

## **5.12 Barrowmouth and Saltom Bay (Map Figure 5.129)**

### *5.12.1 Location and geology*

Barrowmouth and Saltom Bay (NX 95743 15738) lies on the Irish Sea coast, to the north of St Bees Head. It is c.3km south of Whitehaven and c.6km northeast of Egremont. Whitehaven still retains a significant industrial character and in the 18<sup>th</sup> and 19<sup>th</sup> century the coastline in this area was used extensively for mining, with the port at Whitehaven used to export raw materials. After the Second World War the Marchon Chemical Factory was also established close to the shore. It manufactured detergents and became the town's largest employer following the gradual cessation of mining during the 20<sup>th</sup> century. It closed in 2005, however, and no mining is currently undertaken in the area.

The solid geology of the Saltom Bay area is predominantly composed of Carboniferous Whitehaven Sandstone Formation, with outcroppings of Carboniferous Pennine Middle Coal Measures Formation of Mudstones, Siltstones and Sandstone (BGS 2008). The superficial geology is characterised by Quaternary deposits of Devensian Diamicton Till. The principal soil in this area is Deep Loam which is suited to dairying and stock rearing with limited arable crop production in areas where the flood risk is low (Farewell 2007). The shoreline topography is composed of a narrow inter-tidal zone of sand and shingle beaches backed by tall cliffs that vary between sandstone, till and sand and gravel deposits (Figure 5.118). This stretch of coast is generally unprotected.



Figure 5.118 The coastline at Saltom Bay, north of St Bees Head, looking northeast.

Land use around Saltom Bay is predominantly stock rearing and arable cultivation. The area is popular with walkers owing to its proximity to St Bees Head and the 'Coast to Coast' footpath, and the coastline is publicly accessible as part of the Cumbria Coastal Way. This stretch of coast forms part of the St Bees Head designated SSSI.

#### *5.12.2 Previous research*

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It highlighted Barrowmouth Alabaster and Gypsum Mine and Saltom Pit Colliery as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218).

Barrowmouth Alabaster and Gypsum Mine became a Scheduled Monument in 2004 (35009) and is recorded in the Cumbria HER (HER: 11984). The mining remains were mapped as an area polygon and three earthwork building platforms during the Phase 1 aerial photography transcription (NRHE: 1405240). The Scheduled Description makes reference to surviving remains of buildings, levels, spoil heaps, enclosures and an inclined plane at the site. The site was included in Cranstone's survey of the archaeology of the Whitehaven Coast in 2007, but has not received any detailed investigation in terms of earthwork surveys or intrusive investigation (Cranstone 2007). The purpose of the Phase 2 survey of this site was therefore to provide an up-to-date condition statement for the site.

Saltom Pit Colliery was the first undersea coal mine in England and is a Scheduled Monument (27801). It is also recorded in the Cumbria HER (HER: 2754) and was mapped as an area polygon and a series of structures during the Phase 1 aerial photography transcription (NRHE: 8484). The site was surveyed by the Lancaster University Archaeological Unit (L.U.A.U.) in 2000 which produced detailed plans and descriptions of surviving elements (Wild 2000). This was augmented in 2007 by Cranstone's reassessment of the interpretation of these features in his survey of the archaeology of the Whitehaven Coast (Cranstone 2007). The purpose of the Phase 2 survey of this site was therefore to provide an up-to-date condition statement for the site.

#### *5.12.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Barrowmouth and Saltom Bay involved a walkover of publicly accessible areas along the cliff top and shoreline at this location.

#### *5.12.4 Post-medieval*

Barrowmouth Alabaster and Gypsum Mine: The presence of alabaster at Barrowmouth was known by 1682, and there is documentary evidence for mining and quarrying from 1739 to 1907, during which time the land was leased by Bt Bees School to a succession of tenant partnerships (Cranstone 2007, 73). It is not known when the site was developed as a gypsum mine, however Cranstone argues that since gypsum was used in plaster production, and the mining manager in the 1850s had a history as a plasterer, it is likely that exploitation of the gypsum resource was established around this time (Cranstone 2007, 76).

Cranstone's survey of the site makes note of its generally overgrown and unstable nature caused by successive landslips and deposits of waste products (Cranstone 2007, 87). The surviving features include part of the original packhorse track, an incline (railtrack), levels, buildings and enclosures. These relate to three major phases in the development of mining at this location and Cranstone states that the most prominent remains are those of the last twenty years of active operation, from the 1880s to 1907. Cranstone also provided an assessment of the sites condition stating that:

*'All features mapped on 1<sup>st</sup> -3<sup>rd</sup> OS editions can be located, but detailed survey is impossible due to dense undergrowth. However the site is under severe medium-term threat due to a combination of coastal erosion with major rotational landslipping. The only way to halt this process would probably be major civil engineering to both protect the coast and halt movement of the toe of the landslide; this is probably both disproportionately expensive, and environmentally unacceptable. An alternative strategy would be a programme of major vegetation clearance, followed by detailed survey and excavation in advance of progressive destruction; however this would probably have substantial adverse effects on the ecological and amenity value. A further alternative, only very recently becoming possible, might be LIDAR survey; it would appear that this technology is now capable of surveying through vegetation cover and Barrowmouth might provide a useful test-bed for its application under very challenging conditions.'* (Cranstone 2007, 87).

The Phase 2 survey recorded the remains of the Alabaster and Gypsum mines as consisting of extensive earthwork remains of mine waste heaps, a trackway/packhorse track, buildings (133-135), walling (136) and a wagonway on an incline plane (132). As the purpose of the survey was a rapid assessment of the condition of the site, the survey did not repeat the exercise of recording all of the features identified in Cranstone's survey and has instead focused on select features.

The wagonway on an incline plane (132) would have been used to haul mined products up the side of the cliff face, from the pit head to Croft Wagonway at the top of the slope (Cranstone 2007, 63). It survives as a visible earthwork running for a length of c.0.25km and crosses what must be an original trackway by means of a stone-built bridge (Figure 5.119). Cranstone notes that that wagonway now has a slight dog-leg due to damage from land slips (Cranstone 2007, 115).



Figure 5.119 Stone-built bridge carrying the wagonway on an incline plane looking south (scale = 2m).



Three buildings were recorded alongside the wagonway (133-135). These were roofless, square structures which had been reduced in height, in what appeared to be deliberate destruction rather than ruination. Each structure contained the partial remains of an entrance doorway, sometimes fitted with iron hinges for a door rebated to open outwards (Figure 5.120). Each measured  $\approx 5\text{m} \times \approx 3\text{m}$  and the southernmost building (135) was interpreted as a possible gunpowder store as its floor was lower than the surrounding ground, giving it the appearance of a pit-like storage location. Gunpowder stores were usually located in remote locations, however, due to the risk of explosion so this interpretation is open to debate.



Figure 5.120 Remains of three structures at Barrowmouth; top (135), left (133), right (134) (scale = 2m).

A further section of walling was recorded to the southwest of the possible gunpowder store (136). This was undergoing active erosion and access could not be gained to the structure for the purposes of more detailed investigation (Figure 5.121). This may be the remains of a further building or it could be the remains of an old sea wall or boundary wall for the mining operation. There appeared to be lettering on the face of this walling which may give an indication of its date or purpose, but this could not be assessed at the time of survey.



A large, flat-topped tip of mining spoil was also noted to the north of the mining remains, it is a very prominent feature in the landscape of this area (Figure 5.122). Cranstone interprets this mound as spoil from Haig colliery to the north and describes this area as an interesting 'landscape of disposal' which should be retained if possible (Cranstone 2007, 94).



Figure 5.121 Remains of a further structure or walling at Barrowmouth, looking south.



Figure 5.122 Remains of a large mining spoil tip at Barrowmouth, looking north.

Aikbank Quarry: East of the mining operation in the cliffs that back on to the site, there are extensive remains of post-medieval quarrying activities. One such site was recorded as part of the survey at Aikbank Quarry (131) c.160m east of the mine. This site is recorded in the Cumbria HER (HER: 11981) and it was recorded during Phase 2 in order to characterise the remains in this area. The site consisted of a man-made cliff face where past red sandstone extraction would have taken place (Figure 5.123). The quarry is depicted on the First Edition Ordnance Survey Map of 1863 as being rectilinear in plan and accessed from the west. By the Second Edition Map of 1899 it had been enlarged and perhaps abandoned as it is shown as being the same size but disused on the 1925 mapping.



Figure 5.123 Remains of Aikbank Sandstone Quarry at Barrowmouth, looking east.

Saltom Pit Colliery: This site lies c.1.6km to the north of the alabaster and gypsum mine. It was sunk on 1729-32, making it England's earliest undersea coal mine. It remained in use until 1867 and was a centre for innovation, linked particularly to the works of its owner from 1660-1706, Sir John Lowther, and the mining engineer Carlisle Spedding (Cranstone 2007, 38 and 56). Water was pumped from the mine by way of a 17" cylinder Newcomen engine installed in 1731. This was rapidly improved over the following 10 years and by 1740 the pit operated using two 42" cylinder Newcomens (Wild 2000, 11-12). Winding was still carried out using a large horse gin, however, so the pit has been hailed as a key example of the transition from horse powered winding to steam power (Scheduled Monument Description). The mined coal from Saltom was lead to an adit from the rear of the pithead, to the base of the shaft of Ravenhill Pit on the clifftop above. It was then lifted via horse gin and transported by wagon way to Whitehaven Harbour. Ravenhill Pit was dug for this sole purpose; its shaft was never sunk below the Saltom adit (Cranstone 2007, 39).



The survey of the colliery carried out by L.U.A.U. provides a detailed record of the standing building remains (Wild 2000). It describes the engine house, the horse gin and the only surviving chimney and provides a stone-by-stone record of each, against which future erosion or damage can be measured (Wild 2000, 31-41). Cranstone highlights that the survey does not include the seawall along the coastal frontage of the site, which he believes to be 18<sup>th</sup> century and which is included in the site scheduling (Cranstone 2007, 56). He also reinterprets the engine house as a winding engine house dating to 1823 (Cranstone 2007, 56).

The Phase 2 survey recorded the remains of the colliery (187) as consisting of the engine house, chimney, seawall and remains of the horse gin (Figure 5.124-126). Further buildings were mapped to the east of these remains as part of the Phase 1 aerial photography transcription (NRHE: 8484), however no remains of these structures were recorded during the Phase 2 survey. Significant land slip and waste tips from the nearby Haig colliery were noted to the east of the site and these may be obscuring earlier colliery remains.

The site is generally well-maintained and includes an art installation consisting of cast iron beams with quotations from children who worked in the pit during the 19<sup>th</sup> century. It is also provided with an interpretation panel at the top of the cliff.

Cranstone also makes reference to a saltworks that was established at the site in 1734-5 consisting of two salt pans. He believes these were located in the area to the north of the winding engine house (Cranstone 2007, 35). This area is now destroyed by waste tips and land slips which could either have buried the saltworking remains, or destroyed them. No remains of saltworking were recorded during the Phase 2 survey.

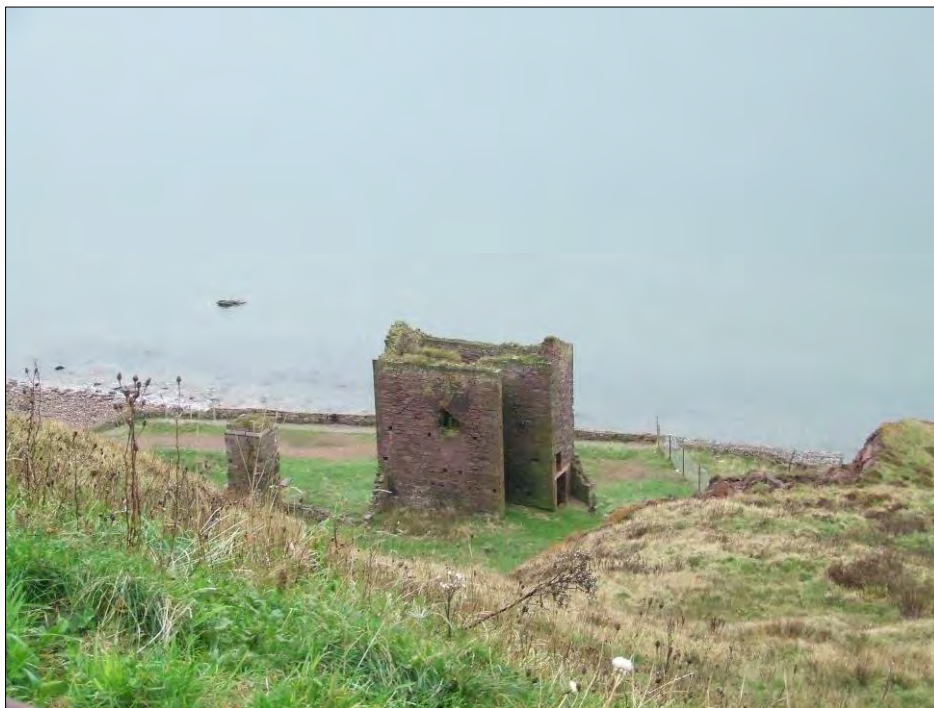


Figure 5.124 Standing remains of winding engine house and chimney, looking west.



Figure 5.125 Standing remains of the chimney with retaining wall and remains of horse gin in the background, looking east.



Figure 5.126 Remains of 18<sup>th</sup> century sea wall erected to protect Saltom Pit Colliery, looking north.



#### *5.12.5 20<sup>th</sup> Century*

**Haig Colliery:** Around 380m to the northeast of Saltom Pit Colliery, the survey also recorded the standing remains of Haig Colliery which now houses the Haig Colliery Mining Museum. This pit was sunk in 1916-18 and had two shafts, operating until 1984-86 (Cranstone 2007, 54). It was the last deep coal mine in operation on the Whitehaven coalfield. The surviving engine houses and power station are a Scheduled Monument (27800) and Grade II Listed Building (429196) and the entire pit head complex is recorded in the Cumbria HER (HER: 5513). The site is a good example of a standard 20<sup>th</sup> century H-plan arrangement with power station and engine houses either side, fronted by twin pithead winding gears. The building contains the only in-situ working example of a Bever & Dorling twin cylinder, horizontal, single parallel drum winding engine in the world (Scheduled Monument Description).

The survey recorded the colliery buildings (140) as being in a good state of repair. It is a prominent feature in the surrounding landscape and is clearly visible from the alabaster and gypsum mine to the south. Only one of the original external winding gears survives and the surrounding area has been landscaped (Figure 5.127). The colliery is not considered to be at risk of erosion.



Figure 5.127 Scheduled and Listed Engine houses and power station at Haig Colliery, looking east.

#### *5.12.6 Threat from erosion*

The remains of Aikbank Quarry (131) and Barrowmouth Alabaster and Gypsum Mine (132-136) lie within SMP2 policy 11e1.1 which recommends 'No Active Intervention' for 100 years, likewise, the remains of Haig Colliery (140) lie within policy unit 11e1.3 which also recommends 'No Active Intervention'. The remains of Saltom Pit Colliery (187), however, lie within policy unit 11e1.2 which recommends 'Hold the Line' for the following 50 years and 'No Active Intervention' thereafter up to 100 years.

The shoreline from St Bees Head to Whitehaven has a varying level of resistance to erosion due to the underlying and superficial geology. This has led to the creation of a

number of small embayments, such as Saltom Bay (Halcrow 2011). Here the cliff face rises to  $\approx 100\text{m}$  aOD and varies between active and relict in terms of coastal erosion. Erosion of the Saltom cliffs is not continuous and can take the form of landslides, cliff falls and debris slides, as there are significant mining spoil deposits along this frontage. It provides the main source of coarse sediment for the system which is carried northwards by dominant southwesterly waves. The active cliffs are thought to retreat by 0.1m to 0.5m per year, whilst the relict system retreats at less than 0.1m per year (Halcrow 2012). Future predictions of shoreline evolution state that beach levels will lower due to the lack of input from the waste products of the mining industry and this will expose seaward defences to greater wave action and the risk of overtopping. Halcrow predict that the shoreline at Barrowmouth will retreat by between 10m and 50m in the following 100 years (Halcrow 2011), whilst NCERM predict a rate of between 3.4m and 6.6m (NCERM 2012). This large discrepancy appears to have been caused by NCERM predicting erosion of the cliff face (i.e. landward of the alabaster and gypsum mine) and Halcrow predicting loss at the shoreline (i.e. seaward of the alabaster and gypsum mine). For the purposes of this study, therefore, Halcrow's prediction is likely to be the more relevant of the two.

The remains of walling (136) recorded at the Barrowmouth Alabaster and Gypsum Mine were undergoing active erosion, and in light of Halcrow's predictions of shoreline retreat, further features associated with the mine will be at risk of coastal erosion. The remains are therefore considered to be at immediate and longer term threat of coastal erosion that will see the loss of a third of the site in the following 100 years.



Figure 5.128 Mining spoil backing on to the remains of Saltom Pit Colliery, looking northeast.

At Saltom pit to the north of Barrowmouth, the shoreline defences will be maintained for the following 50 years, after which time a 'No Active Intervention' policy will be adopted. Halcrow state that maintenance of the seawall at Saltom Pit Colliery will continue until such time as it is deemed technically difficult or not affordable to do so. 'The economic viability of the policy in the short and medium terms may depend on



amenity / heritage benefits of the Scheduled Monument and amenity site...opportunities for co-funding / private funding need to be sought' (Halcrow 2011). Under this management scenario NCERM predict a loss of between 10m and 20m in the 50 to 100 year period (NCERM 2011). This will see the loss of the sea wall, together with the standing winding engine house. The engine house is the most prominent surviving element at the site and without these standing remains its significance would be much reduced. This site is considered to be at risk of erosion in the long term (i.e. within the next 100 years). Halcrow's assessment of the risk of erosion at this site states that 'the monument is at high risk of extensive coastal erosion' (Halcrow 2011).

A further cause for concern at Saltom Pit Colliery is the danger of landslips from above the standing remains. Recent landslips were noted at the time of survey as the cliffs backing on to this site are composed of mining spoil, most likely derived from Haig Colliery to the north (Figure 5.128). Landslips from above could cause major damage to this Scheduled Monument.

Owing to their distance from the shoreline, the remains recorded at Haig Colliery (140) and Aikbank Quarry (131) are not considered to be at risk of coastal erosion in the immediate or longer term.

