



Brora Back Beach, Sutherland

Data Structure Report

2009



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SCAPE
Scottish Coastal Archaeology
and the Problem of Erosion



Back Beach, Brora, Sutherland August 2009

by

Janet Hooper, Joanna Hambly and Jacqueline Aitken

with contributions by

Cathy Dagg

Volunteers

Brian Adams
Leoma Aitken
John Campbell Smith
Steve Clark
Anne Coombs
Ruaridh Coombs
Andrew Dorin
Joanna Dunster
Marischa Francis
Joni Guest
George Gunn
Eddie Keatinge

George MacBeath
Heather Macdonald
Lisa Macdonald
Karl Major
Liz Miller
Robin Murdoch
Marion Ruscoe
Jean Sargent
Roger Smith
Anna Welti
John Wombell
Trina Wombell

Professional Team

Jacqueline Aitken
Cathy Dagg
Joanna Hambly
Janet Hooper
Nick Lindsay

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EXECUTIVE SUMMARY

This report sets out the results of archaeological fieldwork undertaken between 15th - 30th August, 2009 at the Back Beach, Brora, as part of an ongoing interdisciplinary project, funded by Historic Scotland and carried out under the auspices of the Clyne Heritage Society and the SCAPE Trust. The industrial heritage of Brora, in particular the history of the salt and coal works, has been the focus of recent survey and excavation, targeted principally on those buildings most severely affected by coastal erosion. This has been very much a community oriented project, with volunteers, drawn from throughout the local area, involved in all aspects of the fieldwork.

The principle outcomes of this season's work were:

1. The achievement of almost total excavation of the buildings in Trench 4 and Trench 2 (the Saltman's House).
 2. The secure identification of excavated buildings and features with those depicted on historic maps.
 3. Direct evidence of salt production in the form of waste material, known as pan-scratch. Pan-scratch was found in all three trenches opened this year.
 4. The recognition of the potential of the remains of the Old Salt Works, in use for short periods between 1598 and 1617.
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1.0 INTRODUCTION AND BACKGROUND

The history of Brora, in the parish of Clyne, on the east coast of Sutherland (Figure 1), is dominated by its long industrial past. These industries include coal mining, salt panning, tweed production, distilling and electricity generation and extend back to the 16th century. Coal exploration is first referred to in a charter of 1529 and the first saltworks were established in 1598. These activities were encouraged by the Earls and Countesses (later Dukes and Duchesses) of Sutherland and it is perhaps the financial support provided by the estate, as much as the availability of a wide range of resources (both natural and human) which made Brora the 'Industrial Capital of the North' in the late nineteenth century.

In spite of its importance in both domestic and commercial contexts, little is known about the production of salt in Scotland prior to the eighteenth century. Even after this date, most research has been concentrated on the main centres of production along the shorelines of the Firths of Forth and Tay. The importance of the export of salted fish to the economy of the settlements around the Moray Firth is well known; the geographical separation of this area from the principal production centres (whether in Scotland or further afield), is likely to have resulted in a considerable demand for salt. If this could be produced locally, much of the additional expense of importing salt could have been avoided. Therefore, Brora is of particular significance as it offers an opportunity to investigate three quite distinct chronological phases of production, in a location where the physical remains associated with salt making can be elucidated through a comprehensive documentary record.

Many of these activities were concentrated on Brora's Back Beach (NGR: NC 905 033) and it is the history of the salt and coal works carried out in this area which have provided the focus of an ongoing interdisciplinary project carried out under the auspices of the Clyne Heritage Society and the SCAPE Trust. This has involved a considerable amount of historical research and three previous seasons of survey (Aitken 2004; Badger, Cressey and Aitken 2006; Aitken and Hooper 2008; Hooper and Aitken 2009; a lengthier introduction to the Back Beach is given in Aitken and Hooper 2008, 5ff).

The impetus provided by the deteriorating condition of the buildings which appeared to be associated with the two earliest salt works led to the decision to carry out an excavation in summer 2007, with the support of Historic Scotland, National Lottery Awards for All and The SCAPE Trust (Aitken and Hooper 2008). A second season of excavation, funded by Historic Scotland and supported by The SCAPE Trust, took place in 2008 and geophysics was also undertaken by Orkney College Geophysics Unit (Saunders and Ovenden 2008). A third season of excavation took place in 2009.

2.0 AIMS AND OBJECTIVES

The aim of this project is to explore key sites related to the early mining and salt-panning industries of Brora, and to undertake excavation at those sites facing the imminent threat of destruction from coastal erosion. Crucial to this is the participation of volunteers in all aspects of the fieldwork and the involvement of the local community and visitors to the area in the project, through guided tours, open days, and dropping in to view the excavations.

The specific objectives of the 2009 fieldwork were:

- Excavation of those sites facing imminent destruction

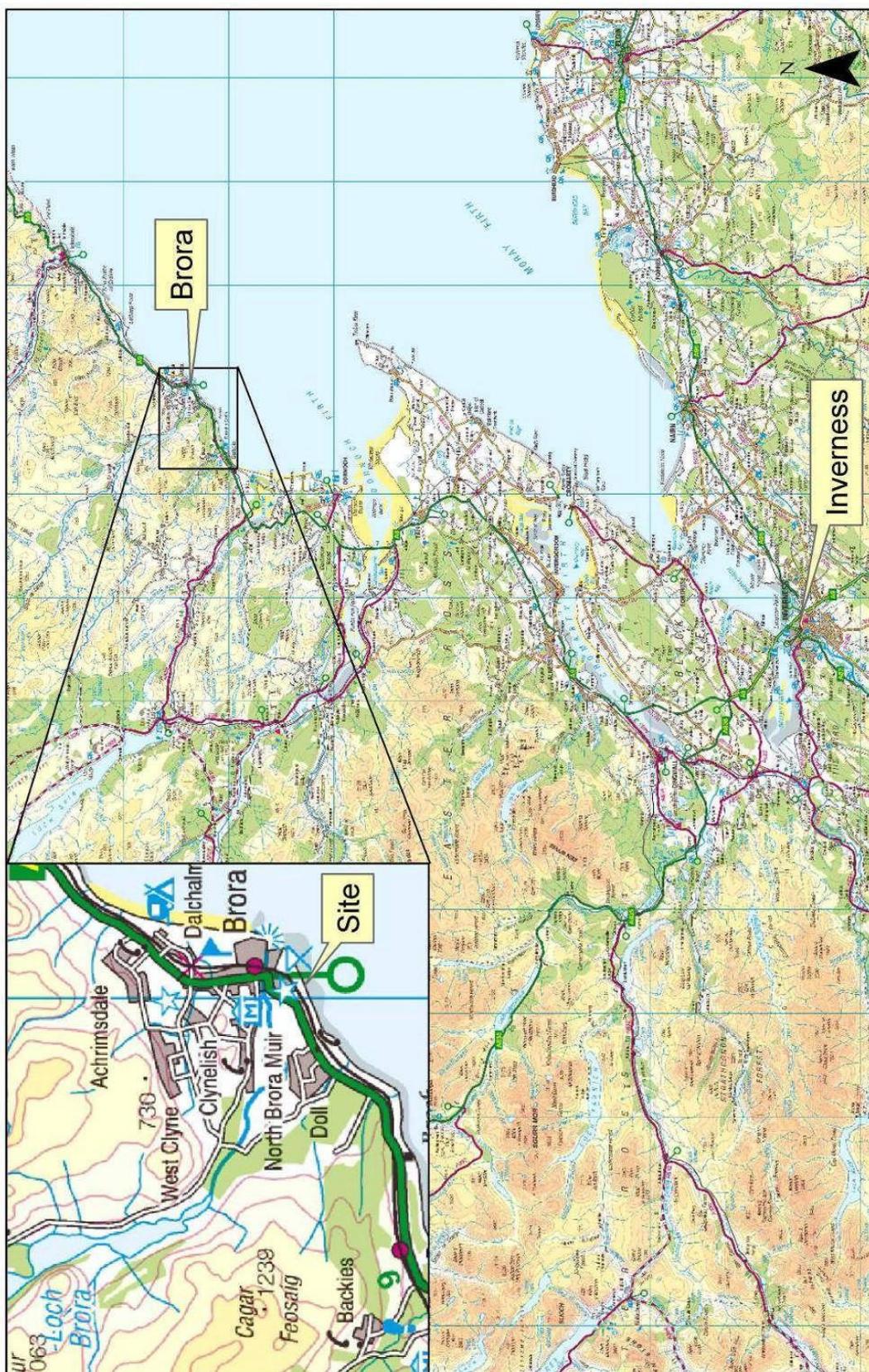


Figure 1. Map showing location of study area.
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In addition to a number of actively eroding sites highlighted in the initial 2006 survey, the 2007/8 excavations revealed most of a previously unrecorded building (Site 37) associated with the New Salt Works, dating to 1767-1777. This structure has undergone rapid erosion over the two preceding winters and the 2009 season was focussed on completing the excavation of this building (Trench 4). A second trench was opened up to the east in order to examine how the geophysical anomalies revealed in the 2008 survey related to the middens eroding out of the coast edge and to the features shown on John Kirk's 1772 map of the salt works (Trench 7). At the Old Salt Works, dating to 1598-1617, the face of the large dune within which the principal surviving building is located, also appears to be increasingly unstable.

- Volunteer participation

In addition to retrieving as much information as possible before the sites were lost, the intention was also to provide local volunteers with training in archaeological techniques. To aid this, it was also decided to return to the Saltman's House (originally Site 19) (Trench 2b & 2c), which was part excavated in 2007, in order to establish its extent and function.

- Raising community profile

Though many people in Brora were aware of the walls eroding out of the dunes (and remembered them in a much better state of preservation), there is a lack of local knowledge about these sites, which may reflect the displacement of the population brought about by the Clearances and creation of the new planned village of Brora after 1810. It was hoped that, in addition to involving local people in the excavation, the profile of Brora's industrial heritage would be raised within the community.

3.0 METHODOLOGY

3.1 Excavation

Following removal of the turf and topsoil from Trench 2 and the sand overburden in Trenches 4 and 7 by machine, all excavation was carried out entirely by hand. All deposits and features were exposed in plan, with discrete features being first sectioned; stratigraphic control was ensured by the deep sections created by the trench edges. All contexts identified were recorded in written form on pro forma sheets, were drawn in plan at scales of 1:20 and in section at 1:10, and were also photographed at all stages of the excavation. Each trench was given a unique sequence of context and finds numbers and a daybook was kept by the supervisor. The location of each trench and major features were recorded using a total station theodolite. Spoil was stored on tarpaulins to prevent damage to the underlying vegetation. It was possible to return the spoil carefully by machine. The turf was replaced last, restoring the original appearance of the ground as far as possible.

3.2 Community Participation

Throughout the excavation, training in archaeological field techniques was given to the local volunteers participating in the fieldwork, building on the skills many already possessed. In addition to excavating, there were also opportunities to undertake

fieldwalking, metal detecting and erosion monitoring. Volunteer participation was encouraged through Clyne Heritage Society, NOSAS and Shorewatch. Locally, volunteers also came as a result of promoting the excavation in Historylinks in Dornoch and Timespan in Helmsdale and by advertisements put up throughout Brora and in the local press. Many of the participants in the 2007 and 2008 excavations returned, along with a number of new ones. An information and assessment form was sent out to all volunteers in advance of the excavation. This helped the organizers to accommodate the different levels of skills, capabilities and expectations of the volunteers in the preparation of realistic daily work schedules and, as far as possible, to involve everybody in all aspects of the fieldwork.



Plate 1. Tea break!

4.0 RESULTS

In the following sections, context numbers for layers and feature fills are given in curved brackets (), while numbers for structures and cuts are given in square brackets [].

4.1 New Salt Works

In order to meet the objectives outlined above, Trench 4, opened up over Site 37 in 2007 and 2008, was extended to the west, in order to complete the excavation of the building. Trench 2 was located over the west end of the Saltman's House with the intention of uncovering the majority of the building, in order to clarify its extents and function. A third trench, Trench 7, was laid out parallel to the shoreline to the east of Trench 4 in order to examine how the geophysical anomalies revealed in the 2008 survey related to the middens eroding out of the coast edge and to the features shown on Kirk's 1772 map. The location of the trenches is shown on Figure 2.

4.1.1 Trench 2

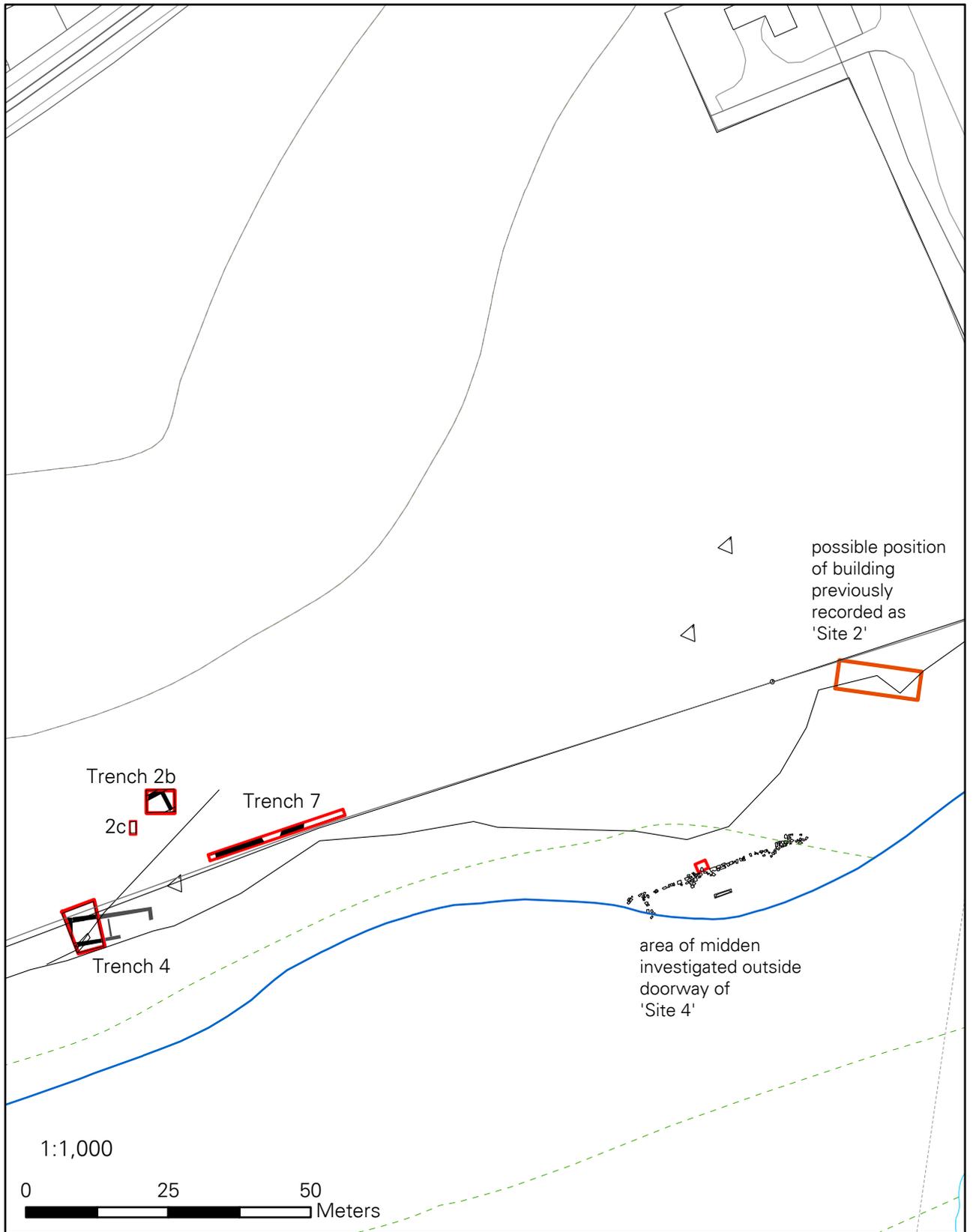
(Cathy Dagg)

A 4m x 5m trench (Trench 2b) was opened up over the western end of the Saltman's House, the eastern half of which had been originally investigated in 2007. An internal partition wall [2045], the extensively robbed out remains of the external north wall [2047] and a fragment of the external south wall [2046] were exposed (Figure 3; Plate 7). A 2m x 1m satellite trench, (Trench 2c), was opened up over the SW corner of the structure, in order to locate its western external wall and verify its dimensions. Here, again, only the robber trench for the wall remained (Plate 2).

