 / 02703 (NE), NT 74840 / 02640 (SE), NT 74791 02650 (SW). Sod-cast bank varies up to 2m wide and height up to 0.35m, less distinct at SW corner and on W side. There is a narrow gap of 1m near SE corner, where the bank is stonier. Possible entrance, 3m wide, at midpoint of N bank. The enclosure is crossed diagonally from SE-NW by a shallow ditch. Nothing visible inside enclosure.

Images C12



# **Survey Record Number C13**

**GPS** NT 74859 / 02648

**Site type** Earthwork

Site form Stone setting

Period Unknown

**Description** 5m length of partly exposed stones, orientated N-S, 0.5m wide, 0.2m high. Scattered stones to W and E.

# Images C13



**Survey Record Number C14** 

**GPS** NT 74777 / 02647

**Site type** Earthwork

Site form Rectilinear platform

**Period** Unknown

**Description** Rectilinear platform , with boulders at each corner but lacking clear evidence of walls or building. SW-SE 12m, NW-NE 9m, SE-NE 5m, NW-SW 6m. Probably random alignment of stones.

Images C14



**Survey Record Number C15** 

**GPS** NT 74739 / 02625

Site type Earthwork

Site form Hollow way

Period Unknown

**Description** 3m wide, shallow hollow way running W-E.

Images C15



**Survey Record Number C16** 

**GPS** NT 74983 / 02602

Site type Earthwork

**Site form** Banked enclosure

**Period** Unknown

**Description** Low grassy banks up to 2m wide, 0.5m high, running below modern wall of plantation making enclosure possibly rectangular in shape, approx. 10m (N-S) x 20m (W-E). Bank runs S from wall at NT 74983 / 02602 for 5m to NT 74979 / 02593. From that point there is a short leg of bank 3m to SW and return E to wall at NT 74999 / 02592. There is another spur bank parallel to wall, 11m long, ending at NT 75007 / 02580. Banks less clear in wooded land N of wall.

Images C16a, C16b





# **Survey Record Number C17**

**GPS** NT 75076 / 02682 to NT 75139 / 02643

**Site type** Earthwork

Site form Hollow way

Period Unknown

**Description** 2.5m wide, 1.5m deep hollow way cut by stream in marshy land at NT 75105 / 02672.

Images C17



**Survey Record Number C18** 

**GPS** NT 74965 / 02581

Site type Boulder

Site form Rock art in landscape

**Period** Prehistoric

**Description** Low-lying stone 1m x 1m x 0.1m with a single large cup-mark and possibly smaller second on upper surface. No sign of peck marks, but probably weathered.

Images C18



**Survey Record Number C19** 

**GPS** NT 75087 / 02688

Site type Earthwork

Site form Mound

Period Unknown

**Description** Turf covered mound. 3m x 2m x 0.2m. Possible clearance cairn.

Images C19



**Survey Record Number C20** 

**GPS** NT 75188 / 02690

Site type Earthwork

Site form Cairn

Period Unknown

**Description** Stony mound 3m x 3m x 0.3m.

Images C20



#### **Survey Record Number C21**

**GPS** NT 75081 / 02842 (NW corner)

Site type Earthwork

Site form Rectilinear enclosure

Period Post-Medieval

**Description** Large (approx 70m x 55m) enclosure with 1.5m wide, 0.5m high earth and stone bank. NE corner NT 75126 / 02801, SE corner NT 75095 / 02768, SW corner NT 75057 / 02778. Possible traces of 3-4m wide rig and furrow in interior. Attribution as post-medieval supported by linear bank C24 that runs from near the NE corner of the enclosure to post-medieval farmstead site C27. Towards the northern end of the interior is a curving stony bank C22 that appears to be overlain by the enclosure bank at its E and W ends.

## Images C21a, C21b





# **Survey Record Number C22**

GPS NT 75081 / 02833 to NT 75116 / 02832

Site type Earthwork

**Site form** Stony linear bank

**Period** Medieval

**Description** 1m wide, 0.3m high slightly curving linear bank towards N end of enclosure C21. At NT 75093 / 02832 is a cluster of 3 large stones adjacent to the bank. LIDAR indicates broad rig and furrow in area immediately N of the bank. In long tussocky grass it was not possible to identify this on the ground.

## **Images**

# **Survey Record Number C23**

GPS NT 75086 / 02859 to NT 75094 / 02884

**Site type** Earthwork

**Site form** Stony linear bank

Period Medieval/ Post-medieval

**Description** Up to 1m wide, 0.2 m high stony bank on same alignment as the western bank of enclosure C21. There is a gap between this bank and the NW corner of the enclosure. It is unclear whether this bank was a continuation of bank C22 or is related to the later enclosure C21. LIDAR does not indicate broad rig and furrow east of this bank, which may suggest it originally formed the east edge of the medieval ploughing.

Images C23



**Survey Record Number C24** 

**GPS** NT 75124 / 02814 to NT 75193 / 02814

**Site type** Earthwork

**Site form** Linear earthen bank

**Period** Post-medieval

**Description** 1m wide, up to 0.5m high earthen bank running between NW corner of enclosure C21 and Farmstead site C27. N-S drainage ditch cutting through bank at NT 75161 / 02818.

Images C24



**Survey Record Number C25** 

**GPS** NT 75183 / 02864

Site type Earthwork

Site form Earthen bank

Period Unknown, but likely post-medieval or medieval

**Description** C-shaped bank , 1m wide, 0.3m high, from just E of drainage ditch at NT 75186 / 02868 and turning back towards ditch at NT 75187 / 02880. There is a possible continuation of this bank from NT 75186 / 02887 to NT 75190/02893.

Images C25



# **Survey Record Number C26**

**GPS** NT 75043 / 02775

Site type Earthwork

Site form Stony rectilinear feature, possible shieling

Period Medieval?

**Description** 6m x 3m x 0.25m high stony rectilinear feature.

Images C26a, C26b





## **Survey Record Number C27**

**GPS** NT 75218 / 02825

**Site type** Earthwork

Site form Farmstead

**Period** Post-medieval

**Description** 4 celled stone building. Eastern cell 10m x 5m with indication of a door at eastern end. Adjoining cells 3m x 5m, 5m x 5m and 6m x 5m. Walls are 1m wide and up to 0.5m high. A substantial stone-built enclosure wall, 1m wide and up to 0.75m high, abuts the NW corner of the farm building running approx 20m west and curving to return east forming a 14m wide yard south of the farm buildings. There is a lower outer wall that runs parallel about 8m to the south adjoining marshy land.

Images C27a, C27b, C27c, C27d