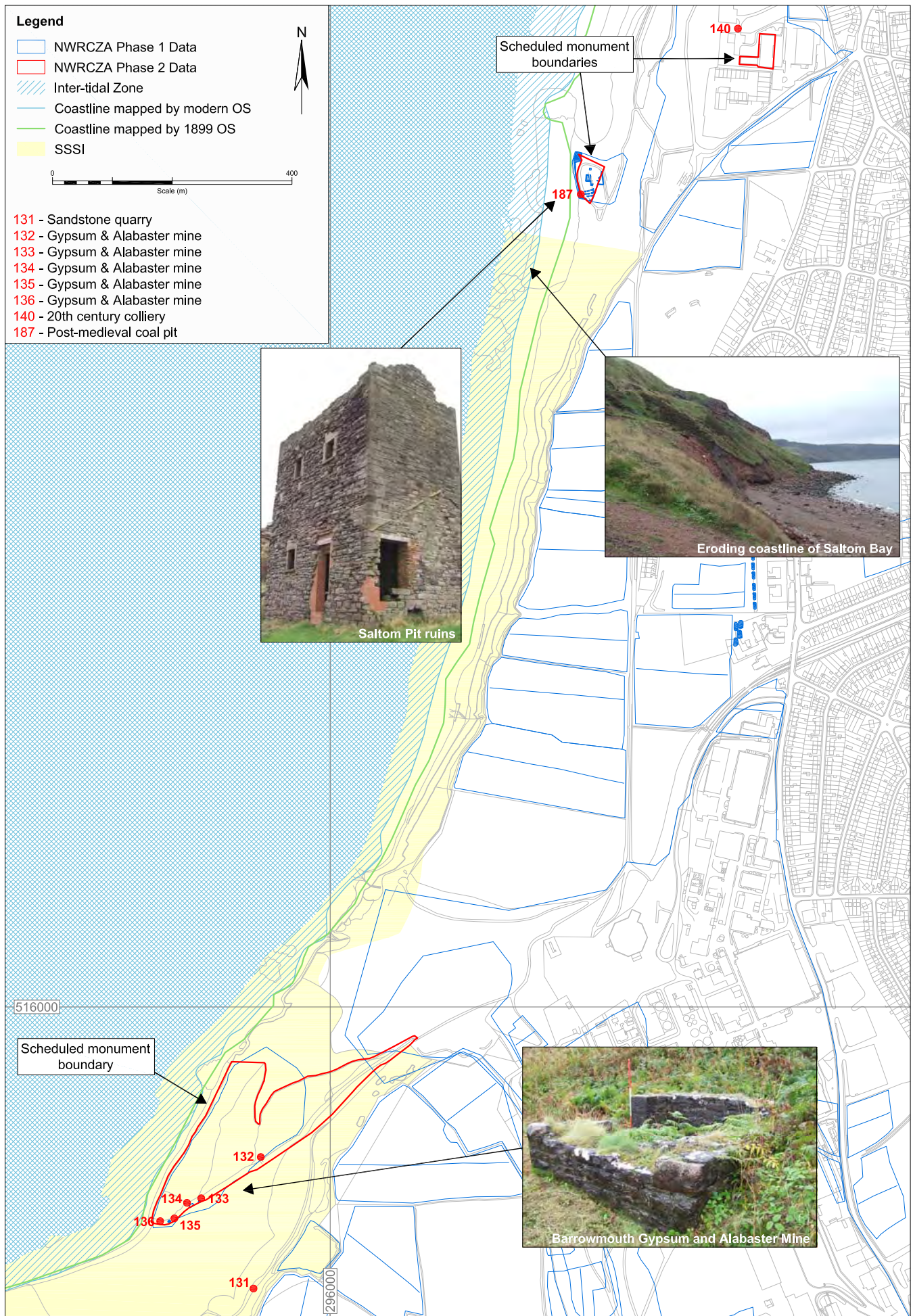


Figure 5.129 Location of sites surveyed in Saltom Bay



### 5.13 Maryport (Map Figure 5.113)

#### 5.13.1 Location and geology

Maryport (NY 03458 36418) lies on the southern mouth of the Solway Firth and is c.8.5km northeast of Workington. The town was established as the Roman Fort of *Alavna* in c.122AD, and marks the southernmost extent of the western coast extension of the defences of Hadrian's Wall. A large Roman town developed around the fort and the area remained important through to medieval times when a motte-and-bailey castle was constructed. In the mid-18<sup>th</sup> century Humphrey Senhouse developed the port and town and named it after his wife Mary; it quickly developed as a trading and industrial centre.

The solid geology in the area of Maryport is composed of outcroppings of Triassic St Bees Sandstone Formation with Carboniferous Pennine Upper Coal Measures Formation of Mudstone, Siltstone and Sandstone in the area of the port (BGS 2008). The superficial geology is characterised by Quaternary Devensian Diamicton Till in the area of the fort, with raised marine beach deposits of Quaternary Sand and Gravel elsewhere around the port. The principal soils in this area are Seasonally Wet Clay and Deep Red Loam which are suited to cereal production and dairying on short term and permanent grassland (Farewell 2007). The shoreline north of the port is composed of sandstone cliffs fronted by a short stretch of land and promenade behind a seawall that extends for 3km north of Maryport (Figure 5.130). This was constructed in the 1930s to protect the cliffs from further erosion. The inter-tidal zone is composed of a shallow lens of sand over solid geology (Halcrow 2011).



Figure 5.130 The shoreline north of the port at Maryport, looking northwest.

Land use in Maryport is primarily residential with stock rearing and arable cultivation in the surrounding countryside. The shoreline promenade is publicly accessible as part of the Cumbria Coastal Way and is used by walkers and birdwatchers as well as local people as a route of access around the town. The northern section of the town lies within the Solway Coast Area of Outstanding Natural Beauty (AONB).

#### *5.13.2 Previous research*

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It highlighted the Roman road at Maryport fort as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218).

The Roman road extending northwards from Maryport Roman Fort was mapped from cropmark evidence during the RCHME Maryport Roman Fort Survey in 1992 (NRHE: 938805). Its mapped extent is included in the scheduling for the fort and vicus site, so it is a Scheduled Monument (22746) and lies within the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'. It is recorded in the Cumbria HER which includes a projected route for the road along the shore between Maryport and Crosscanonby, which has been mapped from the Ordnance Survey (HER: 12410).

Excavations by the Senhouse family began to be conducted on the fort and vicus in the mid-18<sup>th</sup> century and continued intermittently until the late-19<sup>th</sup> century when a remarkable collection of seventeen Roman altar stones was recovered from the field to the northeast of the fort (Biggins and Taylor 2004, 103). Excavations again took place on the vicus in 1880 by Joseph Robinson. Jarret undertook more recent excavations of the site in 1966 focusing on the northeast corner of the fort, and for the past two years excavations have been conducted in the vicus by Ian Haynes (Newcastle University) and Tony Wilmot as part of a funded project by the Senhouse Museum Trust and Newcastle University. These have been focused on the re-excavation of the site where the altar stones were recovered and have produced a reinterpretation of the circumstances of their deposition and the discovery of a new altar stone dedicated to Jupiter Optimus Maximus (Haynes and Wilmot 2011, 24-5; <http://www.bbc.co.uk/news/uk-england-19224154>).

The fort and vicus were subject to an extensive geophysical survey in 2000-2004 which revealed a detailed plan of the vicus and the road extending to the north of the fort site (Biggins and Taylor 2004, 110). This, together with the evidence from aerial photography, shows that the road curves eastwards off the projected alignment of the road shown on Ordnance Survey mapping (and that recorded in the Cumbria HER).

The entire length of Hadrian's Wall and its extension (in the form of forts, milefortlets and towers) along the Cumbrian coast, as far as Maryport, was mapped from aerial photography as part of the Hadrian's Wall World Heritage Site National Mapping Programme (NMP) in 2009 (Oakley 2009). The 1992 RCHME aerial survey was digitised as part of the project (Oakley 2009, 7).

#### *5.13.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Maryport involved a walkover of privately owned fields to the north of the fort site.

#### *5.13.4 Roman*

The purpose of the Phase 2 survey of the Roman road was to ascertain to what extent it is discernable as a surface feature, and also to assess the risk of erosion to the monument as its projected route lies within 50m of the shoreline to the north at Crosscanonby (Johnson 2011, 190).



The Phase 2 survey determined that the line of the Roman road is discernable as a earthwork in the immediate vicinity of the fort, however this does not visibly continue into the fields to the north of the fort, where it has been mapped by aerial and geophysical investigations. No remains of the road were therefore recorded as part of the Phase 2 survey. It should be stressed that the projected line of the road towards Crosscanonby differs from the line recorded during the aerial and geophysical surveys which runs further to the east than the projected route. This might reduce the level of risk to the monument, however geophysical survey in the area of Crosscanonby, where the projected road is closest to the shore, could assess this risk further.

The Phase 2 survey recorded the remains of a second road (186) running east in the immediate vicinity of the southeast side of fort. This road is recorded in the Cumbria HER (HER: 12410), and was mapped as part of the Hadrian's Wall NMP (NRHE: 1326393). It survives as a visible earthwork running from the fort towards Camp Road (Figure 5.131). It is truncated by the road and housing along the east side of the street, however the NMP data records the extension of the road beyond the housing, curving round to the north. This was also revealed during the geophysical survey of the area and coincides with the Ordnance Survey projected route (Biggins and Taylor 2004, 123).



Figure 5.131 The southeast side of Maryport Fort with reconstructed watchtower at the Senhouse museum in the background, looking northwest.

The walkover of this area also recorded the remains of Hadrian's Wall Milefortlet 23 at Sea Brows (188). This site was identified through geophysical (Biggins and Taylor 2004, 116-8) and aerial photography investigations of the site (NRHE: 9020). It is a Scheduled Monument (27725) lying within the buffer zone of the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'. It is recorded in the Cumbria HER (HER: 16515).

The survey recorded the remains as consisting of a slightly raised area of ephemeral earthworks adjacent to an apparently stable cliff face (Figure 1.132). The remains were

bisected by a modern field boundary. The Scheduled Monument description for this site states that it 'will retain undisturbed archaeological deposits and will contribute to any further study of the Roman frontier defences along the Cumbrian coast' (Scheduled Monument Description). However, the location of the site on the edge of the cliff may mean that the site has been partially lost through quarrying activities or erosion/landslip.



Figure 5.132 Slight earthwork remains of Milefortlet 23 bisected by field boundary in the foreground, looking northeast.

#### 5.13.5 Threat from erosion

The remains recorded at Maryport (186, 188) lie within policy unit 11e4.2 which recommends 'Hold the Line' for the following 20 years and 'No Active Intervention' thereafter up to 100 years.

Up until the 1930s there was large scale erosion of the cliffs north of Maryport. This was alleviated by the construction of the seawall and promenade, although small-scale erosion in the form of rock falls and debris slides continued, and foreshore erosion resulted in beach levels dropping to bedrock level (Halcrow 2011). Halcrow state that the relict cliffs landward of Maryport Promenade experience very low rates of retreat (i.e. less than 0.1m/year). Under the current management scenario, they predict that the seawall will cause coastal squeeze following sea-level rise and that this will result in further erosion of the foreshore, prior to the seawall becoming undermined and inundated. There would be a continued risk of rock falls and landslips from the cliffs, however these are expected to remain fairly stable and will act as a flood barrier. NCERM predicts a loss of between 16m and 32m along the frontage in the following 100 years (NCERM 2012), however this will not directly affect the cliffs, the top of which lie at a distance of c.120m from the shore at Milefortlet 23 (188) and c.50m from the shore at the Senhouse Museum. The Senhouse Museum is due to move to the southeast side of the fort and will therefore not be a risk from increased landslip that may result in an erosional trend occurring at the cliff foot (Mike Baker *pers. comm.* Hadrian's Wall Heritage Ltd).



In light of this information the remains of the Roman road running eastwards from the fort site is not considered to be at immediate or longer term threat of coastal erosion as it begins c.320m from the shoreline. Milefortlet 23 is however considered to be at risk of coastal erosion in the longer term (i.e. within 100 years). This is due to the potential for increased rock falls and land slips on the cliff face following erosion of the foreshore at the foot of the cliffs. The cliffs presently appear to be stable, however their future response to cliff foot erosion has not been formally modelled.



Figure 5.133 Location of sites surveyed at Maryport



## 5.14 Allonby Bay (Map Figure 5.144)

### 5.14.1 Location and geology

Allonby Bay (NY 07454 42273) is a 8.5km long embayment in the outer reaches of the Solway Firth, c.3.5km northeast of Maryport and c.37km southwest of Carlisle. The centre point of the bay is located at the village of Crosscanonby which lies 0.5km inland from the coast and was established at least as early as the medieval period. It contains the Grade I Listed Church of St John the Evangelist with a hogback in its graveyard attesting to an Anglo-Scandinavian foundation on the site. The village developed in the 17<sup>th</sup> century as a centre for coastal salt production, which continued until the late 18<sup>th</sup> century.

Allonby Bay is a product of large-scale faulting in combination with the local geology where the less resistant Sandstone of the bay is bounded to the north and south by resistant rock formations at Maryport and Dubmill Point respectively. The solid geology in the area of Crosscanonby is composed of Triassic St Bees Sandstone Formation with a varied superficial geology of Quaternary Devensian Diamicton Till and glaciofluvial deposits of Devensian Sand and Gravel (BGS 2008). Swarthy Hill is a large outcropping of Devensian Till and Sand and forms a prominent feature of the shoreline topography of this area (Figure 5.134). The principal soil in this area is Seasonally Wet Deep Loam which is suited to stock rearing and dairying on permanent grassland (Farewell 2007). The shoreline along this stretch of coast is largely unprotected and composed of low lying sand dunes. Gabion walling has been erected along the seaward side of the salt pans at Crosscanonby to protect against erosion. The inter-tidal zone consists of a narrow upper shingle beach section with extensive sand and shingle flats.



Figure 5.134 The shoreline at Crosscanonby, showing the prominence of Swarthy Hill, looking northeast.

Land use in Crosscanonby is predominately stock rearing with some agricultural production. The shoreline is publicly accessible as part of the Cumbria Coastal Way and falls within the Solway Coast AONB. It is frequented by dog walkers and bird watchers, and is popular with families for recreational purposes.

#### *5.14.2 Previous research*

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It highlighted the Iron Age hillfort and Roman milefortlet 20B on Swarthy Hill as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218).

Swarthy Hill Iron Age Hillfort is a Scheduled Monument (27727) and is the only coastal Iron Age hillfort in Cumbria. It was initially identified as a cropmark on aerial photography in 1949 (Bewley 1992, 37) and this was subsequently mapped as part of the Hadrian's Wall NMP (NRHE: 9143). It is recorded in the Cumbria HER (HER: 609).

A small excavation across the ramparts of the hillfort was conducted by Robert Bewley in 1989 with a view to understanding the date and function of the site. This confirmed that the site dates to the Iron Age and has a good level of preservation of all three boundary ditches (Bewley 1992). It also noted that coastal erosion has caused damage to the monument (Bewley 1992, 38). Bewley also states that geophysical survey was not possible at the site (Bewley 1992, 37).

The remains of a Roman tower 20B are also located on Swarthy Hill, down slope and to the north of the hillfort remains. The tower was initially identified as a cropmark on aerial photography in 1949 (Bewley 1992, 37) however it was not subsequently mapped as part of the Hadrian's Wall NMP. It is a Scheduled Monument (27716) and lies within the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'. It is recorded in the Cumbria HER as Milefortlet 20B (HER: 630). The site has never been subject to formal archaeological investigation.

#### *5.14.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Swarthy Hill and Crosscanonby involved a walkover of publicly accessible land along the shoreline and privately owned fields on Swarthy Hill.

#### *5.14.4 Prehistoric*

The Iron Age hillfort on Swarthy Hill is described as a small multivallate hillfort with a triple ditch system measuring c.140m southwest to northeast and c.80m northwest to southeast. The ditches now form a semi-circular enclosure, which the Schedule Monument Description states is eroded at its northwestern side where there is currently a cliff edge (Scheduled Monument Description).

Excavations on the hillfort did not recover any artefactual remains, however the form of all three enclosure ditches was established, the outer two measure c.3m wide and 0.8m in depth, and the inner ditch measuring 5m in width and 1.3m in depth. There was also evidence for banks on the internal face of all three ditches (Bewley 1992, 40-2). The fill of the inner ditch was rich in charcoal and produced a radiocarbon date of 601-394 Cal BC (Bewley 1992, 39). Bewley states that geophysical survey was not possible at the site, and that he thought it unlikely that any internal features survive at the site (Bewley 1992, 37-8). No explanation for this statement is provided, but it may be related to the fact that the site has been ploughed almost continuously since the 1940s. Nevertheless the scheduling states that 'further evidence of the monument's defences and the nature of settlement within the hillfort's interior will survive (Scheduled Monument Description). The Phase 2 survey recorded the remains of the hillfort (107) as consisting of a very slight raised area nearing the crest of Swarthy Hill (Figure 5.35. The ditches did not have



any convincing surface expression, although a slight depression was noted that may coincide with the location of the inner ditch. The cliff face on the northwestern side of the monument appeared relatively stable and showed dense vegetative growth. However a moderately sized section of subsidence was noted at the top of the cliff at the time of survey, indicating that landslips are a risk to this monument (Figure 5.136).



Figure 5.135 Recording the remains of Swarthy Hill Hillfort, looking southeast.



Figure 5.136 Subsidence at the top of the cliff on which Swarthy Hill Hillfort sits, looking southwest.

#### *5.14.5 Roman*

The Phase 2 survey of Swarthy Hill did not record any remains of Roman Tower/Milefortlet 20B as the site is not visible as a surface feature.

Around 340m southwest of the hillfort, the survey recorded the excavated and partially reconstructed remains of a Roman milefortlet 21 (87). This site is a Scheduled Monument (27743) and lies within the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'. It is recorded in the Cumbria HER (HER: 837) and was mapped as part of the Hadrian's Wall NMP (NRHE: 1030618).

Prior to excavation of this site, a resistivity survey of the area was conducted. This was hampered by the geological and pedological characteristics of the site, however the outer ditch of the milefortlet was discernible as well as an axial gravel road (Turnbull 1998, 65). Excavations of the whole of the interior, the ditch, and the rampart were undertaken in 1990 and 1991, with a limited exploration of the area outside the milefortlet to establish the presence or absence of further features in the vicinity of the site (Turnbull 1998, 65). The excavations established that the site had only one period of construction and occupation in the early Hadrianic period beginning in c.125 AD, with abandonment c.140AD (Turnbull 1998, 104).