The structure and deposits associated with the use of the building

The walling exposed in Trench 2b stood to a maximum height of 0.85m and was best preserved at the junctions of the partition wall with the outer walls of the building. The walls were keyed into each other indicating a single phase of construction. Underneath the northern part of the partition wall, the ground surface dipped down and the cavity was filled with large cobbles (2082), set into a matrix of grey clay (2083) (Figure 4). This may represent the infilling of a natural hollow in the ground surface, although elsewhere, the site seems to have been cleared and levelled before building commenced. It is possible, therefore, that subsidence or erosion of the ground level occurred after construction of the walling, and that the cobbles were inserted to support the wall. The walls were clay bonded and the masonry comprised predominantly sandstone and quartzite stones shaped into roughly rectangular blocks, or, especially in the upper courses, large beach cobbles broken to provide one flat face. The only exterior face of wall exposed in Trench 2b was of the north elevation. It bore the remnants of harling, including a skirt of harl (2078), overlying the exterior ground surface. At the base of the wall while, along the south face, where the facing stones had been removed completely, only a thin ridge of mortar or harl (2071) survived.

In the satellite Trench 2c, the stonework had been removed entirely, the outline of the wall preserved as a band of clean, stone-free sand (2059), respected by possible occupation deposit (2081) and internally and externally, by a possible demolition deposit consisting of dense grey clay and mortar (2062) (Plate 2). This confirmed that the walls had been built directly onto a clean sand surface (2072). No evidence for a foundation cut was identified.



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Figure 2. Trench location plan

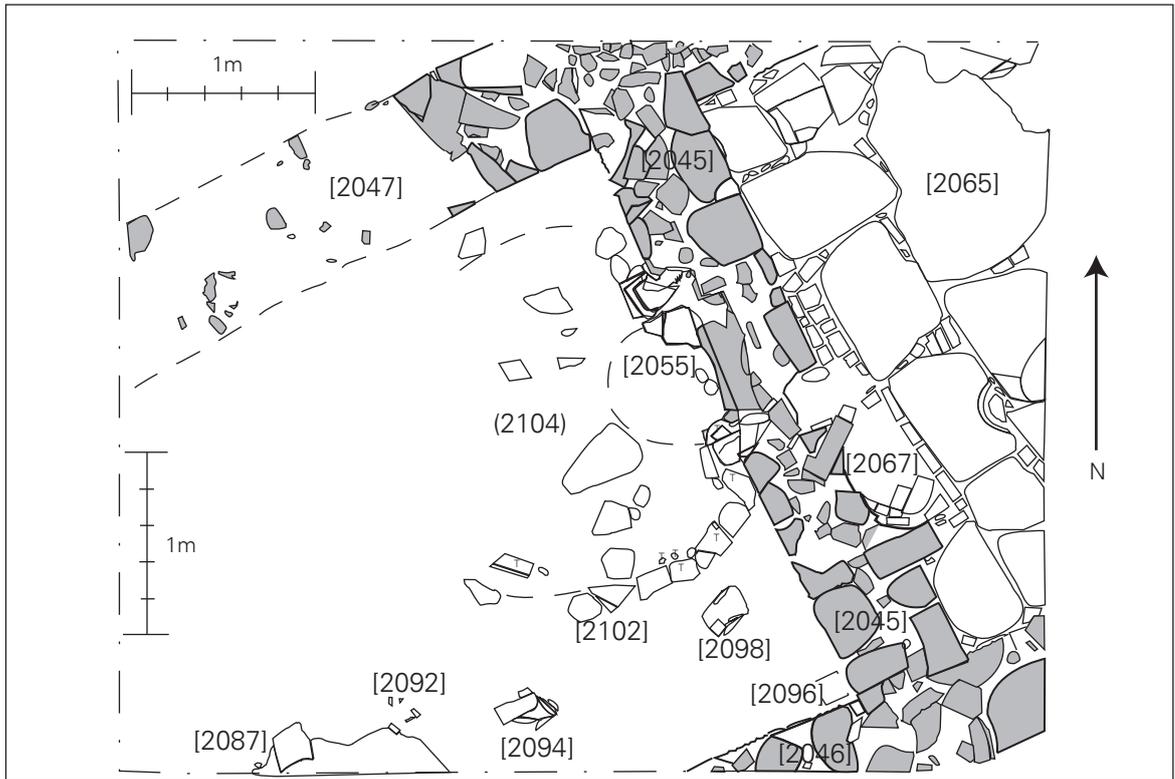


Figure 3. Multi-context plan of features and deposits of building in Trench 2b.

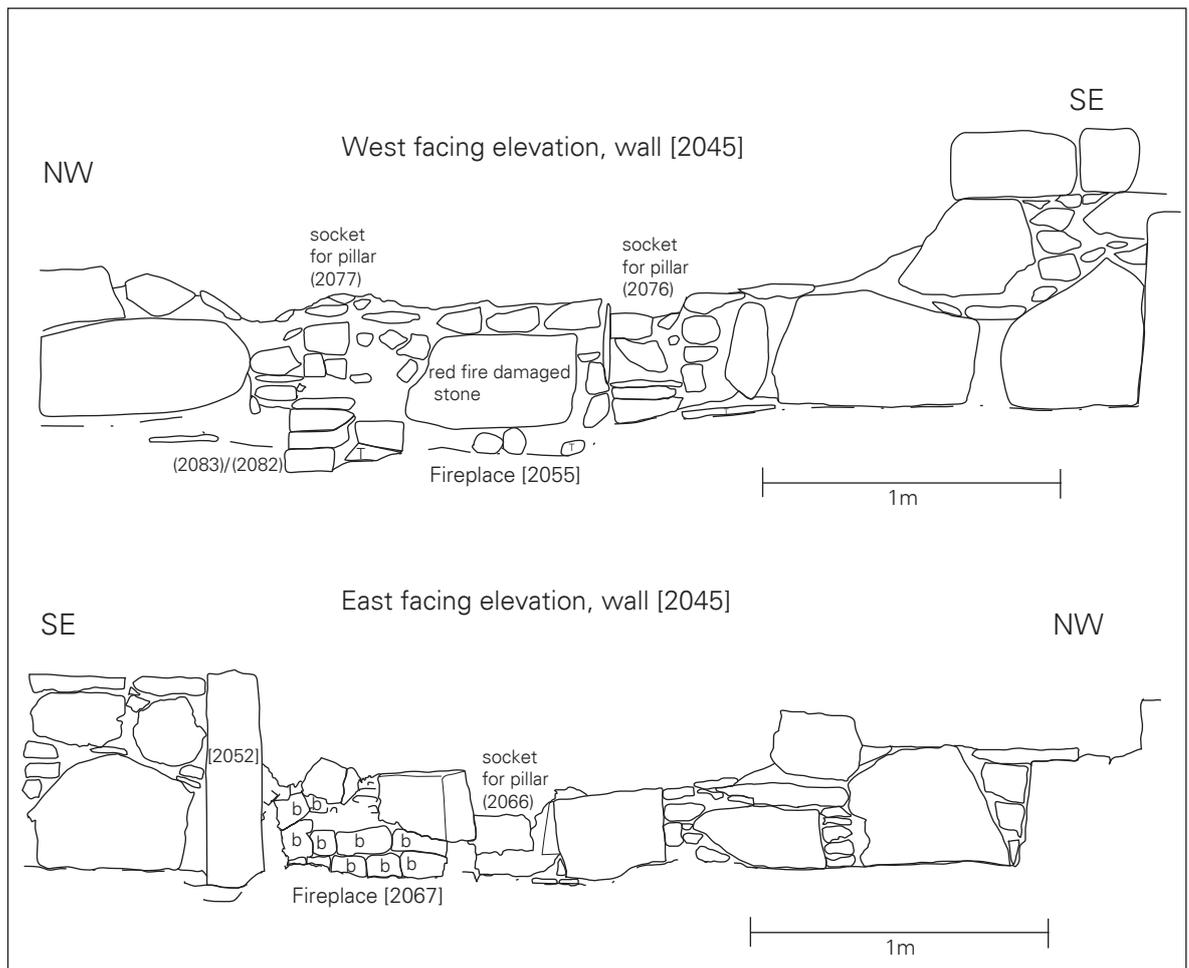


Figure 4. West facing and east facing elevations of wall [2045] and hearths [2055], [2067], Trench 4b.



Plate 2. Outline of robbed out wall visible in Trench 2c. Taken from the N.

Two fireplaces were set into either side of the partition wall. The west-facing fireplace [2055] is located more or less in the centre of the wall, while the east-facing one is offset to the south [2067] (Figure 4; Plates 3, 4, 6, 7). The southern jamb of the western hearth [2076] and the northern jamb of the eastern hearth [2066] were set opposite each other, separated only by a single rectangular stone, aligned with the centre line of the wall. Although differing in style, the fireplaces and the partition wall are a single phase of construction. Both hearths appeared to have had flanking pillars, but only that on the south side of the eastern hearth survives in situ [2052]; however, the sockets for the other three are clearly visible (Figure 4; Plates 3, 4, 6).

The west-facing hearth had no hearth stone, the fire apparently being set directly onto the natural sand surface, turning it red in colour (2101). The hearth was backed by a rectangular slab, sloping slightly backwards and flanked by plinths [2094; 2095], formed of 3-4 small stones piled horizontally on top of each other, which originally supported the jambs [2076, 2077] (Figure 4). The hearth back appears to have originally been placed at the same level as the base of the wall, but at the time of the building's abandonment lay 150mm above the level of the base of the hearth.

Lying above the heat-scorched sand (2101), within the hearth area was a compacted brown-yellow ash containing large flakes of burnt shale (2086) and a dark sticky mixed deposit containing burnt coal fragments (2053). Extending westwards from the hearth was a possible wider 'rake-out' area, defined by an arc of rounded cobbles, quartzite flakes and large pieces of tile (2102) (Figure 3; Plate 4). No return was identified on the west side, but here the overlying deposits were thinner, while two or three loose stones may represent all that remains of the northern arc, though it seems probable that the cobbles (2083) against the partition wall did form part of it. Contained within the stone and tile arc (2102) was a loose, brown sand containing frequent whelk, mussel and occasional limpet shells (2104). In the northern side of the rake out area, deposits were more mixed and incorporated large pieces of burnt and unburnt coal and lumps of clay (2103).



Plate 3. W facing fireplace [2055], during excavation. Taken from the SW.



Plate 4. General view of fire place and rake out area following excavation, Trench 2c. Taken from the SW.

Possible occupation deposits associated with the use of the hearth consisted of a 20mm thick layer of compacted gritty deposits, containing frequent coal/shale fragments (2075) extending between the hearth and the south wall. A similar layer (2081) was recorded in Trench 2c.

Sealed under this thin trampled surface, in the southern part of the excavation trench and continuing into the southern limit of excavation, was a shallow pit [2087], infilled by two thin, but discrete, layers of dark material (2088, 2090), containing iron slag, as well as ferrous artefacts separated by a thin layer of sandy clay (2089). The edge of this cut was adjacent to a group of stakes, driven into the underlying sand and forming a row running around the south side of the rake-out area [2084, 2091] (Plate 5). Also inserted into the sand were larger stake, or post-holes with supporting packing stones [2092/3, 2094/5, 2096/7, 2098/9] (Figure 3). A small piece of pan-scratch was found at the base of one of these stakeholes [2096]. Chunks of mortar were also found in two of the postholes,

while the use of quartzite flakes for the packing in each stakehole suggests that these had been derived from the shaping of the masonry blocks of the building's walls.



Plate 5. Stake [2091], set into natural sand (2072). Taken from the N

On the east side of the partition wall, fireplace [2067] consisted of an arc of two courses of half bricks set around a hearth stone of soft sandstone, all of these fragile and flaking due to heat damage (Figures 3, 4; Plate 6). Above the bricks, the arc was continued in stone, also discoloured by heat. The shallow curved form of this fireplace would be consistent with an early eighteenth century date, earlier than that postulated for this building. Its southern pillar is the only one still surviving in situ [2052]. On top of the hearth stone, filling the area of the fireplace and spreading out over the flagstone floor, was a fine, bright orange ash (2068), suggesting that peat had been burned in the hearth.



Plate 6. East facing fireplace [2067], following excavation. Taken from the NE

The 2007 excavations revealed that, though the east end of this building had a cobbled floor, the central part consisted of sand with scattered slabs, into which a large, but shallow pit had been dug (Aitken and Hooper 2008, 33 and plate 9). In the 2009 excavations, the sandstone floor slabs [2065] were found to have survived more or less intact in this part of the building. The slabs were irregular in shape and larger gaps between them filled with broken bricks (Figure 3; Plate 7). Along the west edge of the slabs, adjacent to the partition wall, the gap had also been infilled with half-bricks laid to form a flat surface.

The floor slabs were almost entirely covered by a thin deposit probably representing trampled material, consisting of coal/shale fragments, charcoal and ash, which measured no more than 20mm thick (2073). Against the partition wall, in the south west corner, the deposits, though similar, were mounded up (2069) and contained a number of ferrous items. These mounded deposits may represent sweeping of the coal/shale dust into the corners of the building. In the northern part of the trench the slabs came directly down onto sand (2072), but in the vicinity of the hearth, a thin layer of mixed ashy material lay directly underneath the slabs. This was presumably intended to level up the surface or to bed in the slabs; these deposits included pan-scratch, the waste material chipped from the salt pans, and building debris (2100).

Deposits associated with the demolition and abandonment of the building

The trampled material upon the floor slabs were overlain by sandy lenses interleaved with rubble (2070), which spread over the south side of the hearth, and appear to represent the initial collapse of the building, since none of the good building stone had been removed.

At the time of its abandonment, both sides of the floor area of the building were covered with a thick layer of yellow clay (2050, west of the partition wall, and 2051 to the east), which did not extend across the whole of the western half of the structure (Figure 5; Plate 7). The thickness of the clay varied and its surface was irregular and thickly mounded in three places. A thin, brittle white layer, 0.5mm thick, noted on the underside of the clay, may be fine particles leached out of it (2074). Although the clay is relatively clean, the presence of small fragments of mortar and other inclusions indicate it is likely to be derived from the cleaning of the clay bonding from the wall masonry during an early episode of demolition following the disuse of the building.

Within clay (2050) in the western room, three long, parallel timbers, all measuring 40mm wide by 10mm thick and aligned NE-SW, seem to have been originally attached to a shorter, fourth timber found lying parallel to the partition wall (Figure 5; Plate 7). The northernmost timber had collapsed over a large stone on the ground surface in front of the hearth. Smaller, more irregularly shaped pieces of wood lay randomly across these timbers. Within the clay, at the same level at which the timbers became visible, were dark stains which may be the remains of more fragile timbers attached to the wood frame. It is possible this wooden frame may be the remains of a wooden partition, or roofing timbers, thrown or fallen into the disused building. The fact that the timber was preserved within the thick clay deposit indicates it was deposited during an episode of demolition of the building.

The deposits overlying this clay layer differed on either side of the partition wall. On the east side of the building was a compacted mound of mortar and tumbled stones, some of these well-shaped building stones (2048). No good building stone was present amongst



Plate 7. General view of building in Trench 4b, before removal of clay (2050) and timbers (2064). Taken from the S.

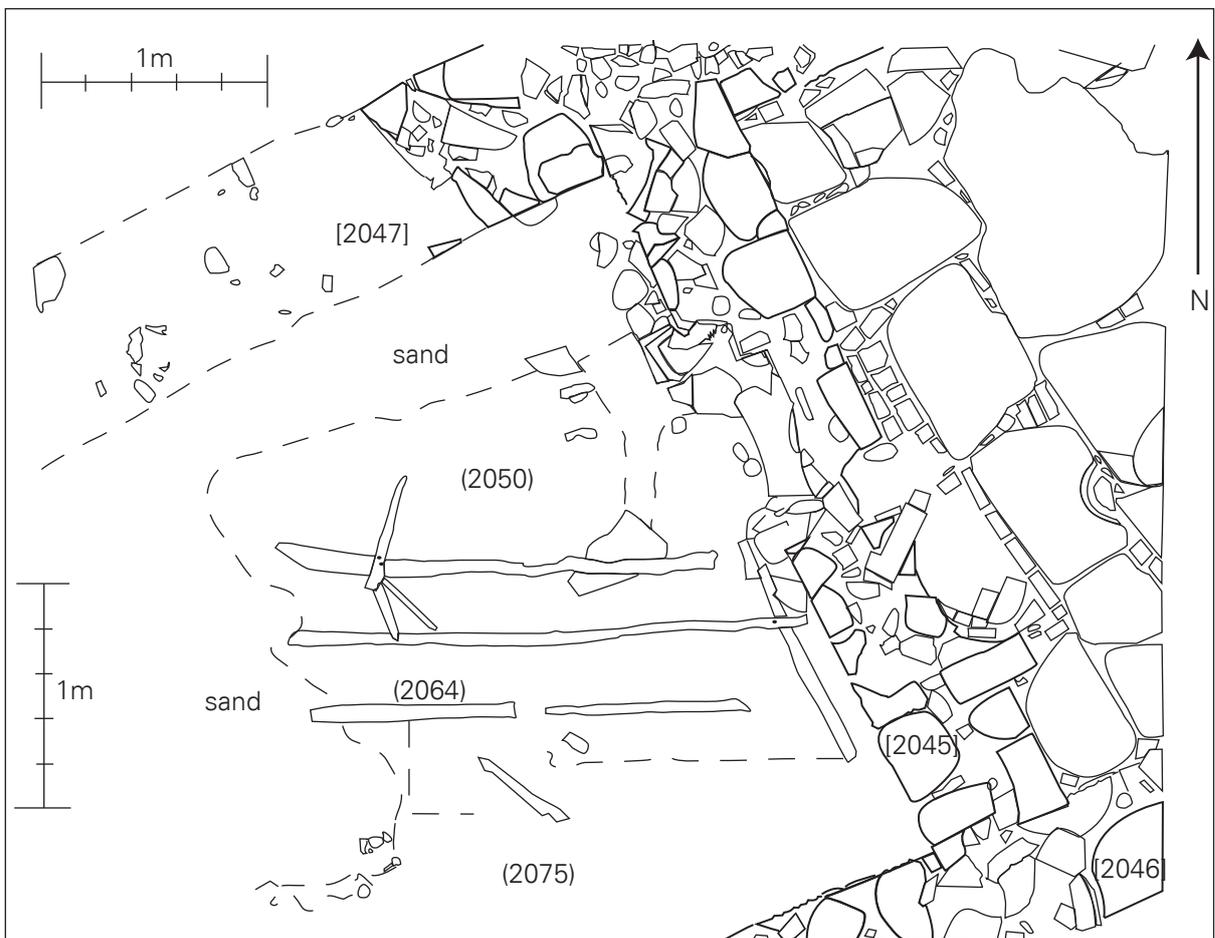


Figure 5. Plan showing extent of clay (2050) and timbers (2064), Trench 2b.

the tumble on the west side (2044), where a layer of dark, friable soil (2054) suggests a possible turf layer had developed after the building had gone out of use. A discrete area of brown ashy sand, containing rubble and brick, in the south west corner of the trench may also represent demolition, though it does lie under the clay (2050). Against the base of the north wall a rubbly deposit of large stones (2058) overlay natural sand (2072) and abutted clay layer (2050) and this may also represent an early phase of demolition or collapse. To the east, the rubble became more clearly a demolition layer, consisting of loose stone, mortar, pockets of clay and lenses of clean yellow sand (2049).

A dense layer of mortar fragments (2043), up to 150mm deep, overlay both the rubble on the east side, and the dark soil on the west side. This appears to have resulted from the cleaning of mortar from the stones, prior to their removal from the site and lay immediately under the topsoil (2001). Another localised area of tumble overlay the east hearth and consisted of burnt stone, tile and brick fragments (2061); it may represent the collapse of the chimney. All the deposits in Trench 2c underlay a similar layer of mortar fragments (2106) to that apparent in Trench 2b.

Deposits recorded outside the building

Within the 2009 excavation, only a small area outside the building was exposed on its north side, and in Trench 2c. Outside of the north wall the compacted surface (2056) seemed very similar to that within the interior, although it was thinner and overlain with thin lenses of windblown sand (2057) and further thin compacted ashy layers, containing lots of coal/shale fragments (2042). In Trench 2c, a dump of mussel shells (2060) recalls similar deposits uncovered in Trench 2a in 2007 outside the south east corner of the building (Aitken and Hooper 2008, 34). Though the stratigraphic sequence is not entirely clear here, this midden material could predate the demolition of the structure. The CFA auger survey and the 2008 geophysical survey suggest that these middens did once extend all the way along the south frontage of the building (Badger, Cressey and Aitken 1005, 24 and fig. 8; Saunders and Ovenden 2008, figs. 4 and 8), though, on excavation, the character of the material outside the door in the south wall differs significantly from the concentrations of mussels at both corners of the building. Midden material visible in a rabbit hole several metres to the west of the Trench 2c consisted principally of ash and coal/shale fragments, but contained no shell. It serves to confirm that the full extents of these midden deposits are not yet known.

4.1.2 Trench 4

Just prior to the 2009 season of excavation, two bundles of iron nails, neatly bound in string, were found eroding out of wall [4003] on the seaward side of Trench 4. They appear to have been stuck into a crevice in the inner face of the wall in the south east corner of the building - and simply forgotten. Their discovery is a graphic indication of the extent of ongoing erosion, particularly now that the stonework protecting the interior of the structure at its east end has now eroded away completely.



Plate 8. String bound nails recovered from wall [4003].

The 2008 limit of excavation was extended westwards by opening up a 7.5m by 5.5m area to expose the western end of the building. The overburden of windblown sand together with all deposits associated with the 19th century boundary wall (recorded in 2008) were removed by machine down to the level of the easily identifiable demolition rubble (4010/1).



Plate 9. Working shot early on in the excavation of Trench 4, showing proximity of the coast edge.

Phase 1: deposits associated with the construction of the building

The earliest sequence of deposits encountered in Trench 4 comprised discontinuous lenses of thin plastic greenish and blue grey clay containing variable, though low, quantities of mortar, and stone chips and rare coal fragments (4244, 4240, 4243). These overlay clean natural sand, and were located inside and outside the building. Adjacent to the northern side of the building (4244) was overlain by a layer of crushed mortar, stone chips and crushed, horizontally laid tile (4243), though the tile became less frequent towards the west. This layer was very compacted and typical of construction trample (Plate 10). A shallow pit [4182], visible in the east facing section of the trench in 2008 and in the north facing side of the large pit [4143] in 2009, was not picked up in plan. Its fill was a loose, light brown sand, flecked with occasional fragments of coal/shale and clay (4183). This, combined with its irregular shape, makes it difficult to interpret. It is clearly early in the sequence as it is sealed by construction deposit (4240), and could simply be a hollow created during the erection of the building or during the preparation of the site.



Plate 10. Tile rich construction trample (4243), on outside of building. Taken from the N.

With the exception of a short stretch of the inside face of the west gable wall of the building, exposed just within the limit of excavation (Figure 6; Plate 11), the external walls of the building [4003] within the 2009 area of excavation had been almost completely robbed out leaving only the 'ghost' of their outline as linear trenches of clean sand bisecting subsequent coal-rich occupation deposits (Figure 7; Plate 12). The gable end wall survived to approximately 3 courses. It was constructed of irregular sandstone blocks bonded with blue grey clay and rendered internally and externally with lime mortar.

Inside the building, the west end of the structure appeared to have been separated from the outset from the flagged area around the hearth complex recorded in 2008, by an internal partition (Figure 7; Plates 12 and 13). The base of the partition was preserved as a strip of stiff blueish grey clay and mortar (4242), which may have supported a wooden superstructure, as it lies on the same alignment as two small pieces of wood and a series of probable stakeholes recorded in 2008. The clay and mortar were set vertically and protruded from an ill-defined linear cut [4250]. The cut has survived most clearly where protected by the overlying field wall [4056/7/8], which also preserved another two

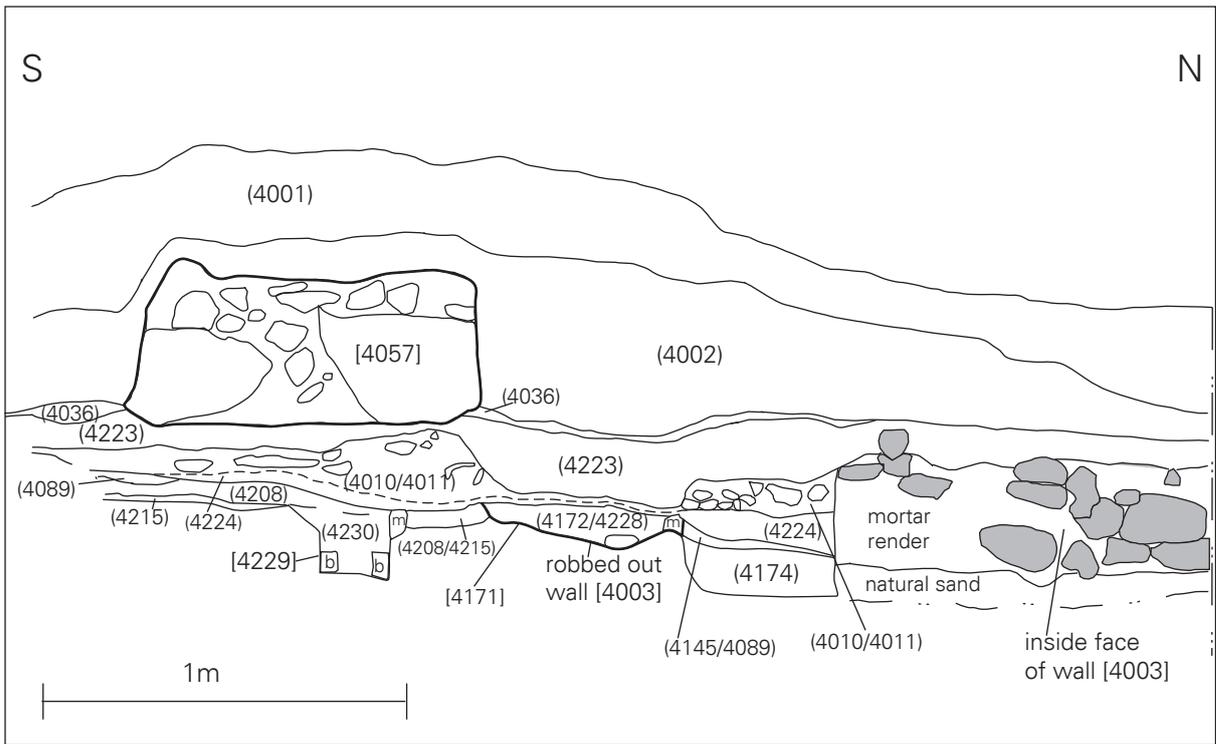


Figure 6. East facing section of Trench 4.



Plate 11. East facing section of Trench 4.

possible rectangular stakeholes (4247, 4248), on the same alignment as those recorded in 2008.



Plate 12. General view of Trench 4, following excavation. Taken from the E.

Phase 2: deposits associated with the use of the building

In the interior of the building, against the south wall, was an approximately 1m², 12cm thick patch of highly compacted, finely laminated midden material (4239) made up of discrete layers of coal dust, mortar fragments, and pan-scratch, the first time that the waste material from salt panning has been found in Trench 4. This deposit had a smooth, slightly convex profile and was far more compacted away from the south wall. On the east side of partition [4242], an equivalent layer (4241) comprised a similarly compacted finely laminated coal rich layer. This respected the eastern edge of the partition and abutted flagstones [4091] recorded in 2008. Below (4241), was another highly compacted deposit, generally dark in colour, mottled with pinky orange and comprising burnt and unburnt coal and mortar fragments and ash (4249). A thin, fragmentary layer of this material appeared to extend under the flagstone floor. The laminated and highly compacted nature of the deposits described above indicates they developed as occupation or floor surfaces. A high proportion of ferrous objects from Trench 4, many of them tool-like, were recovered from these contexts. Externally, these deposits are probably contemporary with a compacted, black coal rich deposit (4215) recorded as the 'coal road' in 2008 to the south of the building (Figure 7; Plates 12, 13).