The Phase 2 survey recorded the remains of the Milefortlet 21 (87) as consisting of the well-maintained, partially reconstructed earthwork remains of a Roman milefortlet measuring c.45m x c.40m externally (Figure 5.137). The excavation of the site showed that the rampart was constructed of turf revetting a sand bank (Turnbull 1998, 68-9) and these remains have been reconstructed at the site inside the perimeter ditch which has been emptied of all fill. The entrance to the site is marked by timber posts which mirror the excavated evidence of sleeper beams constructed to carry a timber structure of a gateway (Turnbull 1998, 71).



Figure 5.137 Partially reconstructed remains of Milefortlet 21, looking south. Around 1.3km southwest of Milefortlet 21 the survey recorded the remains of Tower 21B (90), known as Brownrigg North Tower. This site is a Scheduled Monument (27717)



and lying within the UNESCO World Heritage Site and is recorded in the Cumbria HER (HER: 839) and was mapped as part of the Hadrian's Wall NMP (NRHE: 8978).

Excavations of the tower were conducted by Bellhouse in 1962 and identified the extent of the roughly square tower, measuring c.6.4m north-south by c.6.2m east-west (Bellhouse 1966). The walls survive to a height of two courses on the east side and one course on the north and south, all of which lie on a foundation of clay and cobbles 1.3m wide and 0.4m deep (Scheduled Monument Description).

The Phase 2 survey recorded the remains Tower 21B (90) as consisting of a slightly raised earthwork platform lying on a natural ridge, on the seaward facing slope of Brownrigg Hill (Figure 1.138). The site is located on private land, under crop, and was not accessed for the purposes of detailed survey, however the ephemeral nature of the remains would most likely not repay further earthwork survey.



Figure 5.138 Ephemeral earthwork remains of Roman Tower 20B, looking east.

#### *5.14.6 Post medieval*

Crosscanonby developed as a salt working centre in the late 17<sup>th</sup> century and evidence of this industry is preserved in the low lying dune system along the coastline. The saltworks was built in 1634 by the Senhouse family of Nertherhall in Maryport and used coal mined at Dearham c.3km south of the site for direct boiling of sea water (Martin 1975, 73). It was a successful site, but salt taxes were very high at this time, and the saltworks was closed down probably in the 1760s (Cranstone 2006, 83).

The Crosscanonby saltworking site is a Scheduled Monument (CU 22), confusingly named 'Allonby Saltworks' (Allonby lies 7km to the northeast), although it is always referred to as Crosscanonby in research works and historical documentation. The site was mapped as part of the Hadrian's Wall NMP (NRHE: 9147) and is recorded in the Cumbria HER (HER: 3061).

A management plan for the site was produced by the Ironbridge Institute in 1995 and seaward defences in the form of gabion walls were erected to protect the remains from coastal erosion in 1996.

The Phase 2 survey recorded the remains of the saltworks (86) as consisting of a large saltpan or horse gin, spoil heaps, a possible brine pond or pit, the foundations of a cistern or water pump and walling associated with workers cottages and stables (Figure 5.139).



Figure 5.139 View of Crossscanonby saltworks taken from Swarthy Hill, looking northwest.

The saltpan or horse gin was the most prominent feature of the site. It consisted of a circular structure measuring  $\approx 18\text{m}$  in diameter and is constructed of cobbled stone walling. This stood to a uniform height of  $\approx 0.5\text{m}$ . This structure is usually interpreted as a salt pan, however Cranstone is sceptical of this interpretation and suggests that the structure may in fact be a horse gin, possibly used to power a pump bringing sea water into the saltworks (David Cranstone *pers. comm.*)

Further evidence of a sea water pump or cistern was recorded in the inter-tidal zone in front of the saltworks. This took the form of a timber trough-like feature measuring  $\approx 1\text{m}^2$  (Figure 5.140). Evidence of the presence of horses at the site is attested by the presence of stables next to workers cottages. These were situated at the base of Swarthy Hill, across the B5300 from the site, and were demolished in the 1970s due to dereliction (Martin 1975, 73). The survey recorded the remains of stone walling possibly associated with the gardens or yards of these cottages, running for a length of  $\approx 60\text{m}$  at the base of Swarthy Hill (Figure 5.141).

Various ash spoil heaps define the surrounding landscape of the saltworks and a possible brine pond or pit was recorded as a depression measuring  $\approx 15\text{m}$  in diameter immediately to the west of the salt pan/horse gin.





Figure 5.140 Timber trough associated with a cistern or pump for Crosscanonby saltworks, looking northwest.



Figure 5.141 Recording the remains of walling associated with workers cottages for Crosscanonby saltworks, looking northeast (scale = 2m).

Around 420m southwest of the remains of Crosscanonby saltworks, further evidence that may be associated with another saltworking site was recorded in the inter-tidal zone and upper shingle beach section. This consisted of a possible timber jetty or scaffold (89)



and a timber trough or conduit (143) respectively. These features (Figure 5.142) are similar to the timber structure identified at Crosscanonby saltworks and may provide evidence for the extension of salt working, or another form of industry, along this stretch of coast. Between the two features the survey also recorded an exposure of eroding glacial till (88). This ran for a length of  $\approx 145\text{m}$  and the erosion of this natural deposit appeared to be linked with the presence of an outflow pipe to the north of these features.

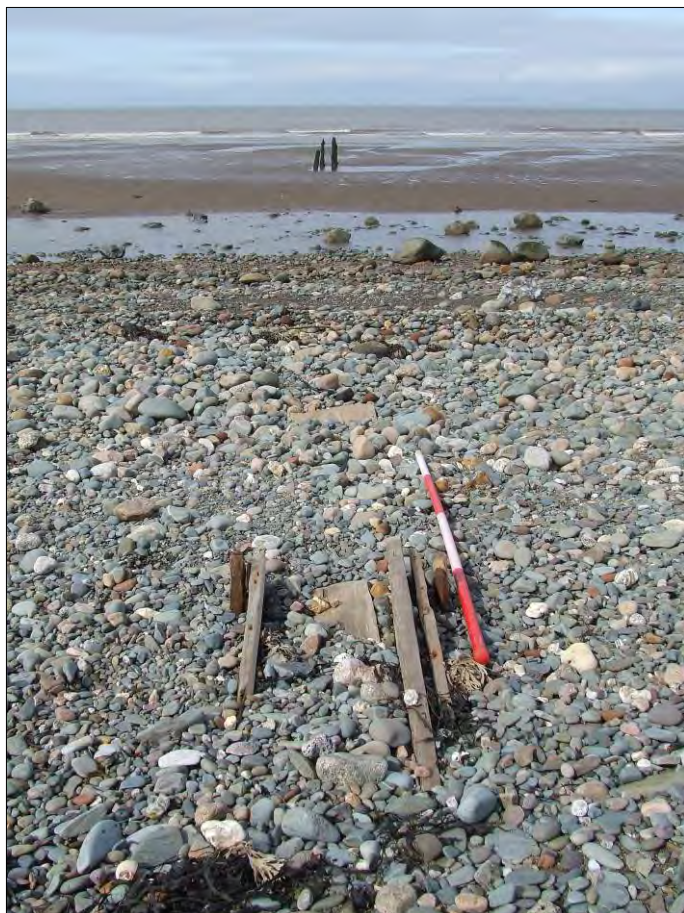


Figure 5.142 Remains of timber jetty or scaffold in the background with the timber trough or conduit in the foreground, looking northwest (scale = 2m).

Around 380m southwest of these remains a short section of an earthwork bank (91) was recorded in the dune system. This ran perpendicular to the shore for a length of 12m. The bank terminated at the B3500 road and did not continue on the other side, suggesting that the bank post-dates and respects the road. The purpose of the bank is not known.

At Allonby,  $\approx 7\text{km}$  northeast of Crosscanonby, a further site identified as a possible salt works (142) was recorded as part of the Phase 2 survey. The survey of this area was assisted by Peter Murphy of English Heritage. No previous record of this site has been discovered during the course of the Phase 2 project.

The remains of the possible saltworks included two large circular water-filled depressions and possible spoil heaps, next to a water channel that appeared to have been trained and embanked (Figure 5.143). The circular depressions each had diameters of  $\approx 19\text{m}$ , making them a similar size to the large salt pan or horse gin at Crosscanonby. The features did not appear to be natural and owing to their coastal location and proximity to the successful saltworks of Crosscanonby they have been interpreted as a post-medieval

saltworking site. The lack of saltmarsh along this frontage suggests that this site would have employed the direct boiling technique similar to Crosscanonby.



Figure 5.143 Recording the remains of a possible post-medieval saltworking site at Allonby, looking south.

#### *5.14.7 Threat from erosion*

The remains recorded in Allonby Bay (86-91, 107, 142-3) lie within policy unit 11e4.3 which recommends 'Managed Realignment' for the following 100 years. This states the aim to 'return to natural shoreline where practicable. Local limited intervention at heritage assess if required' during the next 20 years. The word 'required' changes to 'sustainable' thereafter for a 100 year period (Halcrow 2011).

Allonby Bay is relatively sheltered owing to its position in the outer reaches of the Solway Firth. It is also provided with protection from the resistant headlands at Maryport to the south and Dubmill Point to the north. These promontories act to disperse wave energy within the bay (Halcrow 2011). The shoreline at Allonby village has remained fairly stable over the past century, however erosion has occurred on the shoreline south of the village throughout the same period. In the 1940s a series of holiday chalets were located along the shore at Crosscanonby seaward of the salt pans (Halcrow 2011). These were destroyed in the 1970s and there is currently no land between the salt pans and gabion wall and the beachline. Halcrow state that erosion rates are likely to be  $\approx 1\text{m}$  per year for the area of the salt pans with the most damage occurring during storm events (Halcrow 2011).

Future predictions of shoreline evolution in Allonby Bay state that the resistant promontories at Maryport and Dubmill Point will continue to characterise the shoreline topography of this area, however the embayment will become more pronounced following erosion and dune roll back in the central section. Under current management this will threaten the integrity of the B5300 road which Halcrow suggest should be protected or relocated further inland (Halcrow 2011). NCERM predict a loss of between



20-40m of land in the following 100 years under the current management scenario (NCERM 2012).

In light of this information all of the post-medieval saltworking sites recorded (69, 89, 142-3) are considered to be at immediate and long term risk of coastal erosion. The scheduled remains of the saltworks at Crosscanonby have been provided with specific coastal defences, however it is unclear whether these will be maintained in the 20 - 100 year period. The policy states that these will be maintained only if 'sustainable'. Halcrow's assessment of the risk of erosion to this site makes reference to the defences but states that it is 'at risk of further coastal erosion' (Halcrow 2011). The remaining possible saltworking sites will be entirely destroyed within the next 100 years.

The fate of the Iron Age (107) and Roman (87) remains on Swarthy Hill will be largely dependant upon the maintenance of the seawall for the Crosscanonby saltworks, since this would also protect the B5300 road and the Swarthy Hill cliff face from direct wave action. Nevertheless small scale landslips were noted at Swarthy hill at the time of survey and past erosion of the cliff face was noted during excavation of the hillfort (Bewley 1992). Swarthy Hill Hillfort (107) and Milefortlet 21 (87) are therefore considered to be at risk of coastal erosion in the long term (i.e. within the following 100 years), although Swarthy Hill hillfort is also currently undergoing active erosion in the form of landslips. Halcrow's assessment of the risk of erosion at Swarthy Hill hillfort states that 'the monument is at risk of further coastal erosion' (Halcrow 2011)

The remains of Roman Tower 21B are located c.90m from the shoreline and therefore not considered to be at immediate or longer term risk of coastal erosion.

A final point to note is that the B5300 road follows the projected route of the Roman road from Maryport to Crosscanonby (see Section 5.12.4). A decision to either protect or relocate the B5300 road will therefore have an impact upon any remains of the Roman road that may survive beneath the modern road surface. Geophysical survey at Maryport did indicate that the road turned further inland than this projected route, however it has never been positively identified in the vicinity of Crosscanonby and the projected route is currently the best indication available as to its location. For this reason the Roman road (HER: 12410) is also considered to be at risk of coastal erosion in the medium term (i.e. within the next 50 years)

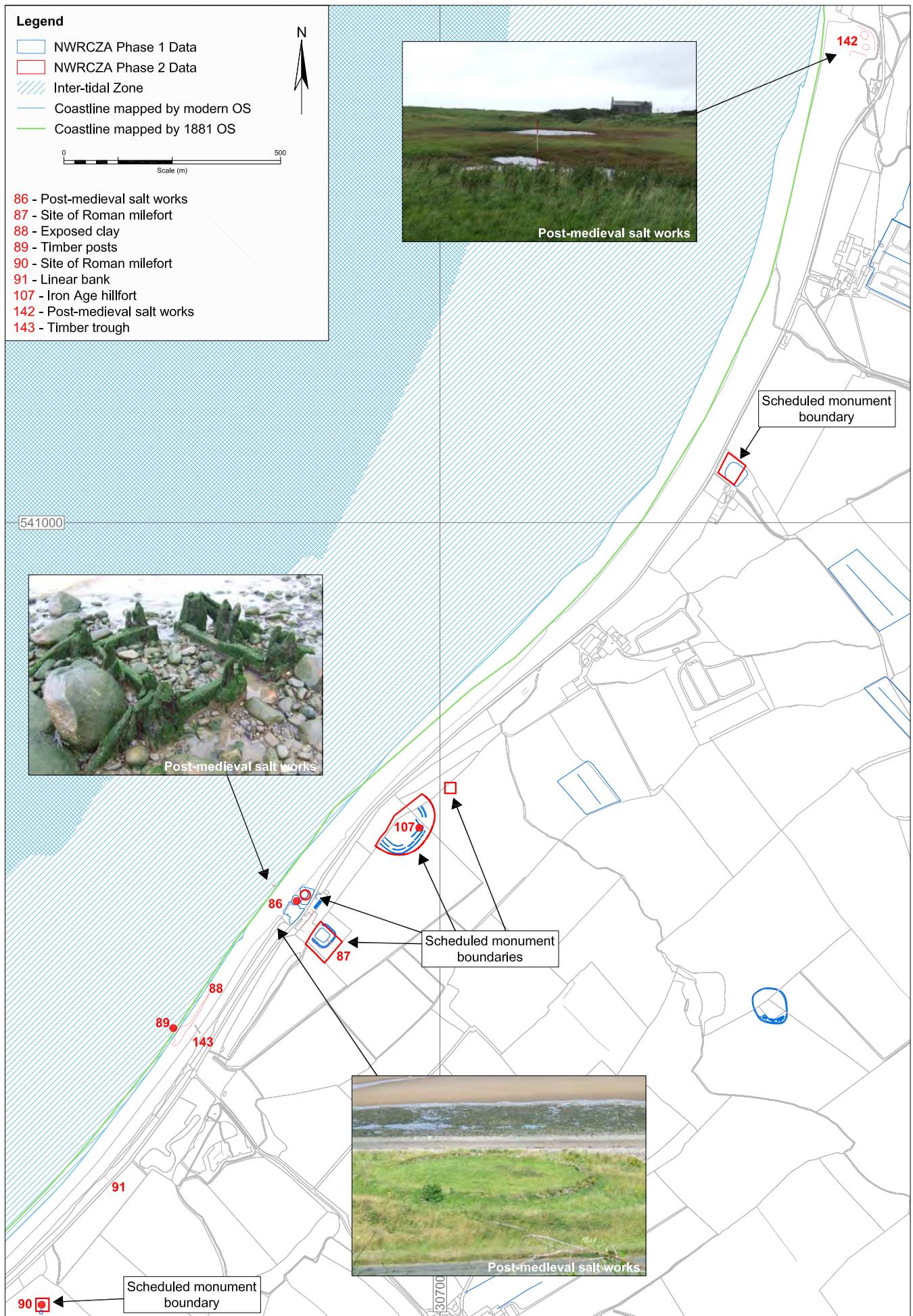


Figure 5.144 Location of sites surveyed at Crosscanonby and Allonby

## 5.15 Mawbray and Beckfoot (Map Figure 5.158)

### 5.15.1 Location and geology

The village of Beckfoot (NY 09054 49583) lies in the outer reaches of the Solway Firth and is c.11km north of Maryport and c.32km southwest of Carlisle. Known settlement in Beckfoot began in the Roman period when the Roman Fort of Bibra was established there as part of the extension of the defences of Hadrian's Wall along the Cumbrian coast. The area had moderate success in the Industrial period with the establishment of a woollen mill along the shore, which was quickly converted into a more successful corn mill. Beckfoot remains populated largely by a rural farming community.

The area around Beckfoot is characterised by a solid geology of Triassic Mudstone, Siltstone and Sandstone with a superficial geology ranging from Quaternary raised marine beach deposits of sand and gravel and Quaternary blown sand and gravels (BGS 2008) (Figure 5.45). The principal soil in the area is Dune Sand which is suited to recreation and very limited agriculture (Farewell 2007). The shoreline along this stretch of coast is unprotected and composed of low lying eroding sand dunes. The inter-tidal zone consists of a wide sand flats with a series of resistant scars composed of relic remains of glacial till deposits, primarily of coarse gravel, cobbles and boulders.

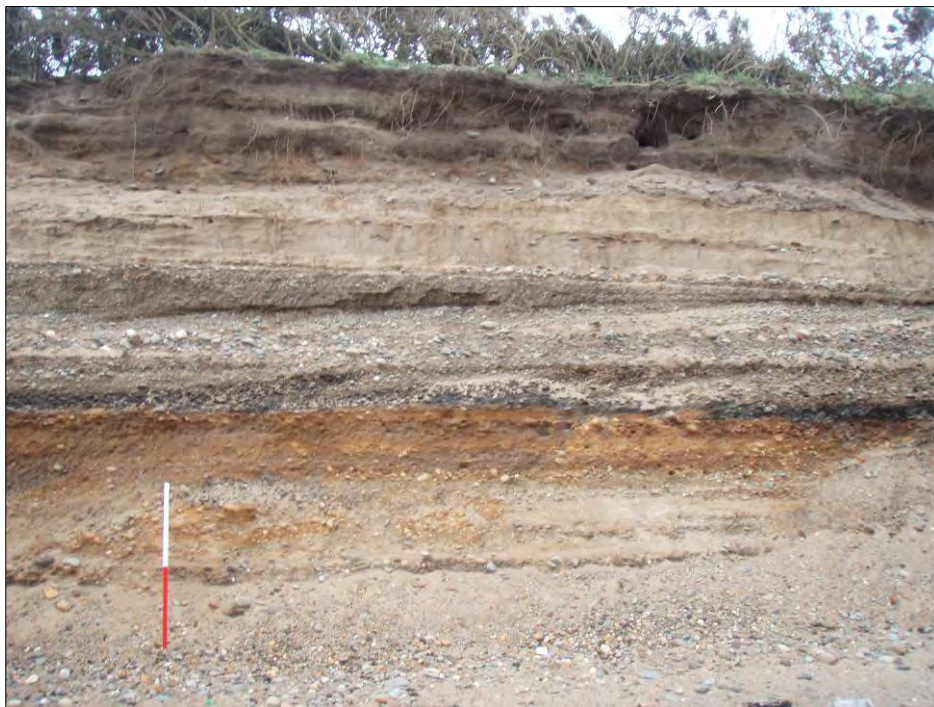


Figure 5.145 Raised beach deposits at Beckfoot, looking east (scale = 1m).