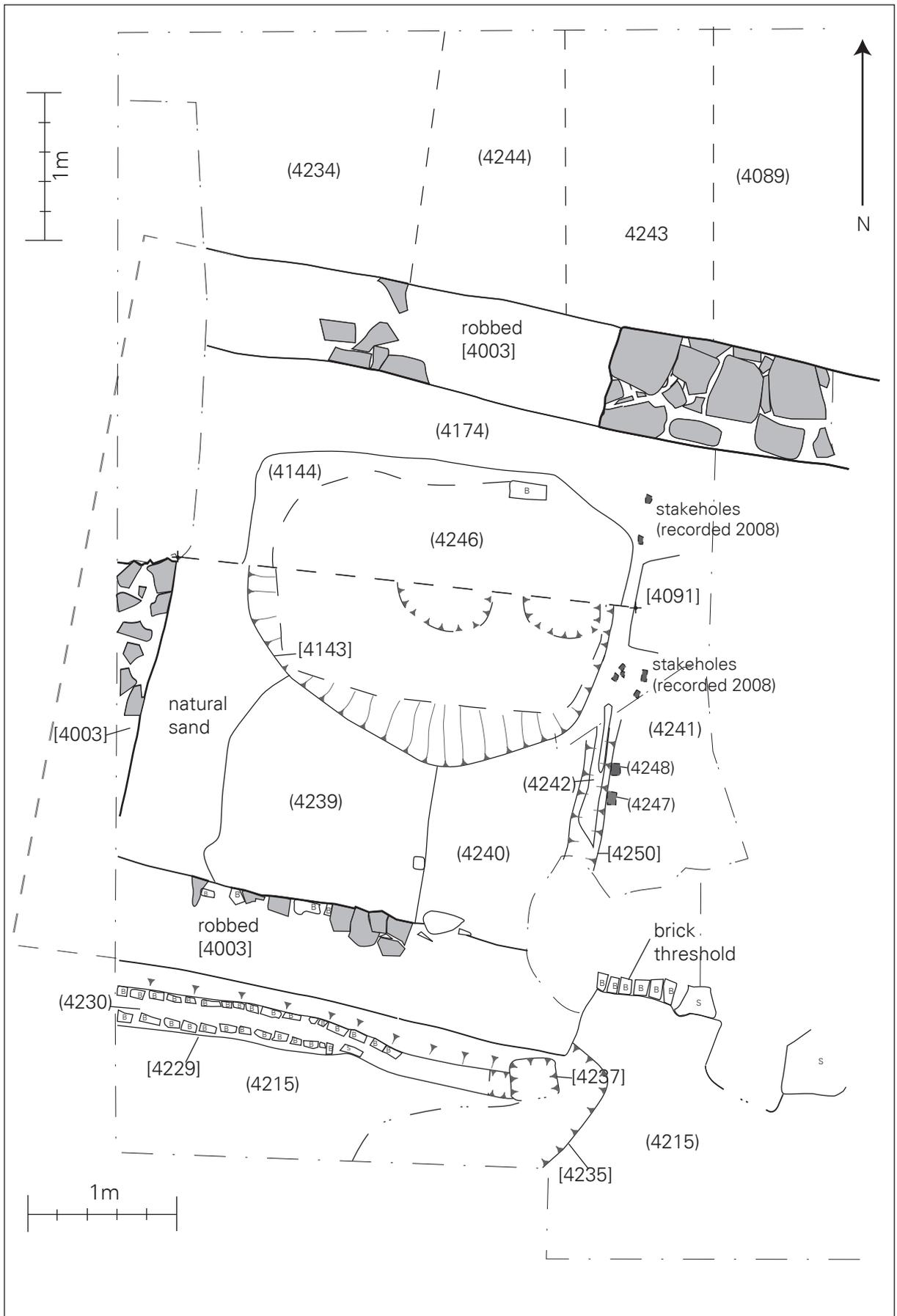


Figure 7. Multi-context plan of Trrench 4, phases 1-3, showing walls [4003]; floor deposits (4239, 4241, 4174); partition [4250]; brick-lined conduit [4229]; pit [4143].



Plate 13. Cross section through primary floor-like deposits in Trench 4. The possible partition [4242], can be seen on the left hand side. Taken from the N.

Sealing these highly compacted floor-like surfaces inside the building on the west side of the partition was an extensive deposit of trampled coal-rich sand (4174), also containing a number of well-preserved tool-like iron objects. This was very similar, but darker in colour, to layer (4092) recorded in 2008 on the east side of the partition. Equivalent deposits on the outside of the building, comprise loose black/dark grey coal rich sand; (4208) to the south and (4234) to the north. Together, these deposits are also likely to derive from occupation and use of the building.

On the outside of the south wall, a square sided, flat bottomed cut [4229] ran parallel to the wall continuing beyond the western limit of excavation (Figures 6 and 7; Plates 14 and 15). The cut was lined with broken bricks, infilled with a mixed, loose, coal/shale rich sandy deposit (4230). The brick-lined trench may have housed a metal or wooden pipe or trough, of which there is no surviving evidence, to carry liquid either into or away from the building. There is no indication of this possible conduit passing under or through the wall, though the latter is almost entirely robbed out at this point. The feature terminated at a square cut [4237]. This had vertical sides and a flat bottom, its north side, against the outside face of the south wall, lined with a vertically set piece of shale. The precise relationship between these two features was not clear during excavation, but it is possible that [4237] held a vertical pipe, either draining from the roof or a tank housed on an upper floor, into the conduit, or taking liquid from the conduit into the building. This cut was infilled with identical material (4238) to that within the conduit.



Plate 14. *Brick lined conduit [4229] on outside of the S wall. Taken from the NW and above.*



Plate 15. *East end of brick lined conduit [4229], showing square cut [4237] and vertically set piece of shale against S wall of building. Taken from the S and above*

In the vicinity of the doorway [4216], the deposits were very disturbed and the sequence difficult to disentangle. A shallow, irregular cut [4235] ran around the end of the south wall, on the west side of the doorway. It coincided with the eastern and western limits of the construction deposits within the building (4240) and cut through the compacted coal rich deposits (4215) which lie below the occupation layer (4208) on the outside of the building. The fill of this pit comprised lenses of yellow sand interleaved with much darker bands, coloured by the amount of coal/shale fragments within the sandy matrix (4236).

Phase 3: deposits associated with pit [4143]

All internal occupation deposits west of the partition were truncated by a *circa* 2.4m diameter, 1.2m deep sub-circular pit [4143]. It had generally vertical sides and a roughly square irregular base with two circular deeper areas towards the centre (Figures 7 and 8; Plate 16). The original spade cuts were identifiable in the sandy sides of the pit. The upper fill of the pit appeared to consist of a trampled layer (4246), formed while the surrounding coal-rich occupation deposit (4174) was still exposed. Below this, the main fill consisted of clean yellow sand (4144), within which there were large fragments of the highly compacted, laminated coal rich deposits. Occasional lenses of blue-grey clay and pieces of coal were visible within the fill, while two broken bricks and part of a probable flagstone were also recovered. The primary fill of the pit consisted of loose mottled orange yellow sand, dark grey blue clay and rounded quartz pebbles (4245); a thin band of fine black sand was also observed in places.

The eastern edge of the pit respects the possible partition and stakehole alignment (see above), has been dug through occupation deposits contemporary with the use of the building (4174 etc.) and is sealed by primary collapse and demolition layers (4089, 4145). The evidence indicates it was excavated and backfilled within the standing building possibly just prior to its demolition. The incorporation of such large and intact floor fragments within the fill also suggests that the pit was dug and back-filled quickly. At the base of the pit, the deposits probably represent re-deposited natural which infills rounded hollows at the base of the pit. Though only half excavated, the most likely explanation for the excavation of the pit may be related to retrieval of equipment following the closure of the saltworks.

Phase 4: deposits associated with the initial abandonment, demolition and robbing of the building

A concentration of tile, some almost complete, within a matrix of loose yellow sand (4089), probably represents the collapse of the roof (Plate 17). Though patchier and thinner within the building, this layer was 10cm thick externally. It did not cover the walls of the building, suggesting that they were still standing at this point. There were occasional inclusions of mortar and coal/shale, which are more frequent in the probably equivalent deposits closer to the centre of the building, recorded in 2008 (4101, 4104). The lack of trampled material, e.g. coal dust, and their stratigraphic position, beneath demolition rubble, and above occupation deposits, implies that this is roof collapse, rather than deliberate demolition. The quantity of sand associated with the tile indicates that there may have been a period, in which windblown sand accumulated within the abandoned building; this phase of sand deposition was much more apparent in the eastern half of the building.

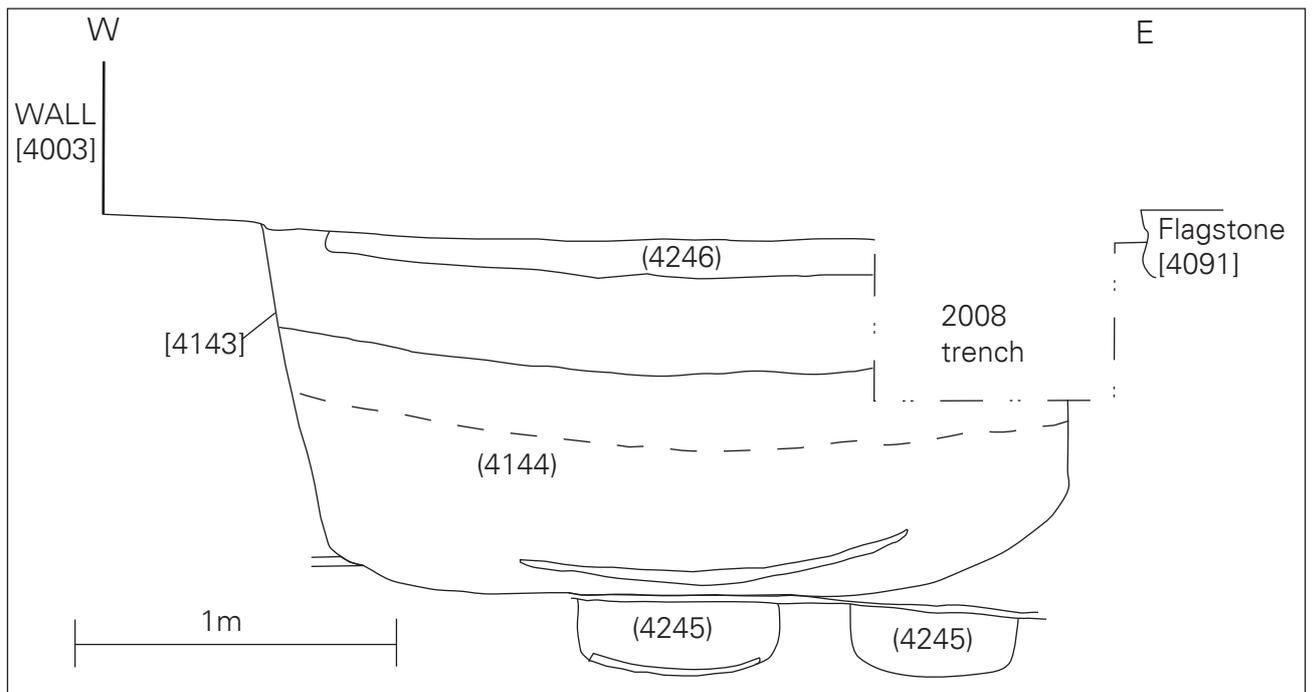


Figure 8. South facing section through pit [4143]



Plate 16. Pit [4143] following half sectioning. Taken from the west.



Plate 17. Concentration of tile on N side of building, suggesting roof collapse (4089). Taken from the N.

Subsequent to this episode of collapse and sand accumulation, the northern and southern walls in the westernmost 3 metres of the building were comprehensively robbed. There is no evidence for a deliberate robber cut, rather the stones seem to have been prised out of the wall and cleaned of their clay bonding and harl before being removed from the site. This process seems to have caused relatively little disturbance to the adjacent, contemporary deposits. The mixed fill of the wall trench comprised lenses of loose yellow sand and compacted blue and greeny grey clay (4228), amongst which were frequent mortar pieces, along with coal/shale fragments and burnt material. Just outside the northwest corner of the building was a small pit, filled with a concentration of demolition debris [4231/2].

This initial phase of demolition resulted in localised deposits (4145) of stiff clay, containing variable concentrations of rubble and mortar, as well as pieces of coal (Figure 9). The clay was predominantly grey in colour and very similar, though less sandy, to the fill of the robbed out wall at this end of the building (4228). Apart from the small area of grey clay (4088) observed under the large quartzite tumble on the inside of the south wall closer to the centre of the building in 2008, (4145) appears to be restricted to the more comprehensively robbed west end of the building.

Phase 5: abandonment and final demolition

Demolition deposits (4145) and the robbed out walls (4228) were covered by an accumulation of windblown sand (4224), containing broken roof tile. This is likely to represent a period of abandonment following the initial demolition and robbing of the building, particularly its western end. Above this, layer (4010/4011), an extensive spread of clay and rubble of varying thickness was encountered across the entire area of excavation (Figure 6). Since the walls in this part of the building had already been almost completely robbed out, this deposit must originate from surviving masonry in the eastern end of the building. This episode suggests a deliberate levelling or clearance event of the ruinous structure, after which the only evidence of a building would be a low mound of rubble soon to be covered by windblown sand. A few years later, the builders of the field

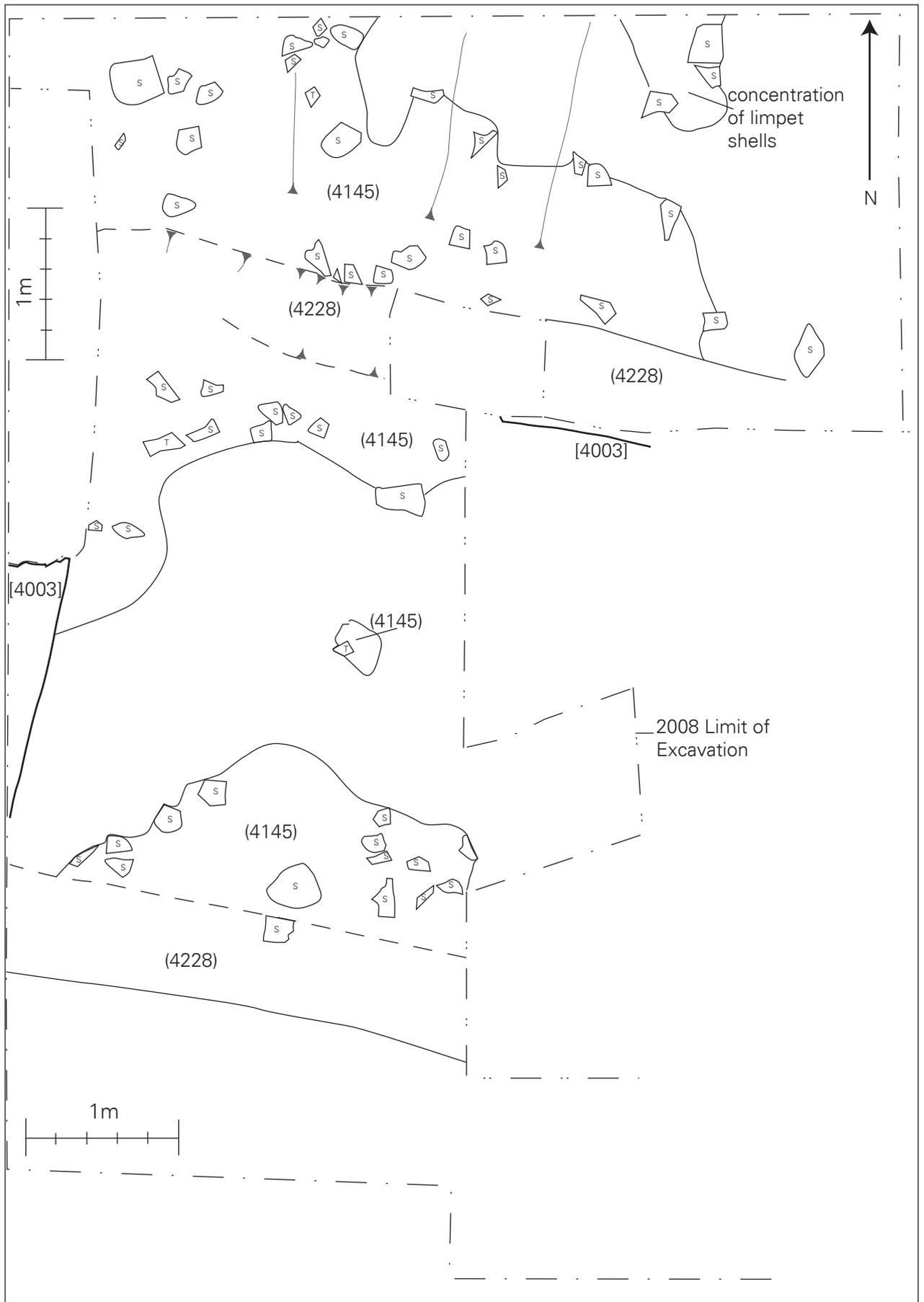


Figure 9. Plan of Trench 4 showing primary demolition deposits (4145, 4228) associated with the demolition and robbing of the west end of the building.

boundary wall [4057] may not have been aware that a building recently stood beneath its foundations.