Land use in Beckfoot is divided between stock rearing and agriculture. The shoreline is publicly accessible as part of the Cumbria Coastal Way and is frequented by dog walkers and bird watchers. The area lies within the Solway Coast AONB and the Upper Solway Flats and Marshes designated SSSI.



#### *5.15.2 Previous research*

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It highlighted the Roman cemetery and Milefortlet 15 as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218).

The Roman cemetery at Beckfoot was first noted in 1908 when an urn was discovered in the eroding dune system (Caruana 2004, 136). Sporadic finds of Roman objects continued to be reported throughout the following decades including urn-burials and stone cists (Bellhouse and Moffat 1959, 57-61). In 2009 a complete urn containing the cremated remains of more than one individual was reported to the Portable Antiquities Scheme (Noon 2009, 7) and two further vessels were reported in 2010-2011 (Mark Brennand *pers. comm.*).

The location of Milefortlet 15 was plotted by Bellhouse although initial trial excavations of the site did not produce any results that could be positively identified as a Milefortlet, but may have uncovered the east corner of a turf structure (Bellhouse 1955, 47). The site was scheduled in 1978 (CU 258), but by 1980 the site was thought to have been lost to coastal erosion (Bellhouse 1989, 47-8).

English Heritage conducted a geophysical survey of the area in 2005 in order to characterise the remains of the cemetery inland from the eroding dune face and to identify the remains, if any, of Milefortlet 15 (Martin 2005, 2). This was to inform the development of a planned evaluation excavation at the site. The survey identified a series of anomalies that may have been funerary pyres or burial pits, but did not locate any remains of the milefortlet (Martin 2005, 4). Although a large rectangular area of high resistance anomalies was identified, it was considered too large to be a standard milefortlet (Martin 2005, 5).

Twelve trenches were excavated in the area of the cemetery and milefortlet in 2006 by Oxford Archaeology North. These recorded the remains of eight cremation burials, four of which were excavated, dating to the 3<sup>rd</sup> century (Healey 2007, 1-17). The excavations did not recover any remains of the milefortlet itself (Healey 2007, 17).

The cemetery is recorded in the Cumbria HER (HER: 591), and lies within the buffer zone of the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'. It is not a Scheduled Monument. The milefortlet is recorded in the Cumbria HER (HER: 590) and is a Scheduled Monument (CU 258). It is included in the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'.

#### *5.15.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Beckfoot involved a walkover of publicly accessible land along the shoreline and within the sand dune system.

#### *5.15.4 Prehistoric*

The palaeoenvironmental survey of Beckfoot recorded the remains of exposed glacial till (101, 102) and peat (242). The peat was sampled for palynology and radiocarbon dating and the results of this assessment are presented in Chapter 6.

#### *5.15.5 Roman*

Erosion of the dune system at Beckfoot has been ongoing since at least the earliest Ordnance Survey mapping and has been measured at a rate of c.0.3m per year (Noon

2009, 7). The Phase 2 survey recorded the line of exposed eroding dune face in the vicinity of the cemetery and Milefortlet 15 on two separate occasions, in order to assess the rate of change at this site. The first recording was conducted in August 2011 (100) when the line of erosion was measured along the base and top of the exposed dunes. A follow-up recording, after the winter, in April 2012 (241) showed that the base of the dune face had retreated as much as 2.45m in places, although the measurement was complicated by the fact that the dune face had been machine scoured in the intervening period (see further discussion below). Areas of natural erosion had retreated by  $\approx 0.7$ m. These measurements (100, 241) provide a base line against which further erosion of the dune face can be measured.

In August 2011 the dune face at Beckfoot showed signs of active coastal erosion and slumping of material from the top of the cliff face to the base. There were moderate levels of vegetative growth (Figure 5.146).



Figure 5.146 Dune face erosion at Beckfoot August 2011, looking north.

During visits in August and September 2011 (the latter with the assistance of Peter Murphy of English Heritage), two possible cut features were recorded in the eroding dune system (99, 125). The first (99) had the appearance of a post hole measuring 0.57m across with a depth of 0.49m (Figure 5.147). The fill of the cut feature was homogeneous and largely indistinguishable from the palaeosol which it appeared to have been cut into. This feature lay within the scheduled area of Milefortlet 15.

The second feature (125) had the appearance of a possible pit or post hole measuring 0.47m across with a depth of 0.38m (Figure 5.158). The fill of this feature was a fine silty sand, darker than the palaeosol above which appeared to overlie the feature. This feature lay  $\approx 10$ m outside the southern boundary of the scheduled area of Milefortlet 15 and was therefore sampled for dating evidence. This was subjected to flotation in a 500 $\mu$ m sieve by Archaeological Research Services Ltd. (ARS Ltd), however no datable residues were recovered.



In October 2011 the dune face had a similar appearance, but with less vigorous vegetative growth. Evidence of recent metal detecting and footprints leading up to the exposed dune face were noted (Figure 5.149).



5.147 Cut feature in the eroding dunes at Beckfoot (99), looking west (scale = 2m).



5.148 Cut feature in the eroding dunes at Beckfoot (125), looking southwest.

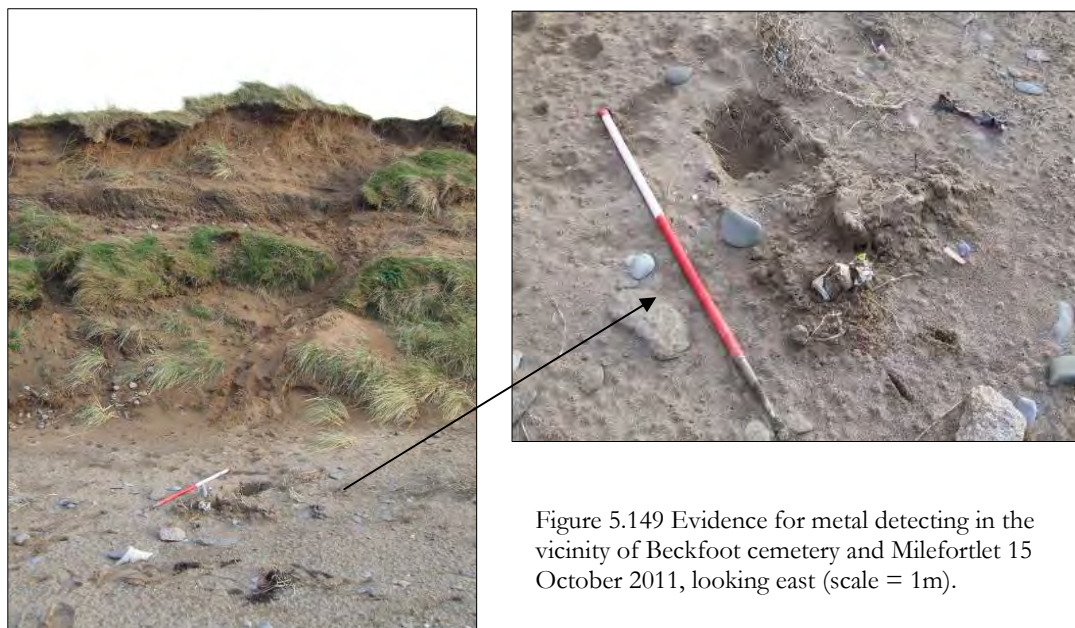


Figure 5.149 Evidence for metal detecting in the vicinity of Beckfoot cemetery and Milefortlet 15 October 2011, looking east (scale = 1m).

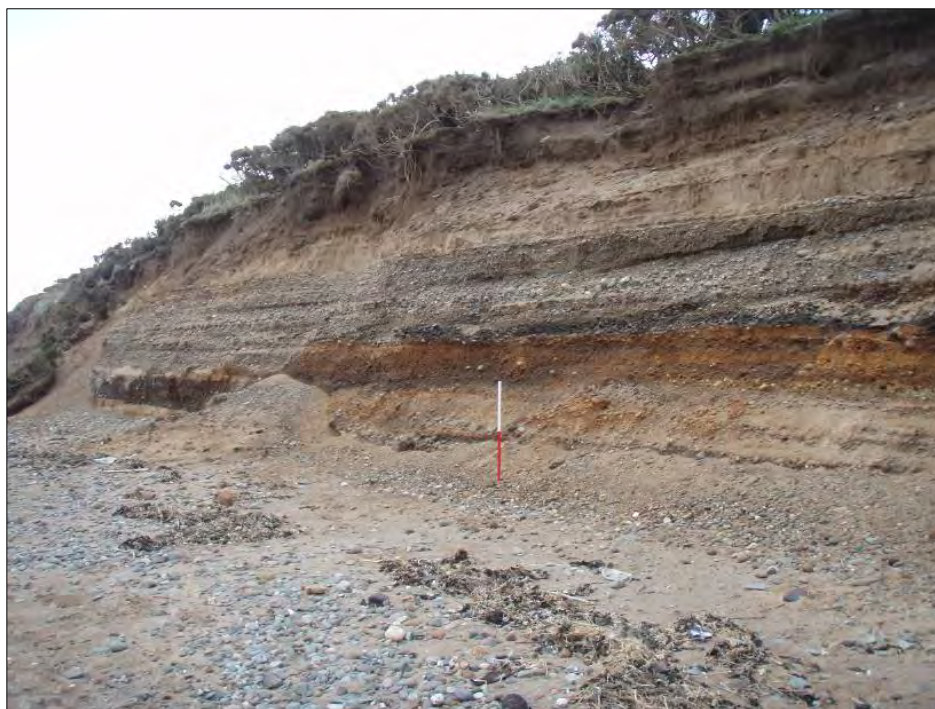
In March and April 2012 preliminary work for the construction of gabion walling to protect the B5300 road at Beckfoot was undertaken in the dune system (Brian Irving *pers. comm.*). It was the opinion of the project team that this involved the machine scouring of the dune face to a vertical surface (Figure 5.150), however Cumbria County Council deny that any machining has taken place (Mark Brennand *pers. comm.*). Netting was subsequently installed to deter nesting birds (Brian Irving *pers. comm.*). This apparent work was conducted prior to the submission of a planning application (No: 02/2012/182) and did not benefit from archaeological monitoring (Mark Brennand *pers. comm.*). At the time of writing, the planning application is awaiting determination. Mike Collins of English Heritage provided a response to the application outlining concerns regarding the exacerbation of erosion that may be caused at either end of the proposed defences. He suggested a system of archaeological monitoring following the completion of site works. There is currently no recommendation for archaeological monitoring during the installation of the gabion walling as the walling is said to affect only the lower beach deposits.

In March 2012 the freshly exposed/machine-scoured dune face exposed the sediment sequence of raised beach deposits (Figure 5.150). The apparent machined area lies immediately to the north of the scheduled boundary of Milefortlet 15. The cut features recorded previously (99, 125) were not effected by the machining, but could not be re-located, suggesting that they had been lost to erosion in the intervening period.

In April 2012 netting was installed to deter nesting birds from the freshly exposed dune face. The exposed area showed signs of significant slumping of material from above the raised beach deposits (Figure 5.151). This is the level where the archaeologically sensitive remains of the Roman cemetery are generally found and the loss of this material, without a formal archaeological monitoring system in place, is a cause for concern. Although the installation of gabion walling is said to directly affect only the lower beach deposits, it is clear from site photography that the work has caused the slumping of material from above that level in archaeologically sensitive areas. It is recommended that any further works in relation to the development will be subject to archaeological monitoring.



The Phase 2 survey did not recover any artefactual remains associated with the cemetery or milefortlet from the eroding dune face.



5.150 Machine scoured, vertical dune face March 2012, looking northeast (scale = 1m).



5.151 Machine scoured dune face April 2012, showing significant slumping of material from above the raised beach deposits, looking northeast.

Within the dune system behind the erosion scar, the survey recorded possible earthwork remains associated with Milefortlet 15 (103) and a possible Roman road/trackway (104).

The earthwork remains identified as the milefortlet consisted of a rectilinear raised area in the dune system demarcated by a possible ditch on the south side and the possible Roman road or trackway on the east side. The raised area (103) measures c.60m north-south and c.30m east-west, where traceable (Figure 5.152). The site of the milefortlet was visited by Keith Blood and Colin Lofthouse of RCHME in 1993 with a view to surveying any remains, however they did not locate any remains that they interpreted as the milefortlet. The raised area recorded may therefore be a natural feature, but its location within the scheduled area of the milefortlet and its condition as a partially eroded rectilinear area, implies that this was the feature originally observed by Bellhouse in 1954.

The raised area is smaller than the scheduled area, but extends beyond its southern boundary by a maximum of c.15m. It is comparable in size to the excavated Milefortlet 21 on Swarthy Hill (see Section 5.14.5). Further evidence in favour of this feature being identified as the remains of the milefortlet comes from a reassessment of the interpretation of the geophysical survey of this site, in particular the results of the resistivity survey. This identified an area of high resistance that coincides with the earthwork remains recorded. Martin states that 'several areas of high resistance have been recorded to the south. These could relate to building foundations, but may be due to variations in drainage caused by the local geomorphology' (Martin 2005, 4). This combination of earthwork remains and high resistance geophysical anomalies, points towards this being an area of archaeological significance, possibly as Milefortlet 15, and argues that it has not been entirely lost to coastal erosion as previously thought. The trenches excavated in 2006 by Oxford Archaeology North (Healey 2007) were located in areas that may have missed these earthwork remains, as well as the remains of the possible Roman trackway to the west.



5.152 Possible remains of Milefortlet 15 showing the possible east-west aligned ditch to the left and the raised area to the right, looking west (scale = 2m).



The remains of a possible Roman road or trackway (104) were recorded defining the eastern side of the raised area, between it and the modern B5300 road (Figure 5.153). This feature was recorded for a length of 100m, but extended beyond this recorded section to the south. It was a prominent feature that may have been artificially emphasised by the build-up of the adjacent modern road. Again, this feature was noted in the geophysical survey of the site which states ‘a linear area of raised readings runs to the east of the above mentioned anomalies and may correlate with a topographic depression in the dunes...it may be evidence of a route or track-way here’ (Martin 2005, 4).



5.153 Possible Roman road or trackway looking south.

Around 625m to the south of Milefortlet 15, the phase 2 survey recorded the remains of Roman Tower 15A (105). This site is a Scheduled Monument (27714) and lies within the UNESCO World Heritage Site ‘Frontiers of the Roman Empire (Hadrian’s Wall)’. It is recorded in the Cumbria HER (105), but was not mapped as part of the Hadrian’s Wall NMP.

This site was excavated by Richard Bellhouse in 1954 when he discovered the foundations of a Sandstone tower measuring  $\approx 6\text{m} \times 6\text{m}$ . The east wall survived two courses high, though only clay and cobble foundations of the other walls remained (Bellhouse 1954, 36-40). A doorway was discovered in the northeast corner of the tower that suggests two phases of construction or repair. Pottery associated with the first phase was Hadrianic in date (117-138) and the second phase remains undated. The site appeared to have been deliberately demolished (Bellhouse 1957, 18-21).



The Phase 2 survey recorded the location of the tower (105) as the highest point in the surrounding dune system (Figure 5.154). This was a natural sub-circular mound of consolidated sand with a diameter of c.50m at the base. The tower was located on the top of this prominence, however no remains of the tower were observed at the time of survey. As with the nearby cemetery site, the tower is at risk of metal detecting and active detecting was observed at the time of survey.



5.154 Site of Roman Tower 15A (scale = 2m).

#### *5.15.6 Medieval*

The Hadrian's Wall NMP mapped the remains of a medieval/post-medieval fish trap (120) at Mawbray, south of Beckfoot (NRHE: 9066). The Phase 2 survey recorded these remains as a degraded stone-built, wide V-shaped fish trap, extending into the inter-tidal zone (Figure 5.155). The remains were only visible at extreme low tide and were not accessible for the purposes of detailed investigation. The trap is similar to those recorded at Nethertown and St Bees and is therefore interpreted as medieval in date.

#### *5.15.7 20<sup>th</sup> Century*

The dune system to the south of Beckfoot cemetery and Tower 15A, the Hadrian's Wall NMP mapped a pair of Second World War bombing range markers (NRHE: 1400748). The Phase 2 survey ground-truthed the aerial photography transcription and recorded the two bombing range markers (116, 117) and a possible ruined pillbox (115).

The bombing range markers were constructed of concrete, laid out to form an arrow when viewed from above. Each arrow has three concrete circles laid out on their nodal points and two rectangular concrete bands to the rear. The northernmost arrow (116) was smaller than that to the south. It measured 10m in length as opposed to the southernmost arrow (117) which measured 25m in length. The remains of these features were relatively well-preserved with limited intrusion of vegetation (Figure 5.156).



5.155 Medieval fish trap at Mawbray, looking northwest.



5.156 Bombing range marker arrow (117) in the dunes south of Beckfoot, looking northeast (scale = 2m).

The remains of a possible ruined pillbox (115) were also recorded  $\approx 30\text{m}$  to the west of the bombing range markers. This was most likely to be a feature associated with the range markers, but its exact purpose is not known. The remains consisted of a concrete base for a structure measuring  $\approx 3.5\text{m} \times 2\text{m}$  (Figure 5.157).





Figure 5.157 Base of a Second World War structure south of Beckfoot, looking southwest (scale = 2m).

#### 5.15.8 Threat from Erosion

The remains recorded at Beckfoot and Mawbray (99-105, 115-117, 120, 125, 241-242) lie within policy unit 11e5.1 which recommends 'Managed Realignment' for the following 100 years. This states the aim to 'allow continued natural coastal evolution with localised limited intervention to manage risk to assets whilst adaptation is considered' and argues that the 'managed realignment policy will allow for adaptation measures and/or recording at the undesignated Roman cemetery at Beckfoot, where there is ongoing erosion' (Halcrow 2011).