4.1.3 Trench 7

A 26m long and 1.5m wide long slit trench, was opened up by machine parallel to the shoreline to the east of Trench 4 in order to investigate geophysical anomalies recorded in the 2008 survey undertaken by the Orkney College Geophysics Unit (Saunders and Ovenden 2008, figs. 4 and 8). One of these anomalies appeared to correspond with the 'Intended Waggon Road' shown on Kirk's 1772 map and to an area of midden material, exposed along the coastal edge as Sites 6 and 7, but also extending inland as far as the Saltman's House, (Badger, Cressey and Aitken 2006, figs. 3 and 8; Aitken and Hooper 2008, 29).

An 8.5m wide 'mound' of midden deposits (7009), up to 400mm thick in the centre, was revealed in the western half of the trench (Figures 10 and 11). The midden was made up of numerous discrete dumps of, burnt and unburnt stone; coal; clay and mortar; ash and pan-scratch (Plate 18). The amount of pan-scratch suggests that this midden might have been located close to one of the panhouses. The sand at the base of the midden has a 'corrugated' appearance, with striations oriented NNW-SSE. These may indicate that the midden simply built up on top of the uneven and unvegetated surface of the natural windblown sand.



Plate 18. *Large piece of pan-scratch within midden deposits (7009) at west end of Trench 7.*

In the eastern half of the Trench, Kirk's 'Intended Waggon Road' was identified as a cobbled roadway (7010) with a surface of highly compacted coal dust (7008) (Figures 10 and 11; Plate 19). The full width of the road measured 4.75m and was oriented NNE - SSW. The cobbled base was 3m wide and composed of beach cobbles of varying sizes (150mm – 300mm) and lithologies, all of which are common on the present beach at Brora.. The cobbles were set into a matrix consisting of a high proportion of coal dust, but which also contained more midden material than the surface of the road itself. Though not particularly clear, there do appear to be striations in this surface, which respect the

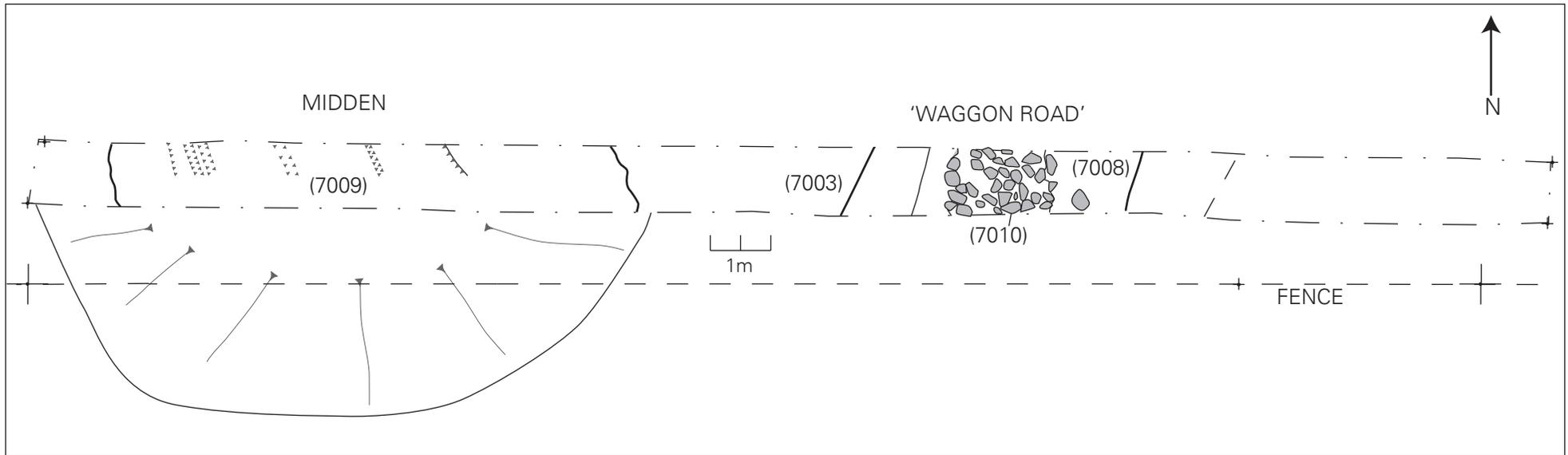


Figure 10. Plan of midden (7009) and "Waggon Road" (7010, 7008), Trench 7.

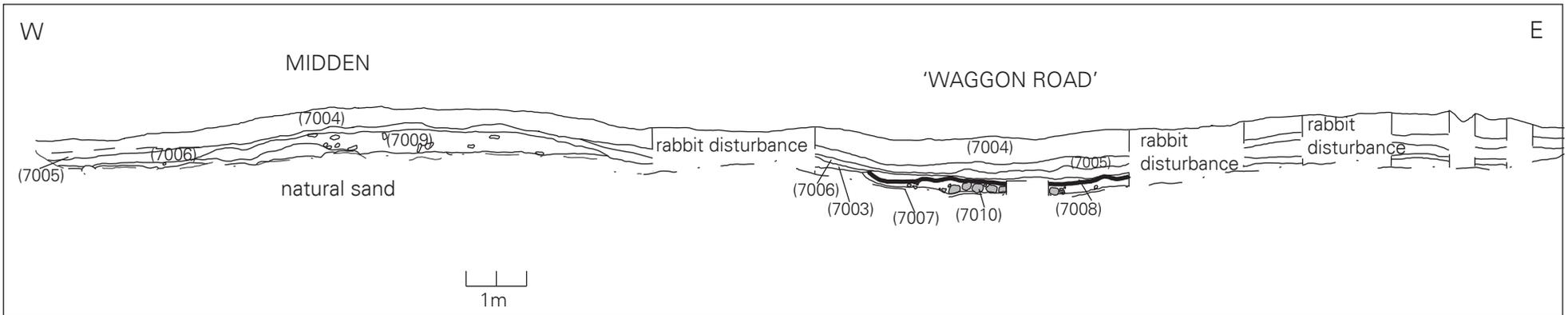


Figure 11. South facing section of Trench 7, following excavation.

alignment of the road and which may have been worn by wheels of the carts passing along it. The line of the trackway can be traced as far as the 'new' pit shown on Kirk's map, close to Lower Brora; close to the pit, erosion by rabbits and cattle has revealed the make-up of the road, which is very similar to that in Trench 7.



Plate 19 The 'Waggon Road', prior to excavation. Taken from the W and above

Like the midden deposits to the west, the cobbles of the roadway seem to have been placed directly onto the natural windblown sand, which has become stained during this process (7007). The contemporary ground surface between the road and midden mound consisted of a 90mm thick deposit of loose, dark grey, coal rich sand (7003). These deposits probably represent modified natural windblown sand, suggesting that the ground surrounding the road and the adjacent buildings was largely free of vegetation and giving some insight into the environment contemporary with the industrial landscape.

Sealing the road and midden throughout Trench 7 was a layer, between 40mm and 200mm in thickness, of clean windblown sand. This would have accumulated in the period immediately following the disuse of the road and midden, and probably the closure and abandonment of the wider industrial complex.

4.2 Old Salt Works

A limited amount of work was undertaken at the Old Salt Works. A small area was opened up on the landward side of the doorway in Site 4, (Figure 2) where only the footings of the long wall on the beach now remain in situ to investigate the relationship between midden deposits exposed in the dune section, with the wall. Although excavation conditions were difficult, the midden deposits appeared to be associated with a later phase of activity than the wall against which they abutted.

The continued erosion of the large dune which contains the remains of the Old Salt Works has revealed that the surviving remains of the building recorded as Site 2 are far more substantial than has been supposed. It had been thought that the previously

recorded substantial fragment of walling running into the dune face on an approximate N-S alignment and a flagstone floor (Plate 20) were the remnants of the back or northern edge of a building, that had largely been eroded away. However, further collapse of the dune has resulted in the exposure of a 1.5m length of walling 9m to the west of the fragment already recorded, oriented WNW – ESE and running into the dune face (Plate 21).



Plate 20. Floor slabs and overlying deposits exposed in the dune face.



Plate 21. Newly exposed walling in dune face in area of Site 2.

This wall has proved to be the remains of the front or south wall of a building, the rest of which may survive within the dune (Figure 2). The exposed walls are constructed of large squared sandstone blocks forming an internal and external face with a rubble core. The

whole is bonded with a hard white lime mortar. The eastern wall survives to a height of over 1.5m, and interpolated measurements between the visible masonry indicate the building is at least 15m long. Following further dune collapse in November 2009, indications of internal structures were observed (Plate 22). A possible piece of panscratch was recovered from this area.



Plate 22. Previously recorded walling in Site 2 showing heat reddened internal structures.

5.0 GEO-REFERENCING OF THE HISTORIC MAPS (Joanna Hambly)

This year the geo-referencing of the historic maps has contributed much to our understanding of the archaeological remains on the Back Beach at Brora. A series of detailed maps, dating back to the early 1770s, exist for the area. Of these, the most reliable regarding information about the location and the buildings associated with the 16th-17th century (Old) and 18th century (New) salt works are John Kirk's 1772 '*Plan of Part of the Estate of Sutherland*', and John Farey's 1813 '*Mineral Map of the Coal field at and near Brora in the County of Sutherland*'. For the first time, geo-referencing of these maps has enabled positive correlations between the recorded archaeological remains and buildings and features depicted on historic maps. This exercise has also made it possible to chart the changing coastline and quantify the scale of coastal erosion in the areas of the Old and New Salt Works.

Methodology

The maps drawn by Kirk and Farey pre-date the development of the planned settlement of Brora, and so it was necessary to use map regression to trace back common, precisely located features in order to accurately geo-reference the earlier maps. This was achieved by using current OS Master Map data, the 1879 1st edition 6 inch to 1 mile OS, and an anonymous 1820 '*Plan of the Town and Harbour of Brora*', an early map of the planned town showing completed and proposed buildings and streets. The work was carried out using Esri ArcMap 9.3 software, and the maps added to the project GIS which comprises geophysical, landscape and excavation surveys carried out since 2004. A maximum error of 2.5m was achieved between features recorded in the site survey with the same features depicted by Kirk and Farey in the area of interest.

Results

John Kirk's map of 1772 is crucial to any understanding of the New Salt Works, because it depicts the salt works in operation (Figure 12). The geo-referenced maps suggest that there is very good agreement between the location, dimensions and orientation of the building recorded in Trench 4 and the westernmost of a pair of E-W oriented buildings depicted by Kirk some 40m inland from the contemporary coast edge. It is now certain that the substantial building next to the annotation '*Salt Pans*' and the structure lying at right angles to the coastline, have succumbed completely to erosion. Overall, the general close agreement between features and deposits recorded during fieldwork at Brora with the arrangement, location and dimensions of those on Kirk's plan indicates the 1772 survey is a relatively accurate and reliable representation of the late 18th saltwork complex.

Trench 7 was laid out to investigate geophysical anomalies recorded in 2008, one of which appeared to correspond with the '*Intended Waggon Road*' shown on Kirk's 1772 map. The geophysical anomaly was positively identified in the eastern part of the trench as a cobbled roadway with a surface of highly compacted coal dust, and indicates that the actual route of the *Waggon Road* here lay approximately 13m west of the intended route on the map. Between the road and the building in Trench 4, a concentration of stone, brick, mortar and tile eroding out of the coast edge is probably all that remains of the easternmost of the pair of buildings.

Trench 2 was originally laid out to investigate slight earthwork remains which were thought to be the site of the '*Ruins of Saltman's House*', shown on Farey's plan of 1813. The close agreement between the surveys of the building excavated in Trench 2 confirms that it is indeed Farey's Saltman's House (Figure 13). This is located adjacent to the NE-SW oriented stone dyke, recorded by Farey and revealed in the excavations of Trench 4.



Figure 12. The relationship of 2009 excavation trenches and principle features and the results of gradiometer survey carried out by Orkney College Geophysics Unit in 2008 with buildings and features shown on John Kirk's 1772 'Plan of Part of the Estate of Sutherland'.

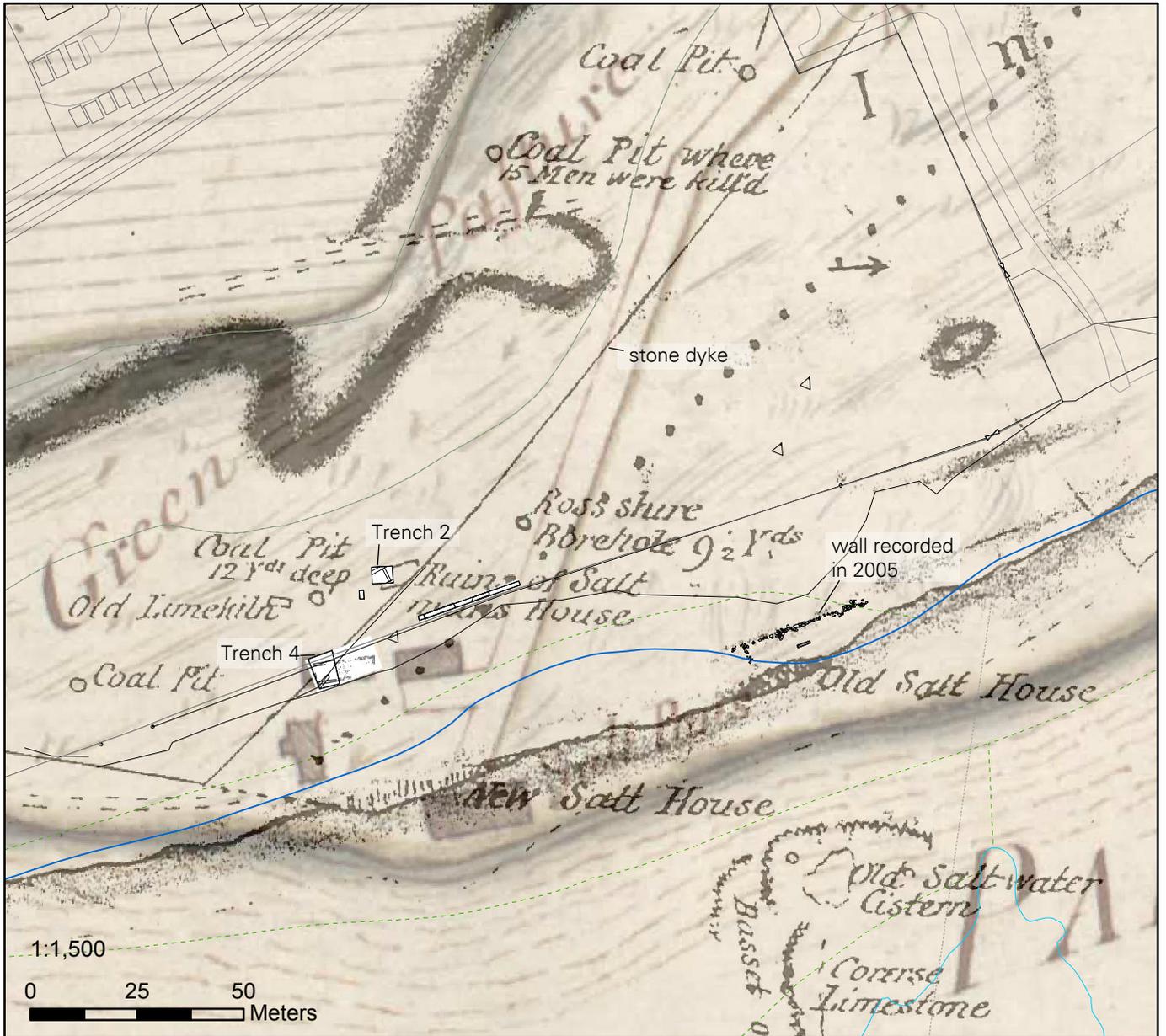


Figure 13. The relationship between John Farey's 1813 'Mineral map of the Coal field at and near Brora in the County of Sutherland' with excavated features recorded in 2005 and 2009; and with buildings shown on John Kirk's survey published 41 years earlier.

Farey marks the location of the New and Old Salt Houses as hatched areas along the coast edge but gives no information about individual buildings of either salt works. However, the surveyed remains of a c. 35m long wall recorded on the beach in 2005 lie in the immediate vicinity of the remains of the 'Old Salt House' as located by Farey. It is possible this wall is the north, or landward, wall of a very substantial building associated with the Old Salt Works.

The coincidence of Farey's annotation, '*New Salt House*', with the location of the largest and most seaward building depicted by Kirk suggest it is possible that it was the eroding remnants of this, now lost, structure that Farey recorded in the dunes at the coast edge.

Although only 41 years separates the surveys of Kirk and Farey, none of the buildings depicted on Kirk's plan appear on Farey's, and there is nothing on Kirk's map that corresponds with the Ruin of Saltman's House shown less than 50 years later by Farey. Inundation by blown sand together with coastal erosion is the likely explanation for the disappearance of the four buildings mapped by Kirk in 1772. By the time of Farey's 1813 survey, the coastline between the Old and New Salt Houses had retreated by between 14m-18m and he reports that the fire places of the Old Salt House were washed and covered with waves of every spring tide. Interestingly there is no mention of Kirk's large seaward building of the New Salt House, any surviving remains of which would have been largely in the intertidal zone by this time.

By 1813, the remaining buildings of the New Salt Works were likely to have been completely buried and invisible within the dune hinterland immediately behind the coast edge. This is supported by evidence from the 2009 excavations for the extensive dismantling and robbing of the building in Trench 4 following the closure of the salt works, after which a thick accumulation of windblown sand covered the ruins prior to the construction of the stone dyke depicted on Farey's map of 1813. The archaeological evidence thus supports the relatively swift disappearance of the buildings, probably leaving little or no visible trace in the landscape within a few decades of their closure. History records the ongoing battle with the unstable landscape in the 1760s when cattle and sheep were kept off the links for three years to allow the grass and marram to stabilise the ground surface due to the chronic problem of sands blowing and choking up the pits (Bangor-Jones 1994).

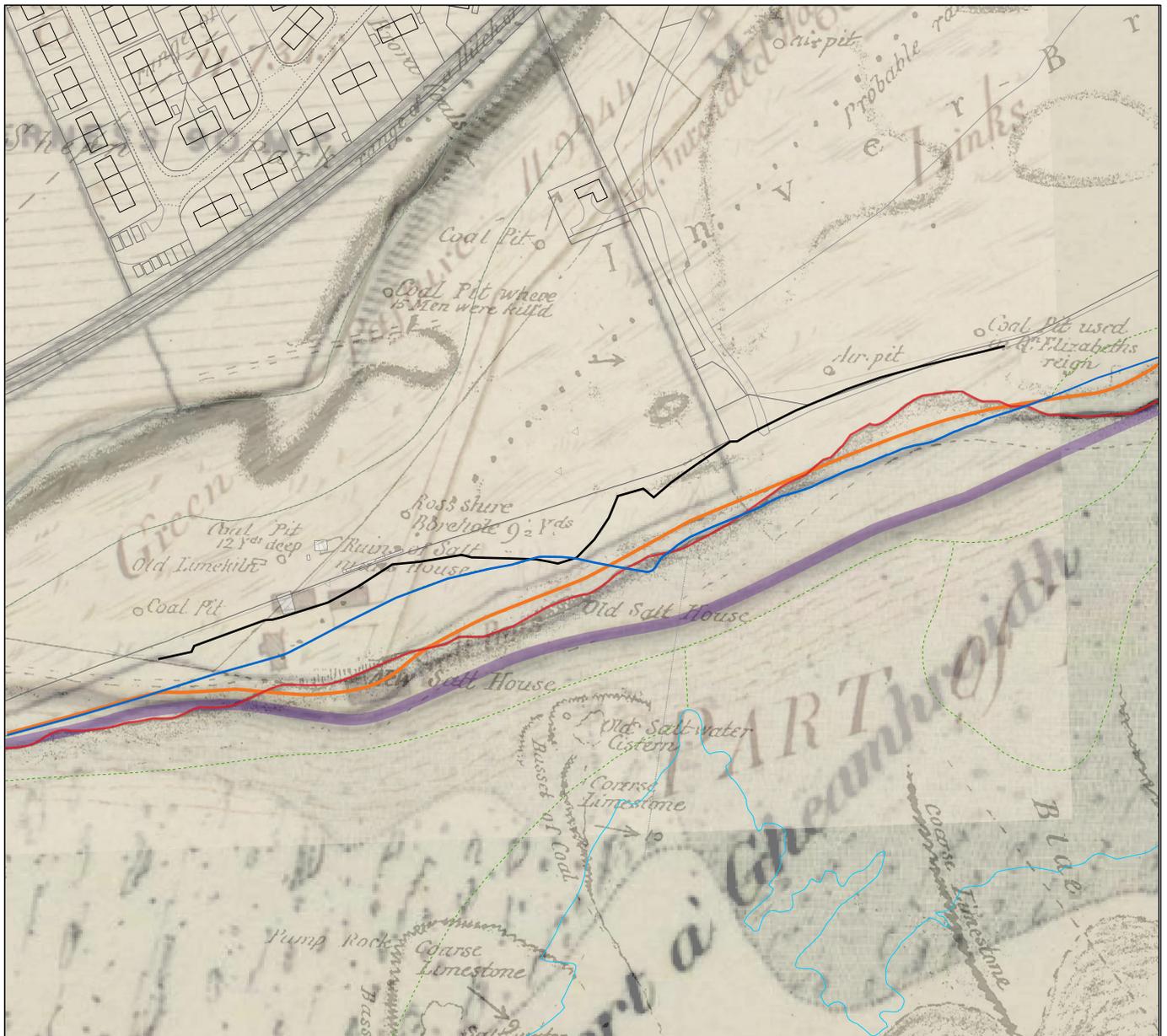
As to the absence of the Saltman's House from the 1772 map, the simplest and most likely explanation is that it was built after Kirk carried out his survey. The documentary record tells us that the salt works ceased operating in 1777, and so it is possible that the building was only in use for around 5 years.

Changes in the coastline

The most dramatic changes to the coastline have taken place in the area depicted in Figure 14.

In the 41 years between 1772 and 1813, the coastline retreated by approximately 13m in the vicinity of the Old Salt Works and by 20m at the New Salt Works.

In the 66 years between Farey's survey and the 1st edition Ordnance Survey of 1879, no change is recorded at the New Salt Works and there is an indication of up to 11m of accretion where Farey shows an area of indentation just to the southeast of the point



KEY

-  Coast edge, 2009 survey
-  Coast edge, current OS
-  Coast edge, 1879, 1st ed. OS,
-  Coast edge, 1813, Farey
-  Coast edge, 1772, Kirk

1:2,500

0 25 50 100 Meters

Figure 14. Coastal change at the Back Beach, Brora documented between 1772 and 2009, in the vicinity of the Old and New saltworks

where the modern track meets the beach. The majority of the coast edge elsewhere, however, appears to have receded at a slower rate to a total of between 6m and 8m.

Comparison of the 1st edition OS with the current OS shows a retreat of 27m at the New Salt Works and 15m at the Old Salt Works.

Comparison of the current OS and our site survey of 2009 indicate we are in another period of rapid change. The top of slope at the coast edge near the New Salt Works, as recorded in 2009, plots 10m-15m north of the top of slope line shown on the current OS. At the site of the Old Salt Works, every spring tide now penetrates at least a further 10m beyond the MHWS/coast edge line recorded on the current OS.

In total, between 30m and 50m of coast has been lost to erosion within the area of investigation at Brora Back Beach since the late 18th century. The period of greatest change in the historical record occurred between 1772 and 1813. The rate of current change, however, appears to be the most rapid yet documented.

6.0 DISCUSSION AND RECOMMENDATIONS FOR FURTHER WORK

As well as ascertaining the extent of the Saltman's House, it was hoped that further investigation would allow the function of this building to be established. However, no artefacts were recovered which give any indication as to its use, though analysis of the ferrous items scattered across the occupation deposits and floor layers will hopefully aid this understanding. Both fireplaces are on a domestic scale. Though the division of the building into two is reminiscent of the structure in Trench 4, the fact that Farey refers to it as the 'Salt-maker's House' and not simply as the Saltman's House, in the text accompanying his 1813 map, could indicate that it was divided into two smaller units as dwellings for the salt workers. Equally, it is feasible that the two fireplaces indicate that this building was not used for domestic purposes, but for the drying and storage of the salt. It is possible that the wooden framework found within demolition deposits inside the building may have been the remains of a structure that supported the wicker baskets or sacks in which the newly made salt was placed in order to drain. A number of nails may have come from this framework - or perhaps from the roof. In contrast to the building in Trench 4, very few pantile fragments were recovered from this trench. This may indicate that they were removed for re-use, but given the contrast with the amount of tile in Trench 4, it is perhaps more likely that the roofing material was dissimilar, suggesting also that the function of the buildings was different.

The excavation of the west end of the building in Trench 4 has clarified the stratigraphy and confirmed its industrial character, though the precise nature of the activities taking place within it remain to be explored in post-excavation analysis. The plan of the entire building is shown in Figure 15. The final external dimensions of the building measure 14.8m (48.5 feet) by 4.8m (15.7 feet). The internal dimensions of the eastern room measure 6.5m (21 feet) by 3.5m (11.5 feet) and the western room, 6.3m (20 feet) by 3.5m (11.5 feet). A circa 2m square (6 feet) pan would fit comfortably over the western hearth structure.

A substantial number of iron objects have been recovered from Trench 4 in the excavations of 2008 and 2009. In 2009, these were recovered almost exclusively from deposits relating to the use of the building. This year, a third solid semi circular cast iron object, very similar to the two found in 2008 in the vicinity of the central hearth complex, was found on the beach. Similar objects are depicted on Plate III of Brownrigg's cross section of an idealised 18th salt pan, and described as *Pillars of cast iron called taplins which support the salt pan*. This highlights the potential importance of the identification and analysis of the metalwork from the Brora excavations for our understanding of the use of the buildings.



Figure 15. Ground plan of building recorded in Trench 4 between 2007 and 2009



Plate 23. Semi-circular cast iron object (possible taplin) found on the beach by Eddie Keatinge. Two similar objects were recovered from the hearth area of Trench 4.

Possible evidence of a conduit on the shoreside edge of the building may indicate sea water was being piped into the building, and the excavation of the substantial pit may be representative of the removal of a valuable piece of equipment, possibly a pump, or a cistern, following the closure of the salt works. In the historical record, an entry in the Minute & Letter Book of the Tutors refers to some of the terms of the closure of the salt and coal works at the end of 1777:

The Agent laid before the meeting a letter from Captain Sutherland of 28th October desiring the Tutors Instructions about the Utensils & Materials of the Coal & salt works at Brora which the Company were carrying away and disposing of. The Tutors recommend to Captain Sutherland to take care that the houses shall not be demolished, but have no objections to the Company's carrying away the saltpans and utensils (Minute 7 Letter book of the Tutors of the Duchess, 21st November 1778, NLS Dep.313/275).

A period of abandonment represented in the archaeological record by evidence of possible roof collapse associated with an accumulation of windblown sand supports the historical record of the tutors desire to initially retain the building assets. However, the archaeological record also shows that following the closure of the salt works, the buildings were not re-used or maintained and were soon to be demolished and mined for their materials.

It is possible that the difficulties in determining the use of both the buildings recorded in Trench 4 and 2 may arise from the fact that the activities taking place within them were varied: panhouses; offices; workers' houses and storehouse are all known to have formed part of the complex on the Back Beach, but need not have taken place in separate buildings. For example, it is noted that Williams got into difficulties when constructing a house for the salters in 1767 (NLS MS 1485) but, at other contemporary salt works,

particularly on the west coast, the workers seem simply to have bedded down within the panhouses (Whatley 1987, 103).

The first direct evidence of salt production in the form of waste material known as pan-scratch was recovered after over 10 years of working at the Back Beach from all trenches. Pan- or stone-scratch was the crust of calcium sulphate and magnesium chloride which had to be chipped from the pans at regular intervals, a process known as 'paddling' (Whatley 1987, 18). The pan-scratch seems to have been utilised to level up the floor of the Saltman's House, in the vicinity of the hearths, as well as forming part of a hard working surface within the building in Trench 4. The heat resistance of the pan-scratch made its use in this way a common feature in Scottish salt works (Murdoch and Lewis 1999, 10-11).