The undefended coast at Beckfoot is provided with some protection against erosion in the form of resistant scars (Dubmill Scar, Catherinehole Scar, Lowhagstock Scar, Lee Scar, Beck Scar and Stinking Crag), in the inter-tidal zone that serve to dissipate wave action to some degree (Halcrow 2011). However, as the frontage lies within the outer reaches of the Solway Firth estuary, the behaviour of the shoreline is influenced by the channel and bank movements within the estuary, which can significantly influence the degree of exposure of the shoreline. Halcrow state that erosion of the shoreline appears to occur only during storm events, however local observations suggest that the area south of Beckfoot has eroded by c.20m since the 1950s (Halcrow 2011). This erosion is linked to the shoreward movement of the eastern Solway Firth (Swatchway Channel) resulting in a narrowing of the inter-tidal area (Halcrow 2011).

Existing predictions of future shoreline evolution state that under the unconstrained scenario the shoreline will move towards dynamic equilibrium by a widening of the estuary mouth, landward movement of the channels and erosion of the dune system. Under managed realignment the presence of defences at Dubmill Point in the south and Silloth to the north will artificially hold the shoreline seaward of its natural equilibrium position and will lead to coastal squeeze as sea levels rise and the natural sediment supply is cut off by the defences. Sea level rise will also limit the effectiveness of the resistant scars as they become submerged and can no longer influence the shoreline position.



NCERM predicts a loss between 20m and 40m in the following 100 years under the current management scenario (NCERM 2012).

In light of this information all of the sites recorded in Beckfoot are considered to be at long term risk of coastal erosion (i.e. within the next 100 years). The Roman cemetery (100), the scheduled Milefortlet 15 (103) and the medieval fish trap at Mawbray (120) are considered to be at ongoing and immediate risk of coastal erosion.

The changes that have taken place at Beckfoot cemetery (100) over the course of the present project show how much change and damage can occur at such a monument in a single year, both through natural and human processes. This serves to highlight the level of risk to these sites going forward. The cemetery site (100) and possible remains of Milefortlet 15 (103) are of national significance and these will suffer increased damage as each year passes. The construction of temporary gabion walling at the cemetery site, may arrest coastal erosion for the following 25 years, however there is a danger of the exacerbation of erosion at either end of the defences. This is due to be monitored by English Heritage.

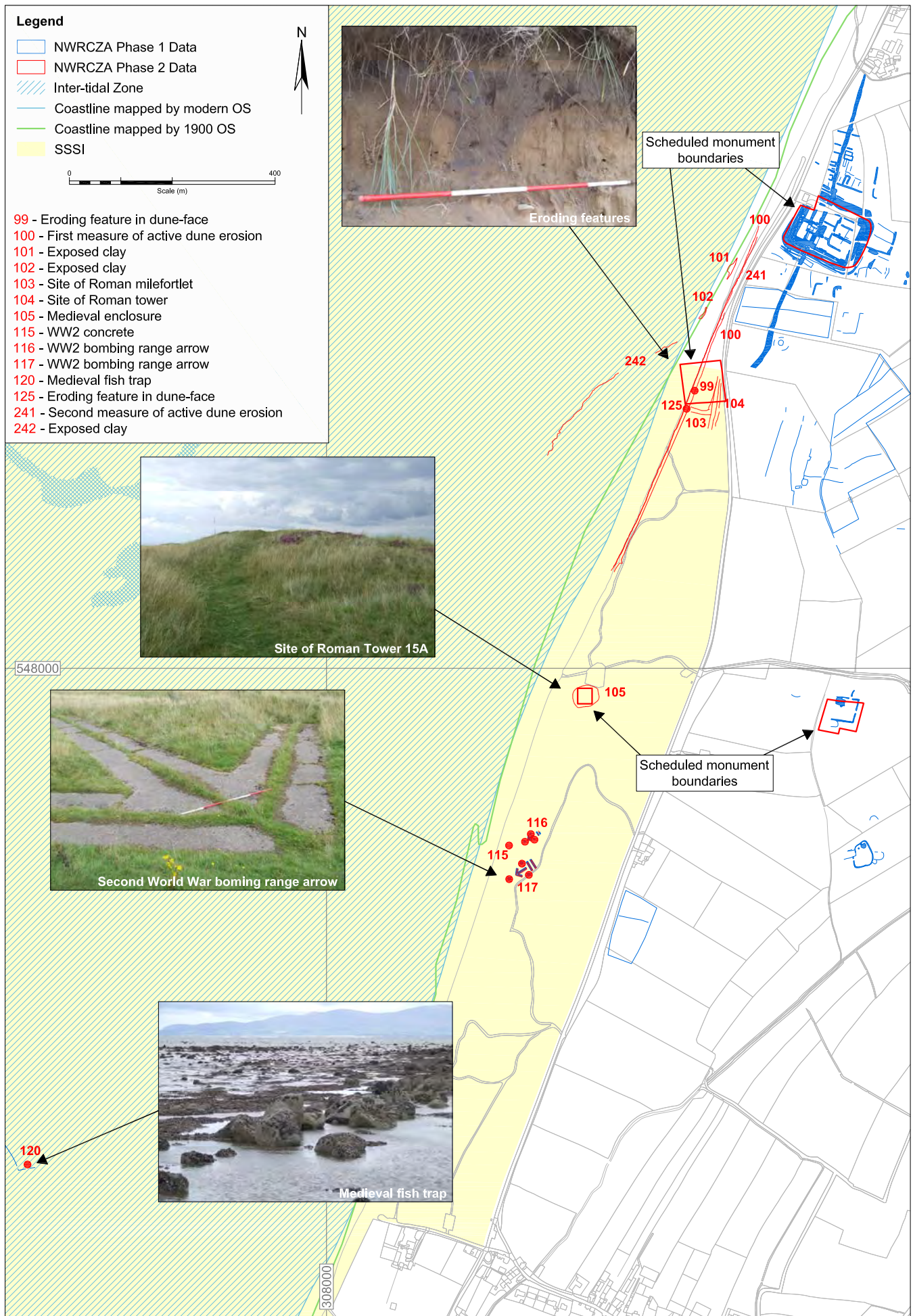


Figure 5.158 Location of sites surveyed at Mawbray and Beckfoot

## 5.16 Skinburness and Moricambe (Map Figures 5.183 – 5.185)

### 5.16.1 Location and geology

Skinburness lies on a low lying peninsula known as the Grune (NY 13124 56358) at the mouth of Moricambe Bay. It is c.24km west of Carlisle and c.1.2km northeast of Silloth. It is a small residential hamlet that serves the town of Silloth to the south. Moricambe Bay is an estuarine system that covers an area of 14km<sup>2</sup> between The Grune and Newtown Arlosh. Until the development of the ports at Silloth and Port Carlisle, to the northeast, Skinburness was an important anchorage and was used as a base by King Edward I's troops in his wars against Scotland in the late 13<sup>th</sup> century (Dodd 2007, 3).

The Grune is composed of a solid geology of Triassic Mudstone, Siltstone and Sandstone with a superficial geology of Quaternary raised marine deposits of sand and gravel. The geological characteristics of Moricambe Bay are similar with an outcropping of superficial Devensian Diamicton Till in the northeast corner of the bay (BGS 2008). The principal soil on The Grune is defined as Deep Sandy (Farewell 2007), whilst around the southern side of Moricambe Bay, extensive saltmarsh known as Skinburness Marsh and Newtown Marsh, has developed in the protective lee of the peninsula. Deep sandy soil types are suited to cereal and permanent or short term grassland, whilst saltmarsh is more suited to stock grazing and recreation (Farewell 2007). The shoreline along the Grune peninsula is unprotected with an inter-tidal zone consisting of an upper shingle beach and lower sand flats. The southern side of Moricambe Bay, between Skinburness and Sea Dyke End Farm, is protected by an earthen sea dyke that originated in the medieval period (Fletcher and Miller 1997, 206). This has seen several periods of repair, but runs for a length of c.1.6km (Figure 1.159). The remaining shoreline is unprotected, except for the saltmarsh which offers some natural protection to the low lying hinterland. The coast road in this area is known to flood at extreme high tides.



Figure 5.159 Shoreline at Skinburness Marsh showing the earthen sea dyke of medieval origin in the background (scale = 1m).



Land use in Skinburness and Moricambe is divided between residential and stock rearing, particularly on the marshes which are used for sheep grazing in the summer months and cattle grazing in the winter. The shoreline is publicly accessible as part of the Cumbria Coastal Way and is frequented by dog walkers and bird watchers. The area lies within the Solway Coast AONB and the Upper Solway Flats and Marshes designated SSSI.

#### *5.16.2 Previous research*

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It highlighted the medieval port and St John's Chapel at Skinburness as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218). Further consultation with project partners and local authority archaeological officers highlighted the potential medieval and post-medieval saltworking sites within Moricambe Bay which are currently ill understood and potentially under threat of coastal erosion. A survey of saltworking sites was therefore included in the Phase 2 survey.

The earthwork remains of the medieval port at Skinburness were mapped as part of the Hadrian's Wall NMP (9637) which suggested the survival of buried walls and building foundations. The site is not recorded in the Cumbria HER and no further investigation has been undertaken. The Phase 2 survey therefore aimed to assess the character and condition of any surviving upstanding remains.

St John's Chapel in Skinburness is known from historical sources and is recorded in the Cumbria HER (HER: 345). No modern investigations of this site have been undertaken, however excavations in the 19<sup>th</sup> century are said to have been abandoned due to the large number of burials encountered at the site. The chapel was said to be ruinous in 1704 and no standing remains are now present at the site (NMR Description).

#### *5.16.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Skinburness and Moricambe involved a walkover of publicly accessible land along the shoreline and within the saltmarsh system.

#### *5.16.4 Roman*

The remains of Roman Milefortlet 9 and its associated camp were mapped as part of the Hadrian's Wall NMP (9632). The site is a Scheduled Monument (27745) and lies within the UNESCO World Heritage site 'Frontiers of the Roman Empire (Hadrian's Wall)'.

The site is thought to have two main periods of occupation, based on the aerial photography which appears to show one milefortlet lying partially on top the remains of a second, earlier milefortlet. No further investigations of the site have been undertaken and the Scheduled Monument description states that 'the monument will retain undisturbed archaeological deposits and will contribute to any further study of the Roman frontier defences along the Cumbrian coast' (Scheduled Monument Description).

The Phase 2 survey recorded the remains of the milefortlet and camp (96) as consisting of a series of undulations in the field where they have been mapped from aerial photography (Figure 5.160). The remains were ephemeral and non-diagnostic. Local knowledge states that the site is visited regularly by metal detectorists, which may lead to the loss of significant archaeological deposits and contextual information.



Figure 5.160 Ephemeral earthworks of Roman Milefortlet 9, looking southeast.

#### 5.16.5 Medieval

The village and port of Skinburness was originally founded as a grange of the Cistercian Abbey of Holm Cultrum in 1175. It developed as an important trading port for the abbey's wool production and also served as the base from which Edward I launched his campaigns into Scotland in the late 13<sup>th</sup> century (Dodd 2007, 3). In 1301 the grange was granted borough status, and the right to hold a weekly market for all merchants, English and foreign, except his enemies (Grainger and Collingwood 1929, 95-96). At the same time the Bishop of Carlisle granted permission for the foundation of the parish church of St John to serve the requirements of the newly proposed borough. By 1305, however, the town and its access road were described as having been washed away by the sea and the market town was moved to nearby Newtown Arlsoh, also a grange of Holm Cultrum Abbey (Grainger and Collingwood 1929, 95-96).

The Phase 2 survey recorded the possible remains of the port and village (98) as well preserved earthworks consisting of linear banks, building platforms and a hollow way leading from the remains, southwest towards the mainland.

The linear banks were the most prominent feature of the monument and these were also recorded in the Hadrian's Wall NMP. A series of banks were recorded demarcating four enclosed areas aligned northwest to southeast abutting the shoreline (Figure 5.161, 5.162). The enclosures cover an area of  $\approx 105\text{m} \times \approx 30\text{m}$  and show evidence of previous erosion and subsequent accretion at the shoreline. The purpose of the enclosed area is uncertain, they most likely relate to the port as they are aligned along the shoreline, however they may also be the remains of a croft associated with the village.

Immediately to the northwest of the enclosure the survey recorded the remains of two possible building platforms measuring  $\approx 70\text{m}^2$  and  $\approx 90\text{m}^2$  respectively (Figure 5.163). The



Hadrian's Wall NMP recorded the remains of a further three building platforms, however these were not visible as surface features at the time of survey.



Figure 5.161 Remains of a series of enclosed areas at Skinburness port/village, looking southeast.



Figure 5.162 Recording the remains of well-preserved enclosed areas at Skinburness port/village, looking north (scale = 2m)



Figure 5.163 Remains of well-preserved building platforms at Skinburness port/village, looking south (scale = 2m)

To the west of the building platforms a possible hollow way was recorded running from the site towards to the mainland in the southwest (Figure 5.164). It follows the line of the current footpath and was recorded for a length of  $\approx 120\text{m}$ , but extended beyond this recorded length.



Figure 5.164 Remains of well-preserved hollow way at Skinburness port/village, looking south.



To the west of the enclosures, platforms and hollow the fields also contain earthwork remains that may be associated with the medieval village, or may be post-medieval field boundaries (Figure 5.165). No remains of St John's Chapel were recorded as part of the survey.



Figure 5.165 Remains of further earthwork remains in fields to the west of Skinburness port/village, looking northwest.

The survey also recorded the remains of four possible salt working sites of medieval date and five possible saltworking sites of post-medieval date. The dating of these features is difficult, however, and is open to further interpretation.

Brian Irving of the Solway AONB is currently undertaking an investigation into the monastic landscape of the Solway, an important aspect of which is the exploitation of the marshes for salt production (Brian Irving *pers. comm.*). Irving has identified sites which he believes to be the remains of domestic-scale salt production, in the areas of marshland that appear to be medieval in date and where placename evidence points towards salt production. The sites are generally formed of two or more water-filled pools with managed water channels nearby. The suggested process is a form of *sleeching*, whereby pools would be lined with turf, then filled with saltmarsh silts that had been scraped from the surface of the marsh. These would then be saturated with water, before being left to solar evaporation or moved for boiling elsewhere (Brian Irving *pers. comm.*). The turf may have acted as a blotting medium to promote evaporation. This produced poor quality salt which would be collected and used for salting meats and fish (Brian Irving *pers. comm.*). Cranstone states that *sleeching* was the most common method of salt production during the medieval period (Cranstone 200, 13) and Irving has conducted tests on a selection of the identified pools and found them to have a high level of salinity (Brian Irving *pers. comm.*). Irving has identified the location of potential domestic-scale salt production sites using Google Earth<sup>TM</sup> imagery and the Phase 2 survey made use of this technique and identified potential sites to visit using Google Earth<sup>TM</sup>.

Cranstone investigated the salt working sites of the Solway in 2006, but did not identify these types of site as potential salt working locations (Cranstone 2006, 13-18). This was mainly due to it being a different kind of evidence from that found on the North East coast, an area where Cranstone was more familiar with the salt working methods of the region (David Cranstone *pers.comm.*). He now states that a new assessment of the salt working sites of the Solway would be beneficial, but believes that several of the types of site identified here and by Brian Irving may be stock ponds or other features not associated with salt working (David Cranstone *pers. comm.*)

The Phase 2 survey recorded potential medieval salt working sites alongside the Skinburness sea dyke (129, 184) as well as at Anthorn (174, 175).

The Skinburness saltworking sites (129, 184) were recorded with the assistance of Peter Murphy of English Heritage. They consisted of extensive remains of small water-filled pools with an almost gridded system of cut water channels. Site (129) was recorded for a length of  $\approx 225\text{m}$  but extended beyond the mapped area. Four pools were recorded in this system with a general diameter of  $\approx 8.5\text{m}$  (Figure 5.166). Site (184) had a more defined area and was recorded running for a length of  $\approx 90\text{m}$  and had pools up to  $10\text{m}$  in diameter, one of which was rectilinear rather than circular (Figure 5.167).

The Anthorn saltworking sites (174, 175) were less extensive and consisted of single pools, or twinned pools with an associated water channel. These sites are recorded as unknown extents of a medieval salt works in the Cumbria HER (HER: 41696) and the Phase 2 survey has therefore provided an accurate location for these remains. Site (174) consisted of four pools in total; two small pools with a diameter of  $\approx 4.5\text{m}$ , joined by a water channel; and two large pools with a diameter of  $\approx 12\text{m}$ , each with its own water channel (Figure 5.168). Site (175) consisted of a single pool with a diameter of  $\approx 10.7\text{m}$ , and an associated water channel (Figure 5.169).



Figure 5.166 Recording remains of a possible medieval saltworking site (129) on Skinburness Marsh, looking east.





Figure 5.167 Possible remains of medieval saltworking site (184) on Skinburness Marsh, showing rectilinear pool with associated water channel, looking south (scale = 1m).



Figure 5.168 Possible remains of a medieval saltworking site (174) on Anthorn Marsh, looking east (scale = 1m).



Figure 5.169 Recording possible remains of a medieval saltworking site (175) on Anthorn Marsh, looking north (scale = 1m).

The four saltworking sites described above have been placed into the medieval category based mainly upon their size, which is smaller than the sites that have been placed in the post-medieval category. It should be noted, however, that these four sites may be post-medieval in date, and equally some of the sites labelled as post-medieval may actually be of medieval date.

#### 5.16.6 Post-medieval

Five possible saltworking sites of post-medieval date (128, 130, 167-173) were recorded in this area during the Phase 2 survey. These generally consisted of large water-filled pools or saltpans, associated water channels and in some cases associated spoil heaps and other earthwork remains.

Site (128), at Border, was identified by Brian Irving who believes it to be medieval in date (Brian Irving *pers. comm.*). It consisted of a large water-filled pool adjacent to a water channel. A building complex that may be associated with the management of salt working and salt processing was located directly to the south of the site and these buildings are recorded in the Cumbria HER as post-medieval farm buildings (HER: 41475). The water filled pool had a diameter of  $\approx 12\text{m}$  (Figure 5.170).

Site (130), on Skinburness Marsh was located at Sea Dyke End Farm. The survey of this feature was assisted by Peter Murphy of English Heritage. The site has previously been surveyed during an investigation into the sea dyke by Fletcher and Millar in 1997, who identified it as a salt pan (Fletcher and Millar 1997, 210). It is recorded in the Cumbria HER (HER: 41703). The site consisted of a large circular, banked pool with a diameter of  $\approx 30\text{m}$  and an associated water channel (Figure 5.171). Fletcher and Millar recorded the depth of the pool as  $0.75\text{m}$  (Fletcher and Millar 1997, 210). The earthen bank may cover



a stone wall and had a breach linking it to the water channel. This breach must have been a water inlet, possibly controlled with a sluice gate.



5.170 Water-filled pool, possibly being the remains of a medieval/post-medieval salt pan, looking northeast.



5.171 Bank of large post-medieval salt pan at Sea Dyke End Farm (130), looking northwest (scale = 2m).

Site (167) at Salt Coates consisted of a large circular banked pool with a diameter of  $\approx 30\text{m}$ , together with an associated water channel (Figure 5.172). The channel was mapped for a length of  $\approx 62\text{m}$ , but extended beyond the mapped area.





5.172 Large banked, circular salt pan and associated water channel at Salt Coates (167), looking north.

Site (173), southwest of the Parish Church of St John at Newtown Arlosh, consisted of a large circular banked pool with a diameter of at least 30m, together with an associated system of water channels (Figure 5.173). The channels were mapped for a length of c.190m, but extended beyond the mapped area.



5.173 Recording the large circular salt pan and associated water channels southwest of Newtown Arlosh (173), looking southwest.



Sites (168-172), northeast of the Parish Church of St John at Newtown Arlosh, consisted of earthwork remains of an extensive system of salt pans, water channels, a spoil heap, and possible extraction areas. This site is recorded as a medieval salt works in the Cumbria HER (HER: 41699). There were at least seven salt pans consisting of circular and sub rectangular depressions, some of which were water-filled, but other smaller pans were dry (Figure 5.174a). The largest pan had a diameter of  $\approx 30\text{m}$ , with the smallest having a diameter of  $\approx 10\text{m}$ . There was a large spoil heap measuring  $\approx 50\text{m}$  in length consisting of a flat topped mound (Figure 5.174b) and extraction areas consisting of hollowed out areas were also noted. The extraction areas may not be related directly to the salt working industry. This site ran for a length of  $\approx 500\text{m}$  (Figure 5.174c) and was clearly an important, industrial-scale operation.



(a)



(b)



(c)

5.174 (a) Water-filled salt pan (171); (b) flat-topped spoil heap (170); and (c) water-filled depressions and channels (171) (scale = 1m).

Further sites of post-medieval date that were recorded as part of the Phase 2 survey consisted of a possible shipwreck (106), a possible fish weir or jetty (92) and a parallel stone alignment (176).

The shipwreck site (106) was located on the western shoreline of Skinburness, south of the Grune Peninsula. It consisted of a series of nine upright timbers only visible at extreme low tide. The vessel was  $\approx 13\text{m}$  in length and most likely represents the remains of a small fishing vessel (Figure 5.175).



5.175 Remains of possible post-medieval fishing vessel at Skinburness (106), looking west.

Around 950m northeast of the shipwreck site, the survey recorded the remains of a possible fish weir, jetty or groyne of post-medieval date (92). This consisted of eleven upright timber posts, in a linear alignment running seaward for a length of  $\approx 38\text{m}$ , with timbers located either side of the linear alignment at the seaward end, suggesting that the function of the site was to trap fish in nets at this end. The posts were highly degraded and stood to a height of  $\approx 0.7\text{m}$  (Figure 5.176).

The final site recorded of possible post-medieval or modern date, was a parallel alignment of orthostats (176) at Anthorn Marsh adjacent to the medieval salt working sites described in Section 5.16.5. The site is not recorded in the Cumbria HER and its function and antiquity are unknown. The parallel rows of stone orthostats run for a length of  $\approx 25\text{m}$  consisting of 13 stones in total, of both rounded and angular profile, and varying in size. They appear to form an avenue running down to the shoreline (Figure 5.177). It is considered unlikely that a very well-preserved, previously unrecorded, prehistoric stone alignment would exist in this location, although it is possible, but it is currently considered more likely to be of post-medieval or modern date.





5.176 Remains of possible post-medieval fishing weir or jetty at Skinburness (92), looking west (scale = 2m).



5.177 Remains of parallel stone alignment at Anthorn Marsh (176), looking northeast (scale = 1m).

#### *5.16.7 20<sup>th</sup> Century*

Several features dating to the Second World War were mapped on the Grune Peninsula as part the Hadrian's Wall NMP. The Grune was used as a training location alongside the important training base at RAF 22MU Silloth, 2km to the south and was also used as an outlying defence for this airfield. The Phase 2 survey recorded the remains of an air-gunnery range (109), a pillbox (93), demolished buildings or rifle range (97), various trenches (121-123), slit trenches (94, 124) and a weapons pit (95).

The air gunners' range (109) was of similar construction to that recorded on the north end of Walney Island (see Section 5.6.6). However, the Grune example was better preserved consisting of an embanked concrete wall demarcating the target area within. This stood to a height of  $\approx 1\text{m}$  and was recorded as a three-sided structure running for a length of  $\approx 108\text{m}$  (Figure 5.178). The wall most likely continued beyond this measured extent, but was inaccessible due to vegetative cover. A rail track would have been located outside the concrete wall, fitted with mounted machine guns that would be fired into the target area. The earthwork remains of this rail track were also recorded as part of the survey encircling the wall for a length of  $\approx 117\text{m}$  with an offshoot of  $\approx 38\text{m}$  to the east.



5.178 Remains of air gunners' range on the Grune Peninsula (scale = 2m).



Around 1km northeast of the air gunners range the Phase 2 survey recorded the remains of a Second World War pillbox (93). This consisted of a Cumberland Machine-Gun and Anti-Tank Rifle Emplacement ([www.users.globalnet.co.uk/~rwbarnes](http://www.users.globalnet.co.uk/~rwbarnes)). It was a circular structure with a short blast wall over the entrance and a flat concrete roof supported on a central pier (Figure 5.179). It had a diameter of  $\approx 13\text{m}$  and was constructed using concrete sand bags, the hessian of which survives in places internally. A pointed cairn was erected on the roof of the structure as a memorial to four firemen who lost their lives off Grune Point attempting to rescue a wildfowler (later found to be a false alarm).

This site was mapped as part of the Hadrian's Wall NMP (NRHE: 1421476) and is recorded in the Cumbria HER (HER: 4946).



5.179 Cumberland Machine-Gun and Anti-Tank Rifle Emplacement at Grune Point (scale = 2m).

Around 210m southwest of the pillbox the Phase 2 survey recorded substantial concrete and brick demolition waste that was Second World War in character. This appeared to be arranged as a flood defence running for  $\approx 330\text{m}$  along the southeastern shore of the peninsula (Figure 5.180). The origin of these remains may have been the Second World War firing range that was mapped as part of the Hadrian's Wall NMP (NRHE: 1467482), but is now destroyed.

Various Second World War trenches and slit trenches were mapped on the Grune Peninsula as part of the Hadrian's Wall NMP and several features of this type were recorded during the Phase 2 survey. Three slit trenches (94, 95, 124) were recorded on the north of the peninsula consisting of short shallow trenches, large enough to shield a single soldier (Figure 5.178). Site (95) had an accompanying weapons pit, whilst site (124) lay at one end of a more substantial network of trenches (123).

Three sets of Second World War trenches were also recorded (121, 122, 123), of which site (123) was the most substantial. This ran for a length of  $\approx 45\text{m}$  and appeared to be sited to defend the northeastern point of the peninsula (Figure 5.179). The remaining

two trenches (121, 122) were sited to defend the northern shoreline and most likely formed part of a more extensive network of trenches that have not survived.



5.180 Second World War debris used as a flood defence on the Grune Peninsula, looking southwest (scale = 2m).



5.181 Slit trench (94) adjacent to the pillbox (93) on the Grune Peninsula, looking northeast (scale = 2m).





5.182 Recording the Second World War trench network on the northeast end of the Grune Peninsula, looking northwest (scale = 2m).

#### 5.16.8 Threat from Erosion

The remains recorded at Skinburness and Moricambe Bay (92-98, 106, 109, 121-124, 128-130, 167-175, 184) lie in a number of different SMP2 policy units. These are outlined in Table 5.3 below.

Site name	Location	NWRCZA 2 No:	SMP 2 policy unit	SMP 2 policy at this site
Roman Milefortlet 9	Skinburness	96	11e6.3	NAI
Skinburness port	Skinburness	98	11e6.3	NAI
Saltworks	Skinburness Marsh	129	11e7.2	HTL 0-20 years MR 20-50 years HLT 50-100 year
Saltworks	Skinburness Marsh	184	11e7.2	HTL 0-20 years MR 20-50 years HLT 50-100 year
Saltworks	Salt Coates	167	11e7.4	MR
Saltworks	Newtown Arlosh	173	11e7.4	MR
Saltworks	Anthorn	174	11e7.5	MR
Saltworks	Anthorn	175	11e7.5	MR
Shipwreck	Skinburness	106	11e6.2	HTL
Fish trap/jetty/groyne	Skinburness	92	11e6.2	HTL
Saltworks	Newtown Arlosh	171	11e7.4	MR

Saltworks	Newtown Arlosh	170	11e7.4	MR
Saltworks	Newtown Arlosh	169	11e7.4	MR
Saltworks	Newtown Arlosh	172	11e7.4	MR
Saltworks	Newtown Arlosh	168	11e7.4	MR
Stone alignment	Anthorn	176	11e7.5	MR
WW2 air gunners range	Grune Point	109	11e6.3	NAI
WW2 demolition debris	Grune Point	97	11e6.3	NAI
WW2 weapons pit	Grune Point	95	11e6.3	NAI
WW2 slit trench	Grune Point	94	11e6.3	NAI
WW2 pillbox	Grune Point	93	11e6.3	NAI
WW2 trenches	Grune Point	123	11e6.3	NAI
WW2 slit trench	Grune Point	124	11e6.3	NAI
WW2 trenches	Grune Point	121	11e6.3	NAI
WW2 trenches	Grune Point	122	11e6.3	NAI

Table 5.3 Sites recorded as part of the Phase 2 survey in Skinburness and Moricambe Bay.

The sites that lie within SMP2 policy unit 11e6.2 that recommends ‘Hold the Line’ for the following 100 years, are inter-tidal sites that will not be protected by shoreline defences. These sites (92, 106) are therefore considered to be at immediate and long term risk of coastal erosion.

The Grune Peninsula is a long shingle spit and dune system whose existence depends upon both the supply of sediment, and the channel configuration in Moricambe Bay. The shoreline is currently unprotected and the SMP2 recommends a policy of ‘No Active Intervention’ for the following 100 years. Halcrow state that this may lead to breaching and breaking down of the spit in the next 100 years as sea levels rise. This will, in turn, lead to increased exposure and the erosion of saltmarsh within Moricambe Bay (Halcrow 2011). This level of destruction is not predicted by NCERM, however, who state that there will be shoreline retreat on the Grune Peninsula, or within Moricambe Bay (NCERM 2012). The discrepancy between these two scenarios makes it difficult to predict the future shoreline evolution and level of threat to the remains recorded on the Grune and also within the saltmarshes of Moricambe Bay. It can only be assumed that the NCERM predictions relate to the actual shoreline, rather than the loss of the marshland in front, where the majority of the recorded sites are located.

Erring on the side of caution therefore, all of the remains recorded in the Grune Peninsula and Moricambe Bay are considered to be at long term risk of coastal erosion (i.e. within the next 100 years). Within this, the most significant remains are those of the Roman Milefortlet 9 (96), the potential medieval port of Skinburness (98) and the wealth of uninvestigated possible saltworking sites that are currently ill-understood. All of these remains will require recording works prior to their destruction.



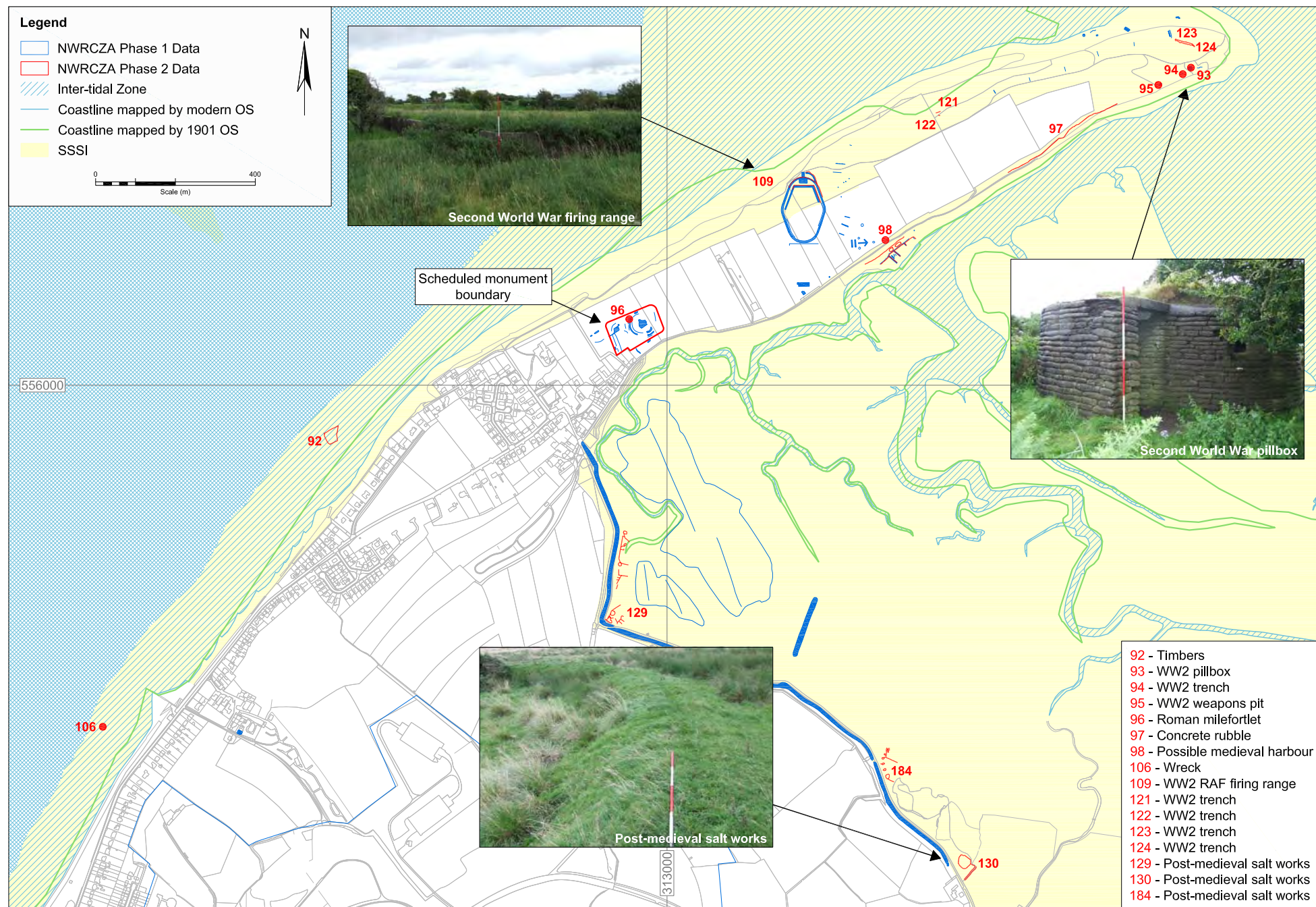


Figure 5.183 Location of sites surveyed at Skinburness



Figure 5.184 Location of sites recorded from Border to Salt Coates



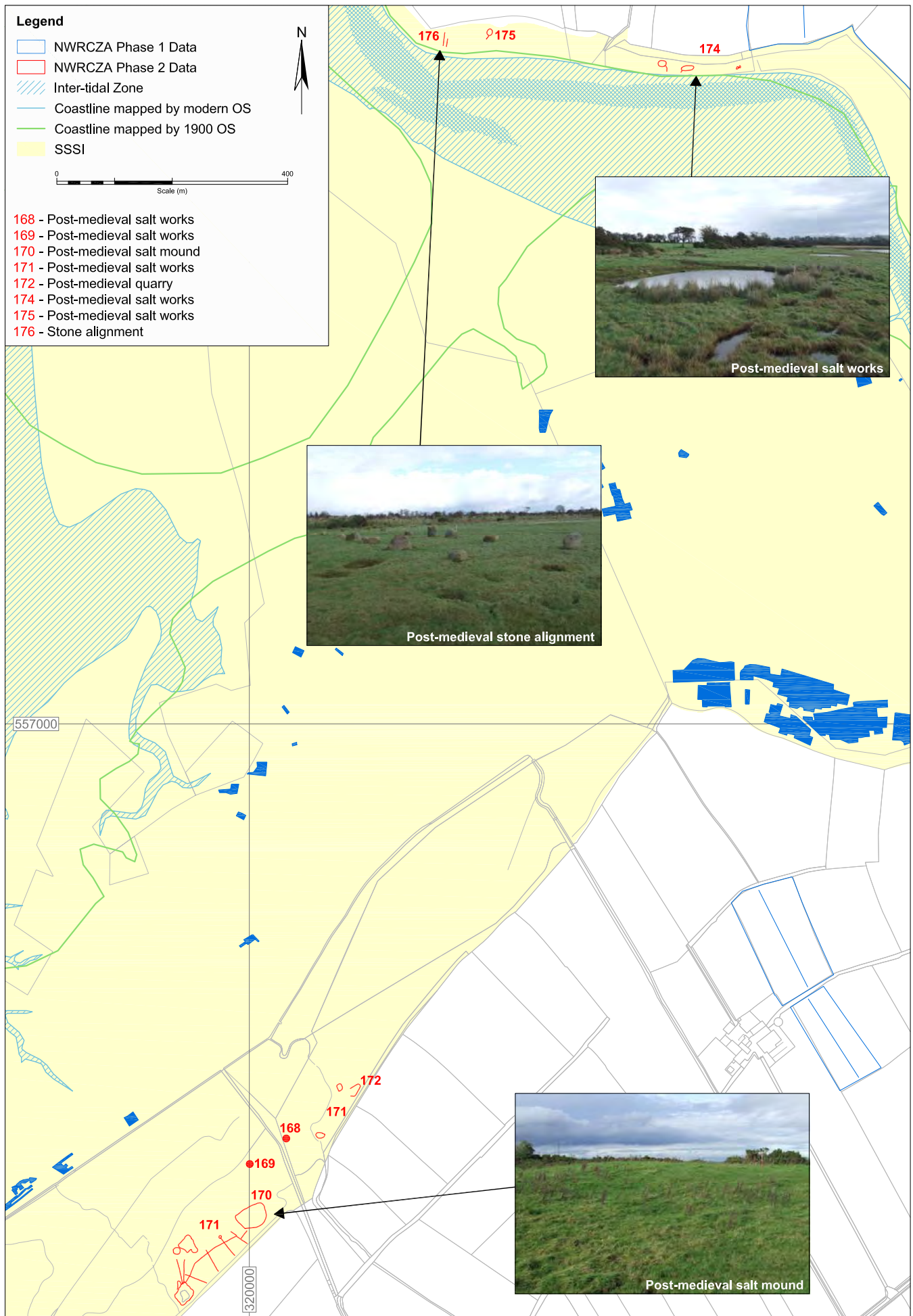


Figure 5.185 Location of sites recorded from Newton Arlosh to Anthorn

## 5.17 Bowness-on-Solway (Map Figure 5.197)

### 5.17.1 Location and geology

Bowness-on-Solway (NY 13124 56358), as its name suggests, lies within the Solway Firth to the east of the remains of the Solway Viaduct. It is c.19km northwest of Carlisle and c.6km southeast of Annan which lies across the Solway. It is a small residential town established in the Roman period as the fort of *Maia* which was the second largest fort on Hadrian's Wall. It now acts as the start/end point of the Hadrian's Wall footpath walk, and is therefore a popular tourist destination.