The geo-referencing of the historic maps means that it is now certain that the long building annotated Salt Pans and the structure lying at right angles to the coastline, which are depicted on John Kirk's estate plan, dated 1772, showing the salt works in use, have succumbed completely to erosion. Of the two other buildings shown on the plan, the structure in Trench 4 is likely to be the more westerly structure. A concentration of stone, brick, mortar and tile eroding out of the coast edge (Site 6) is probably all that remains of the eastern building. It is hoped to confirm this through excavation in 2010.

The 'Waggon Road' and midden in Trench 7 appear to be constructed directly onto vegetation free sand, which also surrounds them. This provides an insight into the apparently dirty and unpleasant industrial environment of the time, confirming the conclusions reached on the basis of the deposits outside the building in Trench 4 in 2008 (Aitken and Hooper 2009, 16-7). It implies the instability of the dunes in this area, and might serve to illustrate why John Farey could only indicate the location of the 'New' Salt House on his 1813 map. However, it is possible that the amount of erosion along the coast edge and the almost complete disappearance of the salt works in just over twenty years which seems to be implicit in Farey's depiction suggests that there could have been a major storm event in the intervening 41 years.

The most important new discovery in 2009 is the realisation that the surviving remains of the Old Salt Works are far more substantial than previously thought. The quality of preservation of the visible structure raises the possibility that the interior of the structure, still buried in the dune, may be very well preserved indeed. The base of the dune is now being undercut at every high tide and the masonry structures within it are collapsing.

The rarity of any excavated examples of 16th – 17th century salt pans, the potential completeness and quality of the structure, the links with the historical record and the association of the remains with a salt making tradition in Brora that spanned 230 years, means that the archaeological remains of the Old Salt Works at Brora are potentially an important example of an early industrial site in northeast Scotland. These remains are now at risk of imminent loss from coastal erosion and it is hoped that a further season of fieldwork in 2010 will allow the information they hold to be rescued.

It is again the enthusiasm and energy of the volunteers which has made the third season of excavation at Brora such a success. Field and finds days, involving the volunteers, are planned for the late winter and spring in order to capitalise on this interest. It is hoped that on the field days it will be possible to continue the monitoring and recording of the various industrial middens associated with the Old and New Salt Works and to examine

the resources, such as clay, exploited by the industrial operations at Brora. During this year's excavation, the upper classes of Brora Primary School toured the site, while the number of visitors during the open day (c. 70) attests to the continuing interest among the local community. The industrial history of the Back Beach is a crucial element in the current development of a heritage trail around Brora and it is intended to take advantage of this through expansion of the displays within the Heritage Centre. Connections with St. Monans and with Portsoy continue to develop and the project team have already been asked to speak in Portsoy and as part of the Groam House lecture series in 2010. It is hoped that the project can continue to maintain this momentum in the future.

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9.0 APPENDICES

9.1 List of Contexts

Trench 2

No.	Area	Description	Interpretation/Relationships
2001	2B	Dark brown friable sandy loam, supporting lush grass and bracken	Turf and topsoil
2042	2B	Loose, light brown cleanish sand, containing coal/shale fragments	Post-abandonment layer outside N wall of building. Equivalent to ?2006 (2007 excav.)
2043	2B	Spread of crumbled mortar, in a matrix similar to 2001. Concentrated in SW corner of trench, but thinnest closest to robbed out N wall	Immediately under topsoil. As deposit relatively free of stone, appears to represent cleaning of rubble, prior to re-use
2044	2B	Rubble - and a small quantity of brick/tile - in a compacted matrix of yellow, crumbled mortar	Demolition rubble or collapse. Though similar to 2009 and 2011, uncovered in 2007, lacks clay component. Equivalent to 2048 on E side of partition wall
2045	2B	Clay bonded masonry walling, running NW-SE. Made up of shaped quartzite blocks and harled internally and externally	Internal partition wall. It appears to be keyed in to the external walls of the building and therefore contemporary
2046	2B	Clay bonded masonry walling, running NE-SW. Made up of shaped quartzite blocks and harled internally and externally	Wall forming S side of building. Only short stretch exposed in 2B, but must be robbed out beyond this, as no stonework remains in 2C. Equivalent to 2027 (2007 excav.)
2047	2B	NE-SW masonry wall. Appears to be similar to 2046 and 2047, but largely robbed out	Wall forming N side of building. Equivalent to 2020
2048	2B	Rubble, in a matrix similar to 2001, on E side of 2045. Differs from 2044 in that it contains a greater proportion of large stones	Demolition rubble or collapse - the amount of stone remaining perhaps suggests the latter. Equivalent to 2044
2049	2B	Loose deposit containing rubble, mortar, pockets of clay and lenses of clean yellow sand	Overlies deposits within hearth, 2055, but interleaved with clay, 2050. Perhaps represents collapse rather than deliberate demolition
2050	2B	Compacted, clean yellow clay, spread across W half of building	Though appears to post-date the abandonment of the building, not a deliberate surface as mounded up in places. Does not cover entire floor area
2051	2B	Compacted, clean greeny yellow clay, spread across E half of building. Slightly less hard than 2050, as contains more sand	As above. ?Equivalent to 2009/2010 (2007 excav.), though contains less mortar fragments
2052	2B	Upright stone pillar, set into E face of partition wall, 2045	Jamb on S side of fireplace, 2067
2053	2B	Dark, sticky, mixed deposit, containing burnt coal/shale fragments	Mixed deposit apparently consisting of demolition material, 2049 and underlying hearth deposits, 2086. Abuts 2050

No.	Area	Description	Interpretation/Relationships
2054	2B	Dark, loose loam with few inclusions, in SW corner of trench	?Old ground surface, accumulated between deposition of clay, 2050 and cleaning of rubble, 2043
2055	2B	Heat-affected stone setting, consisting of the sockets for 2 robbed out pillars similar to 2052 (2076/7) and a single slab forming a sloping back	Hearth set into W face of partition wall, 2045
2056	2B	Thin, brown compacted layer, containing coal/shale fragments and ash	Working surface outside of N wall of building. Underlies post-abandonment layer, 2042
2057	2B	Pale yellow loose sand, interleaved with lenses of darker sand	Windblown sand (deposited in a dirty environment) on outside of N wall of building. Underlies 2056
2058	2B	Mixed deposit, consisting of clay lumps, chunks of mortar and quartzite flakes	Demolition deposit, adjacent to robbed out N wall. Partially underlies 2054, abuts 2050
2059	2C	Pale clean sand	Fill of robber trench of wall of building
2060	2C	Mussel shells in matrix of topsoil, 2001	Midden deposit on S side of building. ?Equivalent to 2007 (2007 excav.)
2061	2B	Burnt stone, tile, brick and rubble, overlying S part of partition wall, 2045	?Chimney collapse
2062	2C	Mixed deposit of dense grey clay and mortar, within which are lenses of yellow clay and looser clay-mortar mix	Similar to 2050/1
2063	2B	Loose, mixed deposit, consisting of quartzite flakes and mortar, in the SW angle of the partition wall	Underlies clay, 2050, but overlies floor deposits, 2075, so possibly represents initial collapse of the building
2064	2B	3 parallel timbers running NE-SW, plus a shorter timber running parallel to the partition wall and 4 shorter, apparently randomly placed timbers. Set in matrix of clay, 2050, on W side of partition	Fallen partition or internal framework?
2065	2B	Large stone slabs, with gaps infilled with bricks and smaller slabs	Floor of building on E side of partition wall, 2045
2066	2B	Socket for ?stone pillar, similar to 2052	Jamb on N side of E fireplace, 2067
2067	2B	Stone slab, backed by three rows of shallowly curving heat damaged bricks	Fireplace set into E side of partition wall
2068	2B	Homogenous, fine grained orangey peat ash	Ashy deposits within fireplace, 2067
2069	2B	Loose, dark sandy deposit, mounded up in angles of partition wall, 2045 on E side	Very similar to trampled deposit, 2073, so may be sweepings into the corners of the building. Similar to 2073
2070	2B	Rubble, interleaved with lenses of clean yellow sand, in SE angle of partition wall	Collapse or demolition? Underlies the more obvious collapse, 2048, but overlies the floor deposits, 2073

No.	Area	Description	Interpretation/Relationships
2071	2B	Thin ridges of mortar	Mortar continuing external (N) face of robbed out N wall, 2047
2072	2B	Clean, bright yellow sand	Windblown 'natural' sand
2073	2B	Compacted grey black deposit, with coal/shale/charcoal fragments	Trampled deposit, immediately overlying floor slabs, 2065. Similar to 2069
2074	2B	Thin (0.5mm thick), brittle layer of creamy-white clay, visible on the underside of clay, 2050/2051	Natural substance leached out of the clay: so thin that does not seem to be anthropogenic
2075	2B	Patchy, dark, compacted gritty layer, containing fragments of coal/shale, against S wall in W half of building	?Floor surface
2076	2B	Socket formed from vertical slab (N) and 3 poor infill stones (S).	Stone pad/socket for S jamb of fireplace, 2055
2077	2B	Similar to 2076, though no vertical slab between it and the fireplace. Base of socket consists of 3 stones, piled on top of each other	Stone pad/socket for N jamb of fireplace, 2055
2078	2B	Apron of harling at base of external (N) face of N wall, 2047	
2079	2B	Mixed rubble deposit, on outside of N wall, 2047	Rubble associated with construction of wall, as underlies working surface, 2056
2080	2B	Small area of mixed deposits in NE corner of trench (unexcav.)	Area adjacent to 2065, which appears to be deliberately clear of slabs, as comes down directly onto 2072
2081	2C	Compacted, black gritty layer, containing small fragments of coal/shale and a large number of Fe objects	?Floor deposits, equivalent to 2075
2082	2B	Large beach cobbles against W face of partition wall, 2045, N of hearth, 2055	Deliberately levelling of ground prior to wall construction or - perhaps more likely - to infill hollow, formed during use of building. ?Related to 2102 on S side of hearth
2083	2B	Grey clay, which also extends under partition wall, where clean and solid	Matrix of cobbling, 2082. Its relationship to 2045, suggests it might be a construction deposit
2084	2B	Stumps of two rectangular wooden stakes	Located on edge of cut, 2087. Part of wooden partition, 2064?
2085	2B	Mixed brown, ashy sand, containing rubble and brick in SW corner of building	Though lies between clay, 2050, and 'natural', 2072, it differs from floor deposits, 2075, and is more likely to be a demolition deposit
2086	2B	Compacted pale brown ashy deposit, containing frequent burnt coal/shale fragments	Fill of hearth, 2055
2087	2B	Shallow arcing cut, visible running into N facing section of trench	As runs into section, not possible to determine its form. Cuts through floor deposits, 2075
2088	2B	Loose black deposit, made up of clinker, iron and unburnt coal/shale fragments	Upper fill of 2087

No.	Area	Description	Interpretation/Relationships
2089	2B	Homogenous, pale yellow grey sandy clay, containing no inclusions	Middle fill of 2087
2090	2B	Loose black, gritty deposit, made up of clinker, iron and unburnt coal/shale fragments	Lower fill of 2087
2091	2B	Stump of rectangular wooden stake, similar to 2084	Part of wooden partition, 2064?
2092	2B	Setting of three upright quartzite flakes, within what appears to be a roughly circular cut	Cut of ?stake/post hole, adjacent to 2084 and 2091. Set into 'natural' sand
2093	2B	Stoney, yellow clay	Fill of stakehole, 2092
2094	2B	Deep, roughly circular, cut	Cut of stakehole
2095	2B	Loose chocolaty brown sand	Fill of stakehole, 2094
2096	2B	Roughly rectangular cut, with a level base	Cut of stakehole
2097	2B	Loose, black silty sand	Fill of stakehole, 2096
2098	2B	Roughly square cut, tapering to a point	Cut of ?stakehole
2099	2B	Loose, black silty sand	Fill of ?stakehole, 2098
2100	2B	Mixed deposit, containing pan scratch	Levelling material underlying floor slabs, 2065
2101	2B	Compact orangey red ashy layers, interleaved with thin, grey lenses of ash	Base of hearth, 2055
2102	2B	Arc of stones and tile extending W from partition wall, containing deposits within rake-out pit, 2103. Far less clearly defined on N side, but may include cobbles, 2083	Stones defining edge of rake-out pit
2103	2B	Mixed black sandy deposit, containing large pieces of burnt and unburnt coal/shale	Upper fill of rake-out pit, 2102. Very similar to 2075
2104	2B	Loose brown sand, containing numerous whelks, mussels and occasional limpets	Shelly deposit within rake-out pit, 2102
2105	2B	Loose, chocolate brown sand, containing flecks of coal/shale	Lower fill of rake-out pit, 2102. Rests on 'natural' sand, 2072
2106	2C	Spread of crumbled mortar, with some sharp quartzite flakes. Extends across width of robbed out wall, but is not found externally	Demolition deposit. Similar to 2043

Trench 4

No.	Description	Interpretation/Relationships
4001	Mid grey-brown humic sand and turf penetrated by bracken roots	Turf and topsoil
4002	Clean, pale yellow sand	Windblown deposit
4003	White quartzite masonry blocks of wall	Wall, forming long side of a building running E-W parallel to the shore (Site 37)

No.	Description	Interpretation/Relationships
4009	Clean, pale yellow sand	Windblown sand under 4001. Same as 4002
4010	Thin layer of yellow grey clay	Layer of clay, potentially sealing 4011
4011	Rubble layer in clay matrix, underlying 4010. Mixture of angular and dressed stone and mortar	Demolition layer, occurring both inside and outside the building
4036	Spread of yellow sandstone fragments	?Rubble from dressing of stones of field boundary
4056	Predominantly grey, beach stone cobbles	Cobbles overlying field wall
4057	Massive square, yellow sandstone blocks	Field wall (Site 8)
4058	Predominantly grey, beach stone cobbles	Hearting of field wall, 4057. Very similar to 4056
4089	Loose yellow sand, containing lots of roof tile	The concentration of tile, many of which are almost complete, suggest this may be roof collapse
4091	Massive flat, red sandstone blocks	Flagged floor underlying later fireplaces
4143	Steep sided, sub-circular cut	Pit dug to retrieve large piece of machinery, following closure of salt works?
4144	Loose, mottled, yellow sand	Main fill of pit, 4143
4145	Spreads of stiff grey clay and rubble	Demolition deposits at W end of building
4171	Sharp vertical cut, with a flat base, running along both N and S long walls of building	Robber 'cut' for wall, 4003. This is not so much a deliberate cut, as the ghost of the wall
4174	Loose dark brown/black, compact coal/shale rich sand, with a slightly compacted surface	Occupation deposit within W end of building. Equivalent to 4092 on E side of partition, 4242
4181	Compacted (unburnt) black coal/shale fragments in a sandy matrix	?Trampled deposit, created during demolition of building, as only apparent close to north wall
4182	Gently sloping cut	Shallow irregular cut (only visible in section)
4183	Loose light brown, flecked sand	Fill of cut, 4182
4208	Loose black/dark grey, coal/shale rich sand, with slightly compacted upper surface	Occupation deposit on outside of S wall, 4003, at W end of building. Equivalent to 4092, 4174, and 4234
4215	Compact dark brown ashy deposit, containing fragments of coal/shale. Patchy and disturbed	Outside S wall of building, extending within doorway, 4216
4216	Doorway within 4003 (unexcav.)	Doorway allowing access into W half of building
4223	Loose, clean bright yellow sand	Windblown deposit, representing period of abandonment prior to construction of field wall, 4056/7/8
4224	Loose, clean bright yellow sand, containing some large pieces of tile and a discrete deposit of limpet shells	Windblown deposit, representing a period of abandonment between two episodes of demolition. Equivalent to 4012 (2007/8 excav.)
4228	Mixed deposit, consisting of lenses of loose sand and compacted clay	Fill of robber trench, 4171. Replaces 4172 (2008 excav.)