The area of Bowness is composed of solid geology of Triassic Mudstone, Siltstone and Sandstone with a superficial geology of Quaternary Raised Marine Deposits of sand and gravel with outcroppings of superficial Quaternary Diamicton Till (BGS 2008). The principal soil in the area is Seasonally Wet Deep Silty which is suited to cereal and permanent or short term grassland (Farewell 2007). The shoreline in Bowness and westwards towards Port Carlisle is protected by a sea wall which is higher around Bowness to protect housing and infrastructure in the village. To the west it protects the coast road which is liable to flooding during extreme conditions. The sea wall backs on to a narrow shingle and sand inter-tidal zone with limited areas of saltmarsh accumulation (Figure 5.186).



Figure 5.186 Shoreline west of Bowness-on-Solway showing a concrete and stone sea wall and upper shingle beach section.

Land use in Bowness is divided between residential and stock rearing in the surrounding countryside. The shoreline is publicly accessible as part of the Cumbria Coastal Way and is frequented by walkers, dog walkers and bird watchers. The area lies within the Solway Coast AONB and the Upper Solway Flats and Marshes designated SSSI.



#### *5.17.2 Previous research*

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It highlighted the Roman Road at Bowness and the Roman Temporary Camp at Knockcross as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218-219).

Both the Roman Road and the Roman Temporary Camp were mapped as part of the Hadrian's Wall NMP (NRHE: 10123 and 10085 respectively). The road runs south from the fort and is a Scheduled Monument (26126) and is recorded in the Cumbria HER (HER: 166), as is the temporary camp at Knockcross, Cumbria HER (HER: 158), which is also a Scheduled Monument (26036). Both monuments are within the UNESCO World Heritage Site 'Frontiers of the Romans Empire (Hadrian's Wall)'.

The fort at Bowness experienced excavations by Potter in 1973 and 1976 and by Austen in 1988 (Potter 1975; 1976; Austen 1988). These excavations have served to delimit the area of the fort and its western gate, and have provided a date of 120-180AD for the construction and occupation of the site (Potter 1975, 333-4). The Roman Road and *vicus* to the south of the fort has not been subject to formal investigations. Mark Bowden of English Heritage visited the site of the road and *vicus* in 1990, but described the north-south aligned ridge, thought to be the Roman Road, as unconvincing (NMR Description). The temporary camp at Knockcross has not been subject to formal archaeological investigation.

#### *5.17.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Bowness-on-Solway involved a walkover of publicly accessible land to the east and west along the shoreline and within private fields.

#### *5.17.4 Roman*

The remains of the Roman Road running south from the Fort (now under the village) at Bowness were clearly visible as well preserved surface features during the Phase 2 survey, as were the remains of building platforms forming the Roman *vicus*. The survey recorded the remains of the road (118) as consisting of a north-south aligned ridge running for a length of c.90m with narrow parallel ditches on either side (Figure 5.187). It had a width of c.12m. The road survives in a field that appears to have been taken out of agricultural use and does not survive as earthwork remains in fields further to the south, where it is likely to have been ploughed out.

Access to the privately-owned field containing these remains was not requested for the purposes of more detailed survey, since it was apparent that the remains survive well and are not at risk from coastal erosion, being located c.175m inland of the defended village frontage. The ephemeral earthwork remains of two possible building platforms associated with the *vicus* were noted at the time of survey.

The temporary marching camp at Knockcross (111), c.700m west of the Roman Fort, was recorded during the Phase 2 survey as consisting of very ephemeral earthworks within a pasture field (Figure 5.188), with the site being partially occupied by a house. No definitive earthwork remains that could be related to structural elements were observed. The site lies within 60m of the shoreline behind the coast road that is protected by a concrete and stone-built sea wall.



Figure 5.187 The remains of the Roman Road (defined by change in vegetation) running south from the Roman Fort of *Maia* in Bowness-on-Solway, looking northwest.



Figure 5.188 Slight undulations in the field where the Roman Temporary Camp at Knockcross was mapped during the Hadrian's Wall NMP, looking south.

Despite the ephemeral remains of the temporary camp a more prominent ridge was noted extending southeastwards from the mapped eastern entrance to the camp. This was recorded as a possible Roman Road (141) and extended across a number of privately-owned fields in both pasture and arable (Figure 5.189). It was recorded to a



length of 175m in two fields, but extended beyond this recorded distance. On inspection the ridge was broad, with a width of between 18m and 20m, suggesting that it is perhaps not a road, or that it has been damaged by ploughing and is now spread over a much wider area than its original width. The feature may be a natural raised beach (Brian Irving *pers. comm.*). The site lies within the buffer zone of the UNESCO World Heritage Site 'Frontiers of the Roman Empire (Hadrian's Wall)'.



Figure 5.189 Ridge or possible Roman Road visible in fields to the southeast of the temporary camp at Knockcross, looking west.

#### 5.17.5 Post-medieval

In Cardonuck, 6km southwest of Bowness-on-Solway, the survey recorded the remains of possible post-medieval, domestic-scale peat cutting (177). The remains consisted of several rectilinear, water-filled cut features in the saltmarsh measuring between  $\approx 10\text{m}^2$  and  $\approx 16\text{m}^2$  (Figure 5.190). The location of these extractive pits was recorded as a point as the remains were too extensive to map as part of this project.

Further evidence of domestic-scale industry was recorded  $\approx 770\text{m}$  west of Knockcross temporary camp, in an area of saltmarsh accumulation along the coastal frontage. This consisted of the remains of a possible saltworking site (178) similar to those described at Skinburness and Moricambe Bay (see Sections 5.16.5 and 5.16.6). The remains of a water-filled circular pool mark the position of a possible salt pan with a diameter of  $\approx 7.8\text{m}$  (Figure 5.191)



Figure 5.190 Evidence of possible domestic-scale peat extraction at Cardonuck Marsh (scale = 1m).



Figure 5.191 Evidence of possible domestic-scale salt working east of Bowness-on-Solway (scale = 1m).

Port Carlisle is a small residential village c.2km east of Bowness-on-Solway. In the early 19<sup>th</sup> century, however, it was an important trading point and acted as the port town for Carlisle, as its name suggests. Remains associated with the past importance of this area were recorded during the Phase 2 survey in the form of a quayside (114), a canal (110) and a railway platform and railway (126).



The earliest of these features is the quayside which was established in 1819 when the name of this small fishing hamlet changed from Fisher's Cross to Port Carlisle. The quay is recorded in the Cumbria HER (HER: 10339) and was recorded during the Phase 2 survey as the degraded remains of a substantial quay (114), c.120m from the shoreline and accessible at low tide. The quay bears resemblance to that recorded at Hest Bank in Morecambe Bay (see Section 4.8.4) which was built in 1820. The quay was constructed of well-coursed Red Sandstone ashlar and with an upper platform constructed of larger Red Sandstone blocks, held in place by iron fixings (Figure 5.192). The platform stones are covered with lichen giving them a yellow/grey appearance. The quay survives to a length of c.50-60m and whilst it looks well-preserved on its outer face, the inner face has largely collapsed, is partially buried, and is actively eroding.

An eroding harbour wall was also noted on the landward end of the quayside, this was not recorded owing to tidal conditions and its location on private land.



Figure 5.192 Eroding remains of Port Carlisle Quay.

The Carlisle Navigation Canal was in construction for four years following the erection of the quayside and opened in 1823. It stretched from Port Carlisle to Carlisle, a distance of 18km. It was used to transport goods to and from Carlisle, for export and import. It was operational until 1853, when, after a decline in canal traffic from 1850, plans were drawn up to convert the canal into a railway (HER description).

The remains of the canal (110) were recorded during the Phase 2 survey as consisting of the well-preserved remains of the canal mouth and lock. It was constructed of well-coursed Red Sandstone ashlar of similar style to the quayside (Figure 1.193). The canal has largely silted up and could only be traced for a short distance before being blocked by elements of the construction of the railway line.



Figure 5.193 Remains of the Carlisle Navigation Canal at Port Carlisle (with the quayside in the background), looking east (scale = 2m).

The canal was replaced by the North British Railway, Carlisle and Silloth Branch line which opened in 1854 and involved the infilling of much of the canal, the remainder of which was used for coal storage and other purposes related to the railway. The line operated firstly for trade, but became a passenger line within two months of opening. When the branch line to Silloth was established in 1856, however, the Port Carlisle line closed as trade was taken to Silloth and a new harbour was built and opened there in 1859 (HER description).

The Phase 2 survey recorded the remains of the railway as a relatively well-preserved railway platform (126) in Port Carlisle, together with associated railway buildings that are now residential buildings within the village (Figure 5.194). The platform survives exposed in private ground for its easternmost extent, standing to a height of c.1.5m. Whilst the westernmost extent is traceable as a line of Red Sandstone blocks covered by concrete within the car park of the bowling club. The platform was c.75m in length.

The line of the railway can still be traced running south east as an embanked footpath.





Figure 5.194 Remains of the railway platform and associated buildings looking northwest (scale = 2m).

Along the line of the railway, c.525m to the southeast of the platform, the Phase 2 survey also recorded the remains of what appears to be industrial activity that may have taken advantage of the railway or canal for export. This consisted of a stretch of ruined Red Sandstone walling with the remains of circular niches in its seaward side (Figure 1.195). This has been interpreted as a possible salt working site (113), but may have had another purpose that could be determined by historical research. The walling extended for a length of c.53m, with the circular niches having a diameter of c.7m.



Figure 5.195 Remains of possible industrial activity showing ruined Red Sandstone walling and circular niche (scale = 2m).

#### *5.17.6 Uncertain*

The palaeoenvironmental survey investigated an organic deposit at Glasson, recorded as peat in the English Heritage Database of Coastal and Inter-tidal Peat Beds (Record ID: 529). An area of dark silt containing modern root matter was recorded (112), however this was not considered to be peat and was not sampled for pollen analysis or radiocarbon dating.

Adjacent to this deposit, however, two parallel rows of ephemeral degraded timbers and stone, and an accumulation of heavier deposits, were recorded forming what appeared to be a trackway (240). The trackway had a width of  $\approx 2.5\text{m}$  and led out from the saltmarsh to the inter-tidal silts and muds of the River Eden (Figure 1.196). The dating of this feature is uncertain as there were no diagnostic features or associated landscape elements that could place this trackway within a historical context. Further work would be necessary to better understand this feature that is undergoing active erosion.



Figure 5.196 Remains of possible timber trackway at Glasson (scale = 1m).

#### *5.17.7 Threat from Erosion*

The remains recorded at Bowness and Port Carlisle (110-114, 118, 126, 141, 177, 178, 240) lie within policy units 11e 7.7, 11e8.2 and 11e8.3, all of which recommend 'Managed Realignment' for the following 100 years. Policies 11e7.7 and 11e8.2 promote the return to a more natural coastal position, whereas policy 11e8.3 states the 'plan for a local diversion or set back of coastal road where at risk' (Halcrow 2011).

The Solway Firth is a funnel shaped estuary with a shallow embayment system, and extensive sandbanks, mudflats and saltmarsh characterise the large inter-tidal area of the estuary (Halcrow 2011). Following the removal of the Solway Viaduct between Bowness and Annan, in 1939, channel movement within the estuary increased where it had previously been constrained. The channel shifted further from the shoreline leading to significant accretion and saltmarsh accumulation along this frontage. The shoreline was



in a net accretion phase between 1866 and 1972, but since the 1980s a net erosional trend has returned at Bowness and further to the east (Halcrow 2011).

Existing predictions of future shoreline evolution state that under present management the shoreline will behave much as it would under an unconstrained scenario (Halcrow 2011). This means increased levels of erosion as saltmarsh roll back and submersion occurs with rising sea levels. However, Halcrow state that the defences at Bowness-on-Solway and Port Carlisle would hinder natural roll-back, and in turn result in local coastal squeeze (Halcrow 2011). The degree of exposure of the coast line would be dependant on the position of channels and banks within the Solway estuary. Halcrow do not provide a prediction of shoreline retreat in metres and NCERM appear to be working on the principal that the coastline defences will continue to function despite not being maintained. They predict a no coastal retreat for the following 100 years, except for at Port Carlisle where they predict a loss of between 3.4m and 6.6m (NCERM 2012).

These predictions do not take account of plans to move the coast road further inland, which would not only damage archaeology in the course of the new road, but would also most likely remove the present shoreline defences for the current road, increasing the vulnerability of this shoreline.

In light of this information the Roman Road at Bowness-on-Solway (118), the peat cutting at Cardurnock (177) and the small salt works near Knockcross (178) are not considered to be at risk of coastal erosion.

The Roman Temporary Camp at Knockcross (111) and the associated possible Roman Road (141) are considered to be at risk of damage caused by the set-back of the coast road along this frontage and this should be taken into consideration when plans are drawn up for the new road.

The canal (110), railway (126) and possible saltworks (113) at Port Carlisle are considered to be at long term risk of coastal erosion (i.e. within the next 100 years) and this should be monitored, particularly in light of any changes in channel configuration within the estuary.

The quay at Port Carlisle (114) and the undated trackway near Glasson (240) are both located in the inter-tidal zone and are therefore considered to be at immediate and long term risk of coastal erosion.

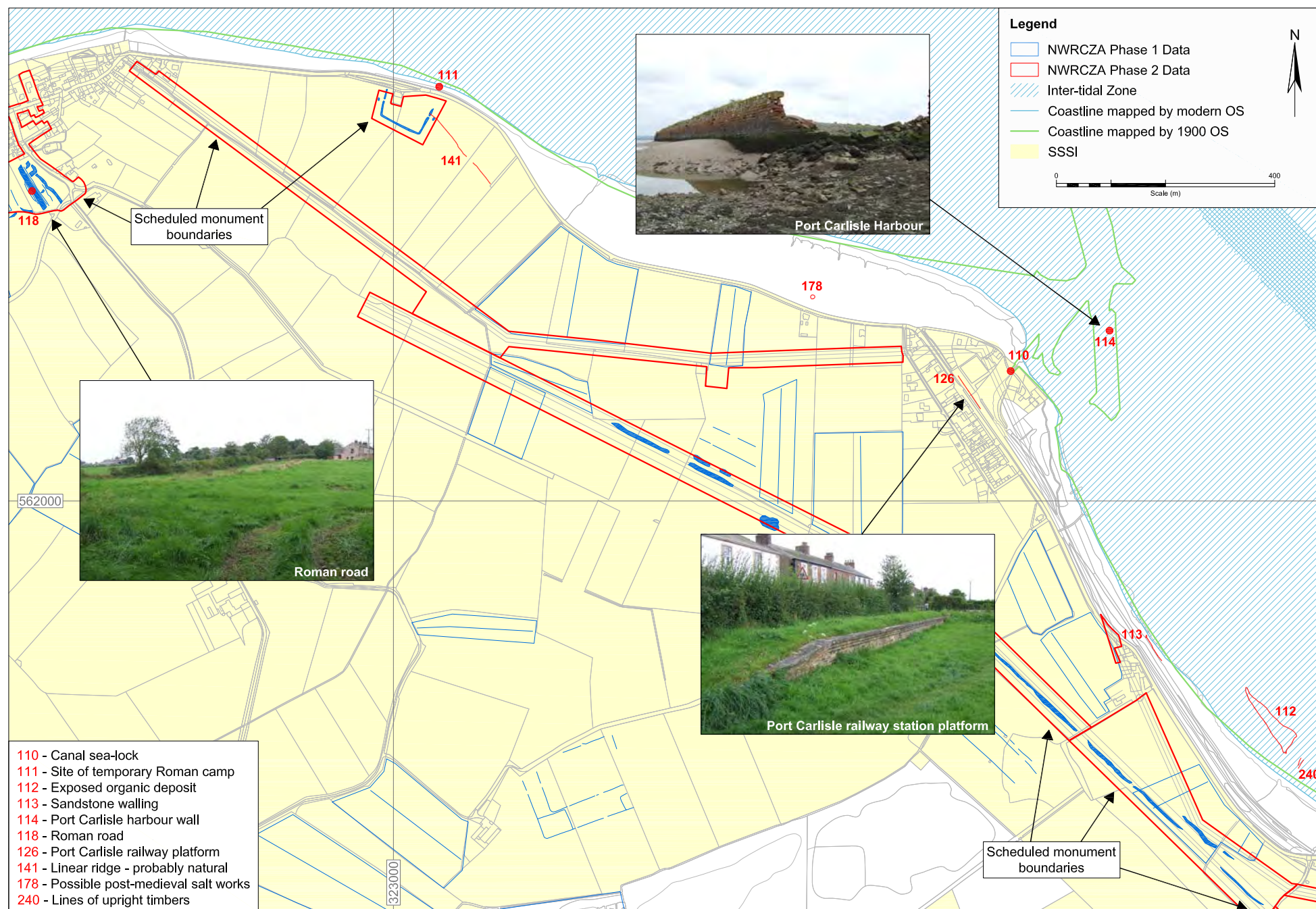


Figure 5.197 Location of sites surveyed at Bowness and Port Carlisle



## 5.18 Burgh Marsh (Map Figure 5.205)

### 5.18.1 Location and geology

Burgh Marsh (NY 29434 60058) lies within the Solway Firth and extends from Drumburgh in the east to Burgh-by-Sands in the west. It is c.9km northwest of Carlisle and c.9km southeast of Gretna across the Solway. It is an area of extensive saltmarsh that lies in front of the old railway line between Port Carlisle and Carlisle. The marsh is famous as the place where King Edward I lost his life in 1307. A monument was erected on the marsh to commemorate this in 1685 and still stands (Figure 5.194)

The solid geology around Burgh Marsh is composed of Triassic Mercia Mudstone with Gypsum Stone and/or Anhydrite Stone with a superficial geology of Raised Tidal Flat Deposits of Holocene Age backing onto Saltmarsh (BGS 2008). The saltmarsh is suited to stock grazing and recreational uses (Farewell 2007). The shoreline in Burgh Marsh is unprotected, but the extensive saltmarsh deposits provide protection for the settled hinterland and road, although the road is liable to flooding during extreme conditions. The marsh is fronted by inter-tidal sand flats alongside the River Eden.



Figure 5.198 Monument to King Edward I on Burgh Marsh © Andrew Smith.

Land use on Drug Marsh is predominantly stock rearing and recreation. The Marsh is used for grazing sheep in the summer months and cattle in the winter months. The marsh is publicly accessible as part of the Cumbria Coastal Way and is popular with bird watchers. The area lies within the Solway Coast AONB and the Upper Solway Flats and Marshes designated SSSI.

### 5.18.2 Previous research

The NWRCZA Phase 1 study looked at this part of the coastline as part of Block 5 of the study area (Johnson 2011). It did not highlight any features within Burgh Marsh as being at risk of coastal erosion and requiring rapid survey (Johnson 2011, 218).

However consultation with Brain Irving at the Solway AONB raised the possibility of previously unrecorded saltworking sites existing within the oldest parts of the marshland and these were therefore added to the Phase 2 survey.

The Phase 1 assessment also highlighted Rockcliffe Castle to the east of Burgh Marsh as being potentially at risk of coastal erosion and requiring rapid survey (Johnson 2011, 219), however no remains of this site, which was demolished in the mid-17<sup>th</sup> century, were recorded during the Phase 2 survey.

#### *5.18.3 NWRCZA Phase 2 Archaeological Investigation*

The archaeological survey of Burgh Marsh involved a walkover of safely accessible land within Burgh Marsh and Drumburgh.

#### *5.18.4 Roman*

In March 2011 Peter Horn of English Heritage's Aerial Investigation and Mapping Team noted a large linear bank with a ditch on its north side within Burgh Marsh. He suspects this to be a previously unrecorded length of Hadrian's Wall Vallum and a report is forthcoming regarding this discovery (Peter Horn *pers. comm.*). The bank is slightly offline from the scheduled and known alignment of the vallum (SAM: 28472) to the east.

The Phase 2 survey attempted to ground-truth this identification and recorded the remains of the possible vallum (217) as consisting of a prominent raised bank, to the west of Burgh-by-Sands (Figure 5.199). The full length of the bank could not be investigated owing to the high water levels in the marsh at the time of survey and it is recommended that any fieldwork in relations to this monument are scheduled for the summer months. The bank had a width of  $\approx 5.5\text{m}$  and was intersected by water and drainage channels within the marsh. This recorded section of possible vallum lies within the buffer zone of the UNESCO World Heritage Site 'Frontiers of the Roman Empire'.



Figure 5.199 Possible unrecorded section of Hadrian's Wall Vallum (217), looking east (scale = 1m).



#### 5.18.5 Medieval

William II took Carlisle in 1092 and, between him and his successor Henry I, established a feudal lordship in the North West of England, including the barony of Burgh-by-Sands (Jansson 2010, 47). The Cistercian monastery at Holme Cultrum was established in 1150 and was responsible for much of the land improvements seen in the area of Burgh at this time. The Phase 2 survey recorded land improvements of medieval date including a possible boundary bank (183) and ridge and furrow within Burgh Marsh (182).

The possible boundary bank is marked on Ordnance Survey mapping as a drain, however, Peter Horn of English Heritage suggested that the site was probably archaeological and would warrant further investigation (Peter Horn *pers. comm.*). The Phase 2 survey showed the site to be a substantial feature consisting of a low, wide bank with ditches on either side (Figure 5.200). It extended out into the marsh from the modern coast road, before arching round and turning back towards the road. It ran for a length of  $\approx 2.7$ km and was  $\approx 6.5$ m wide, although some elements appeared to have been re-cut. The Phase 2 survey recorded the western terminal point only.



Figure 5.200 Remains of possible medieval boundary bank in Burgh Marsh (scale = 1m).

It is possible the bank functioned as an intake or parish boundary, although further research would be needed to confirm this interpretation. It may also have been a flood defence, although the presence of ditches on either side of the bank would be an unusual feature in this case.

Medieval ridge and furrow (182) was mapped within the marsh as part of the Hadrian's Wall NMP (NRHE: 1372802). This was ground-truthed during the course of the Phase 2 survey and the boundary of this area of cultivation, marked by a prominent plough headland, may represent the extent of surviving medieval marsh (Figure 5.201). Brian Irving suggests that the marsh has eroded and re-accreted in the post-medieval period and therefore believes that the marshland nearest the coast road is the surviving medieval portion (Brian Irving *pers. comm.*). This assessment is corroborated by the recorded evidence.



Figure 5.201 Broad medieval ridge and furrow on Burgh Marsh, looking southeast.

#### 5.18.6 Post-medieval

The assessment of potential salt working sites in Burgh Marsh was aided by the use of Google Earth™ imagery which identified at least four sites within the marsh that were selected for field investigation. However, owing the high water content of the marsh at the time of survey, only one of these sites was safely accessible.

The Phase 2 survey recorded the remains of a medieval/post-medieval saltworks (185) c.450m to the west of Burgh-by-Sands. This consisted of a large circular water-filled pool with a diameter of c.12m (Figure 5.202). This is similar to sites described by Brian Irving and those recorded in Moricambe Bay (see Sections 5.16.5 and 5.16.6). The other three sites selected for field inspection had similar characteristics to this site when viewed on Google Earth™ and may therefore be interpreted as potential salt working sites.





Figure 5.202 Remains of possible salt working site on Burgh Marsh, looking west (scale = 1m).

#### *5.18.7 20<sup>th</sup> Century*

The Hadrian's Wall NMP mapped extensive remains of gridded anti-aircraft obstructions extending along the coastal sections of Burgh Marsh (NRHE: 1372364; 1378166). It also mapped a bombing range marker arrow (NRHE: 1372825) which is also recorded in the Cumbria HER (HER: 41466), both of which were included in the Phase 2 survey.



Figure 5.203 Remains of possible salt working site on Burgh Marsh, looking west (scale = 1m).

The anti-aircraft obstructions (179, 181) were noted in a good state of preservation consisting of water-filled cut features in the marsh (Figure 5.203). Within site (181) were mapped further remains of the air-craft obstructions not mapped as part of the Hadrian's Wall NMP demonstrating the extensive nature of these remains, which undoubtedly now help to drain the marshland. The cut features generally measured  $\approx 2.5\text{m}$  in length and  $\approx 1\text{m}$  in width.

The bombing range marker arrow testifies to the use of the marsh for military training purposes. The marker was constructed of concrete slabs, laid out to form an arrow when viewed from above (Figure 5.204). Each arrow usually had three concrete circles laid out on their nodal points, however these did not survive, or were not used, at Burgh Marsh. The recorded arrow (180) measured 23.5m in length with a span of 18m. The remains were these features were relatively well-preserved although significant intrusion of vegetation was noted, causing the concrete slabs to crack.



Figure 5.204 Recording the remains of a bombing range marker on Burgh Marsh, looking north.

#### *5.18.8 Threat from Erosion*

The remains recorded at Burgh Marsh (179-183, 185, 217) lie within policy units 11e8.4 and 11e8.5, both of which recommend 'Managed Realignment' for the following 100 years. This will promote a more naturally functioning coastline, but also includes a plan to re-route the presently at risk undefended coast road (Halcrow 2011).

Burgh Marsh lies in the inner zone of the Solway Firth estuary and acts as a sediment sink. Its pattern of erosion and accretion is influenced by the position of the channel and banks of the River Eden that run along the shoreline in front of Burgh Marsh. Between 1900 and 1970 the channel moved closer to the shore and caused erosion along the front of the saltmarsh at Burgh, and accretion further east at Rockcliffe Marsh (Halcrow 2011). Halcrow did not model the effects of increased sea level on the inner estuary but state that the saltmarsh is likely to accrete in line with sea level rise, but will be more at risk



from wave action with increased sea levels and storminess that will lead to saltmarsh erosion and increased risk of flooding. NCERM do not predict any shoreline retreat under the 'managed realignment' scenario, although this appears to be focused on the shoreline behind the saltmarsh and may not take into account the loss of saltmarsh deposits (NCERM 2012).

Without clear modelling of the effects of sea level rise, it is difficult to ascertain the level of risk to the sites recorded in Burgh Marsh. For this reason, all of the sites recorded are considered to be at long term risk of coastal erosion (i.e. within the next 100 years). Of these, the possible stretch of unrecorded Hadrian's Wall Vallum (217), and the possible medieval boundary bank (183) are the most significant sites, neither of which have been subject to formal archaeological investigation. There are also further potential saltworking sites identified within the marshland from Google Earth<sup>TM</sup> imagery, but not recorded as part of this project. These are also significant sites in terms of our understanding of the historical development of the saltmarsh and its exploitation, particularly in relation to the monastic complex at Holme Cultrum and its influence on the landscape in this region.



Figure 5.205 Location of sites recorded on Burgh Marsh



## 5.19 Summary and conclusions

The archaeological survey of targeted sites in Cumbria revealed significant remains of prehistoric, Roman, medieval, post-medieval and 20<sup>th</sup> century archaeology at risk of erosion. These are summarised in Table 5.4 below which also provides an updated assessment of the significance of each site and an updated assessment of the risk of coastal erosion, based on field observations. The assessment of significance is subjective and not absolute, but is based upon the field teams' informed professional judgement. These initial assessments will be further refined in Chapter 7 and used as the basis to assess the level of threat to heritage assets along the entire coastline. This prioritisation will inform the development of management proposals.

Site name	NWRCZA 2 No:	SMP 2 policy	Significance	Risk
Beckfoot Roman Cemetery	100, 241	MR	High	High
Walney Island prehistoric faunal remains	-	NAI	High	High
Ravenglass Roman Fort	75	NAI	High	High
Aldingham Motte and Bailey	41	NAI	High	High
Beckfoot Milefortlet 15	99, 100, 125	MR	High	High
Walney Island prehistoric flint scatter	60	NAI	High	High
Walney Island possible prehistoric settlement site	204	NAI	High	High
Drigg possible burnt mounds	211, 213	NAI	High	High
Roanhead Neolithic/bronze age structure	71	NAI	High	High
Nethertown medieval fish trap	139	NAI	High	High
St Bees medieval fish trap	138	HTL	High	High
St Bees possible medieval fish trap	137	HTL	High	High
Barrowmouth Alabaster and Gypsum Mine	132-136	NAI	High	High
Crosscanonby post-medieval saltworks	86	MR	High	Medium
Allonby post-medieval saltworks	142	MR	High	High
Skinburness medieval port and village	98	NAI	High	High
Mawbray medieval fish trap	120	MR	High	High
Glasson undated trackway	240	MR	Medium	High
Burgh Marsh possible Hadrian's Wall vallum	217	MR	High	Medium
Crosscanonby possible post-medieval saltworks	89,143	MR	High	High
Crosscanonby roman road from Maryport	-	MR	High	High
Beckermeth medieval St. Bridget's church and cross shafts	233	NAI	High	Medium
Maryport Roman Milefortlet 23	188	HTL 0-20 years NAI 20-100 years	High	Medium
Birkrigg prehistoric stone circle	215	NAI	High	Low
Piel Castle, Piel Island	72	NAI	High	Medium
Knockcross Roman temporary camp	111	MR	High	Medium
Drigg prehistoric flint scatters	210	NAI	High	Medium
Saltom Bay colliery	187	HTL 0-50 years NAI 50-100 years	High	High
Walney Island Hilpsford WW2 battery	65	NAI	Medium	High
Walney Island H5 WW2 battery and military camp	67-68	NAI	Medium	High
Knockcross possible Roman road	141	MR	High	Medium

Ravenglass possible medieval cist	228	NAI	Medium	High
Ravenglass Roman bath house	73	NAI	High	Low
Swarthy Hill Iron Age hillfort	107	MR	High	Medium
Drigg WW2 quadrant towers	79, 81	NAI	Medium	High
Port Carlisle post-medieval quayside	114	MR	Medium	High
Skinburness post-medieval jetty / fish trap	92	HTL	Low	High
Skinburness Roman Milefortlet 9	96	NAI	High	Medium
Beckfoot possible Roman road	104	MR	High	Medium
Anthorn Marsh post-medieval stone alignment	176	MR	Medium	High
Newtown Arlosh post-medieval saltworks	168-173	MR	High	Low
Maryport Roman road	186	HTL 0-20 years NAI 20-100 years	High	Low
Burgh Marsh possible medieval boundary bank	183	MR	Medium	Medium
Ravenglass post-medieval fish trap	78	MR	Low	High
Walney Island possible prehistoric hearth	203	NAI	High	Low
Skinburness Marsh medieval saltworks	129, 184	HTL 0-20 years MR 20-50 years HTL 50-100 years	Medium	Medium
Anthorn Marsh possible medieval saltworks	174-175	MR	Medium	Low
Skinburness marsh post-medieval saltworks	130	HTL 0-20 years MR 20-50 years HTL 50-100 years	Medium	Medium
Border post-medieval saltworks	128	MR	Medium	Low
Salt Coates post-medieval saltworks	167	MR	High	Low
Bardsea post-medieval jetties and breakwater	42-44	NAI	Medium	High
Braystones possible motte	234	NAI	Medium	Low
Swarthy Hill Milefortlet 21	87	MR	High	Low
Drigg WW2 pillbox	83	NAI	Low	High
Beckfoot Roman tower 15A	105	MR	High	Medium
Bowness Roman road	118	MR	High	Low
Grune Point WW2 air gunners' range	109	NAI	Medium	Medium
Sea Wood post-medieval copper mine	214	NAI	Low	Medium
Waberthwaite medieval St John's church	77	NAI	High	Low
Waberthwaite Anglo-Saxon cross shafts	230	NAI	High	Medium
Brighthouse possible prehistoric enclosure	223	NAI	Medium	Medium
Saltcoats possible Roman fortlet/tower	232	NAI	High	Low
Saltom Bay 20 <sup>th</sup> century Haig colliery	140	NAI	High	Low
Drigg 20 <sup>th</sup> century shipwreck	80	NAI	Low	High
Brighthouse possible Roman harbour	225	NAI	Medium	Medium
Burgh Marsh post-medieval saltworks	185	MR	Medium	Medium
Skinburness post-medieval shipwreck	106	HTL	Low	High
Arnside medieval enclosure	33	NAI	Medium	Low
Walney Island WW2 firing range	52	NAI	Medium	Medium
Port Carlisle post-medieval canal	110	MR	Medium	Low
Port Carlisle post-medieval saltworks	113	MR	Medium	Low
Ulverston post-medieval quayside	37	NAI	Medium	High
Walney Island WW1 trenches	54-59	NAI	High	Low
Port Carlisle post-medieval railway platform	126	MR	Medium	Low
Drigg post-medieval enclosure	227	NAI	Medium	Low



Burgh Marsh WW2 anti-aircraft obstructions	179, 181	MR	Medium	Medium
Millom possible medieval saltworks	85	HTL	Medium	Low
Brownrigg Roman Tower 21B	90	MR	High	Low
Arnsdale medieval lynchets	32	NAI	Low	Low
Silverdale Jack Scout post-medieval limekiln	30	NAI	Medium	Low
Eskmeals prehistoric occupation site	216	MR	High	Low
Beckfoot WW2 bombing range markers	115-117	MR	Low	Medium
Crosscanonby post-medieval bank	91	NAI	Low	High
Arnsdale post-medieval jetty	40	HTL	Medium	High
Brighthouse possible medieval pit	231	NAI	Low	Medium
Drigg WW2 gun emplacement	84	NAI	Low	High
Walney Island WW2 air gunners' range	39-50	NAI	Low	Low
Grune Point WW2 trenches and slit trenches	94, 121-124	NAI	Low	Medium
Burgh Marsh medieval ridge and furrow	182	MR	Medium	Low
Burgh Marsh WW2 bombing range marker	180	MR	Medium	Low
Walney Island WW2 wire fence	70	NAI 0-20 years MR 20-100 years	Low	High
Arnsdale post-medieval limekiln	34	NAI	Medium	Medium
Grune Point WW2 pillbox	93	NAI	Medium	High
Baycliff post-medieval quayside	39	NAI	Low	High
Duddon Estuary post-medieval jetty	205	NAI	Low	High
Ulverston post-medieval iron fragment	38	NAI	Low	High
Arnsdale post-medieval structural fragment	35	NAI	Low	High
Duddon Estuary post-medieval shipwreck	207	NAI	Low	High
Drigg WW2 Minefield	209	NAI	Low	Medium
Drigg WW2 trench	208	NAI	Low	Medium
Walney Island WW1/WW2 underground chambers	63	NAI	Low	Low
Drigg WW2 military camps	82, 226	NAI	Medium	Medium
Aldingham WW2 ruined building	235	NAI	Low	High
Knockcross post-medieval saltworks	178	MR	Medium	Low
Brighthouse post-medieval copper working	224	NAI	Low	Medium
Waberthwaite excavated prehistoric structures	222	NAI	Medium	Low
Grune Point WW2 weapons pit	95	NAI	Low	Medium
Walney Island post-medieval saltworks	64	NAI	High	Low
Walney Island WW2 bombing decoy control building	202	NAI	Medium	Low
Greenodd post medieval railway platform	36	HTL	Medium	Low
Barrowmouth post-medieval Airbank Quarry	131	NAI	Medium	Low
Cardunock post-medieval peat cutting	177	MR	Low	Low
Grune Point WW2 demolition waste	97	NAI	Low	Medium
Walney Island WW2 weapons pits	46-47	NAI	Low	Low
Walney Island WW2 airfield platform	53	NAI	Low	Low
Walney Island WW2 trench	48	NAI	Low	Medium
Walney Island WW2 gun emplacement	45	NAI	Medium	High

Table 5.4 Summary of sites recorded in Cumbria during the Phase 2 archaeological survey.

If you require an alternative accessible version of this document (for instance in audio, Braille or large print) please contact our Customer

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