No.	Description	Interpretation/Relationships
4229	Flat-bottomed, steep sided, linear cut running along outside of south wall, 4003	Relationship to wall unclear at E end
4230	2 parallel rows of broken bricks, infilled with a mixed sandy deposit	Brick lining of cut, 4229
4231	Shallow, circular cut	Pit containing demolition debris. Cut through primary demolition layer, 4089
4232	Loose, grey brown gravelly sand, containing demolition debris	Fill of cut, 4131
4234	Loose, brownish grey coal/shale rich sand, with a slightly compacted surface	Occupation deposit on outside of N wall, 4003, at W end of building. Equivalent to 4092, 4174, and 4208
4235	?Sub-rectangular, steeply sloping cut	Irregular cut into 4215, on outside of S wall, 4003. Function unclear
4236	Interleaved lenses of yellow and black coal/shale rich sand	Fill of cut, 4235
4237	Square cut, with vertical sides and a flat bottom	Square shaped cut, which may have held a downpipe
4238	Loose, mixed sandy deposit, very similar to 4229	Fill of cut, 4237
4239	Highly compacted midden material, made up of discrete layers of coal/shale dust, mortar fragments and pan scratch	Midden material forming floor surface within building, on west side of partition, 4242. ?Equivalent to 4241
4240	Loose brown sand, with small lenses of blue grey clay on its surface	Appears to respect the partition, 4242, rather than be cut by it, and to lie below the floor layers. ?Construction deposit. Equivalent to 4244 externally
4241	Highly compacted midden material, made up of coal/shale dust	Midden material forming floor surface within building, on east side of partition, 4242. ?Equivalent to 4239
4242	Vertically set clay and mortar	?Internal partition. Equivalent to 4176 (2008 excav.)
4243	Compact, mortared rubble and crushed, horizontally laid tile. Stone, clay and coal/shale fragments noticeably rare	Heavily trampled construction deposit
4244	Clean sand with thin lenses of plastic greenish and blue grey clay and stone chips	?Construction deposit. Equivalent to 4240 internally
4245	Loose orange yellow sand and blue grey clay, plus thin band of fine black sand	Re-deposited natural, forming primary fill of pit, 4143
4246	Loose brownish grey sand, containing occasional coal/shale and mortar fragments	Trampled layer, incorporating material from surrounding floor layers, 4239. Final fill of pit, 4143
4247	Rectangular, dark stain, though no clearly defined cut	?Fill of stakehole. In line with possible 2008 stakeholes, to E of possible partition, 4242
4248	Rectangular, dark stain, though no clearly defined cut	?Fill of stakehole. In line with possible 2008 stakeholes, to E of possible partition, 4242

No.	Description	Interpretation/Relationships
4249	Mottled, highly compacted, burnt and unburnt coal/shale rich layer	?Floor surface formed from midden material. Below 4241 and extending under flagstones, 4091
4250	Steeply sloping linear cut	Slot for possible partition, 4242. May be continued as a series of stakeholes to the N (2008 excav.)

Trench 7

No.	Description	Interpretation/Relationships
7001	Not used	
7002	Not used	
7003	Loose, dark grey, coal/shale flecked sand	Ground surface contemporary with roadway, 7008/7010 and midden, 7009
7004	Mid grey-brown humic sand penetrated by bracken roots	Turf and topsoil
7005	Mid grey-brown sand	Buried ground surface, beneath 7003
7006	Clean, pale yellow sand	Windblown sand, representing initial period of abandonment
7007	Loose, pale brown coal-flecked sand	Stained windblown sand, below roadway, 7010
7008	Highly compacted black deposit, consisting principally of coal/shale fragments	Surface of roadway. Has sharply defined edges
7009	Generally compact, mixed deposit containing ash, clay, burnt and unburnt coal/shale, pan scratch and building debris	Industrial midden deposit
7010	Large beach cobbles, within a dark compacted matrix of variable composition	Cobbled base of roadway

9.2 List of non metal finds

No	Tr	Context	No pieces	Material
1	4C	4145	1	Glass
2	2B	2044	1	Glass
3	2B	2043	1	Glass
4	2B	2043	6	Ceramic
5	2B	2043	1	Glass
9	2B	2051	1	Glass
11	4C	4002	1	Glass
12	4C	4002	1	Glass
14	4C	4002	1	Glass
15	4C	4002	1	Glass
16	2B	2051	1	Glass
18	4C	4002	1	Glass
21	2B	2049	1	Glass
22	2B	2049	1	Glass

No	Tr	Context	No pieces	Material
23	2C	2062	1	Ceramic
24	2C	2062	1	Glass
25	4C	4224	1	Ceramic
27	2B	2043	3	Glass
28	2B	2001	1	Ceramic
30	2B	2058	1	Bone
31	2B	2063	1	Glass
34	2B	2073		Bone
36	2B	2049	4	Glass
37	2B	2058	1	Ceramic
39	2B	2058	1	Ceramic
40	2B	2073	1	Wood
41	2B	2073	4	Bone
46	2B	2085	1	Stone
47	2B	2075	1	Glass
48	2B	2075	2	Glass
49	2B	2095	1	Glass
50	2B	2095	1	Bone
52	2B	2090	many	Coke
53	4C	4224	1	Glass
54	4C	4230	3	Ceramic
55	4C	4230	1	Ceramic
56	4C	4089	2	Glass
57	4C	4089	1	Glass
58	4C	4145	2	Glass
59	4C	4215	2	Glass
60	4C	4239	1	Ceramic
61	4C	4092	1	Glass
62	4C	4234	3	Ceramic
63	4C	4092	1	Ceramic
64	4C	4092	1	Ceramic

9.3 List of metal finds (organised by Trench)

Bag no	Tr	Context	No pieces	Material	Description
7	2B	2050	1	Metal	Iron
8	2B	2063	1	Metal	Button, plus unknown material
13	2B	2051	1	Metal	Iron nail
20	2B	2044	1	Metal	Iron: straight nail, plus 2 bent nails (lost)
29	2B	2070	1	Metal	Iron nail
32	2B	2073	1	Metal	Iron nail
33	2B	2073	1	Metal	Lead curl
38	2B	2058	1	Metal	Iron nail

Bag no	Tr	Context	No pieces	Material	Description
42	2B	2073	1	Metal	Iron: long thick piece
43	2B	2085	1	Metal	Iron: sharp rectangular
44	2B	2085	1	Metal	Iron
45	2B	2085	1	Metal	Iron nail
51	2B	2094	1	Metal	Iron: knife blade
17	2C	2059	1	Metal	Iron: square
19	2C	2059	1	Metal	Iron: ?strap or hinge
26	2C	2059	1	Metal	Clinker
6	4C	4224	2	Metal	Iron
10	4C	4224	1	Metal	Iron
40	7	7009	2	Metal	Iron: ?knife blades
41	7	7009	many	Metal	Iron: nails (2 bags)
45	7	7009	2	Metal	Slag. ?NR
47	7	7009	12	Metal	Iron: ?
62	7	7009	1	Metal	Clinker
63	7	7009	1	Metal	Iron: strap
35	7	7009	1	Metal	Cu alloy pin

Temporary numbers

T14	2	2073	1	Metal	Fe
T19	2	2088	1	Metal	Fe nail
T20	2	2088	6	Metal	Clinker
T21	2	2090	many	Metal	Clinker
T1	4	4236	3	Metal	
T2	4	4239		Metal	Slag
T3	4	4238		Metal	Slag
T4	4	4230		Metal	Fe
T5	4	4243	1	Metal	Fe nail
T6	4	4092	1	Metal	Fe nail
T7	4	4234	1	Metal	Fe nail
T8	4	4174	3	Metal	Fe
T9	4	4174	3	Metal	Fe
T10	4	4174	7	Metal	Fe
T11	4	4239	1	Metal	Fe
T12	4	4239	1	Metal	Fe
T13	4	4239	1	Metal	Fe
T15	4	4144	1	Metal	Fe
T16	4	4215	3	Metal	Slag
T17	4	4144	3	Metal	Fe
T18	4	4144	4	Metal	Fe
T22	4	4215	2	Metal	Fe
T23	4	4241	1	Metal	Fe
T24	4	4241	3	Metal	Fe

9.4 List of Samples

No	Tr	Context	No bags	Description
1	2B	2051	1	Clay (E), for comparison with sample 2 and natural clay
2	2B	2050	1	Clay (W), for comparison with sample 1 and natural clay

No	Tr	Context	No bags	Description
3	2B	2074	1	Thin pale layer adhering to overlying clay
4	2B	2073	1	Charcoal (1 large, uncontaminated piece)
5	7	7009	?	Sample of pan scratch
6	7	7009	?	Representative pieces of pan scratch
7	2B	2068	1	Ashy deposit (?peat), within hearth, 2067
8	2B	2086	1	Ashy deposit, within hearth, 2055
9	4C	4239	2	Sample of pan scratch
10	4C	4241	1	Ashy deposits
11	4C	4241	1	Large piece of burnt coal/shale
12	4C	4239	1	Black ashy deposits
13	2B	2104	1	Mixed deposit containing frequent whelks
14	4C	4239	1	Mixed deposit containing pan scratch
15	2B	2050	1	Clean, yellow green clay
16	4C	4215	1	Black occupation deposits
17	4C	4244	1	Construction deposit
18	4C	?natural	1	?Natural below windblown sand dune at base of pit, 4143

9.5 List of Drawings

Sheet	No	Tr	Description	Scale	Date	Author
1	1	2B	Plan of trench, following removal of 2001	1:20	17/08/2009	CD/JCS
2	2	4C	Plan of trench, following removal of 4002, 4036 and 4057 (1 of 2)	1:20	17/08/2009	CD/JCS
3	2	4C	Plan of trench, following removal of 4002, 4036 and 4057 (2 of 2)	1:20	17/08/2009	CD/JCS
4	3	7	Plan of trench, following exposure of wagonway and midden deposits (1 of 2)	1:50	17/08/2009	JCG/JXH
5	3	7	Plan of trench, following exposure of wagonway and midden deposits (2 of 2)	1:50	17/08/2009	JCG/JXH
6	4	4C	Plan of trench, showing extent of windblown sand, 4224 (1 of 2)	1:20	19/08/2009	JXH
7	4	4C	Plan of trench, showing extent of windblown sand, 4224 (2 of 2)	1:20	19/08/2009	JXH
8	5	7	Plan of trench, showing wagonway	1:50	22/08/2009	JXH
9	6	4C	Plan of trench, showing extent of abandonment layers, 4089/4145 (1 of 2)	1:20	23/08/2009	JXH
10	6	4C	Plan of trench, showing extent of abandonment layers, 4089/4145 (1 of 2)	1:20	23/08/2009	JXH
11	7	4C	Plan of trench, showing extent of occupation layers, 4092, 4174, 4208 and 4215 and partition, 4242 (1 of 2)	1:20	24/08/2009	JXH

Sheet	No	Tr	Description	Scale	Date	Author
12	7	4C	Plan of trench, showing extent of occupation layers, 4092, 4174, 4208 and 4215 and partition, 4242 (2 of 2)	1:20	24/08/2009	JXH
13	8	7	Plan of trench, following excavation of midden, 7009, and wagonway	1:50	27/08/2009	JXH
14	9	2C	Plan of trench, showing robbed out wall, 2059	1:20	27/08/2009	CD
15	10	7	S facing section of trench, following excavation (1 of 3)	1:20	27/08/2009	JD
16	11	2B	E facing section of trench, following excavation	1:10	27/08/2009	CD
17	12	4C	S facing section across pit, 4143, following excavation	1:20	27/08/2009	JW
18	13	4C	Plan of trench, showing extent of 4089 and cut, 4231 (1 of 2)	1:20	27/08/2009	JXH
19	13	4C	Plan of trench, showing extent of 4089 and cut, 4231 (2 of 2)	1:20	27/08/2009	JXH
20	14	2B	W facing section of trench, following excavation	1:10	28/08/2009	CD
21	10	7	S facing section of trench, following excavation (2 of 3)	1:20	28/08/2009	JD
22	10	7	S facing section of trench, following excavation (3 of 3)	1:20	28/08/2009	JD
23	15	4C	E facing section of trench, following excavation	1:10	28/08/2009	JD
24	16	2B	W facing elevation of partition wall, 2045	1:10	28/08/2009	AC/JS
25	17	2B	N facing section of trench, following excavation	1:10	28/08/2009	AW/MF
26	31	2B	S facing section of trench, following excavation	1:10	28/08/2009	AW/JA
27	28	2C	E facing section of trench, following excavation	1:10	27/08/2009	AW/JD
27	29	2C	W facing section of trench, following excavation	1:10	26/08/2009	AW/JD
28	18	2B	E facing elevation of partition wall, 2045	1:10	28/08/2009	CD
29	19a/b	4C	Sections across deposits, 4239, and 4240/4242/4241	1:10	29/08/2009	JXH
30	20	2B	Plan of trench, following excavation	1:20	27-29/08/2009	NGL
31	21	2B	Plan of trench, following excavation	1:20	29/08/2009	NGL
32	22	2B	W facing section of stakehole, 2094	1:10	29/08/2009	JH
32	23	2B	W facing section of stakehole, 2096	1:10	29/08/2009	JXH
32	24	2B	W facing section of stakehole, 2098	1:10	29/08/2009	JA
32	25	2B	Plan of stakehole, 2094, following excavation	1:20	29/08/2009	NGL
33	26	4C	Plan of trench, showing deposits associated with the use of the building (1 of 2)	1:20	28/08/2009	JXH

Sheet	No	Tr	Description	Scale	Date	Author
34	26	4C	Plan of trench, showing deposits associated with the use of the building (2 of 2)	1:20	28/08/2009	JXH
35	27	4C	Plan of trench, showing deposits associated with the construction of the building (1 of 2)	1:20	29/08/2009	JXH
36	27	4C	Plan of trench, showing deposits associated with the construction of the building (2 of 2)	1:20	29/08/2009	JXH
37	30	2B	Plan of trench, showing clay (2050) appearing and SFs in deposits overlying clay	1:20	21/08/2009	CD
38	32	Site 2	Section, showing walling and floor deposits of building eroding out of dune	1:10	30/08/2009	NGL
39	33	Site 2	W part of section, showing walling of building eroding out of dune	1:20	30/08/2009	JH
40	34	Site 6	Section along exposed face of dune, showing midden deposits forming Site 6	1:20	30/08/2009	JA/KM

9.6 Photographic Record

Trench 2

No	Area	Context No(s)	Description	From
1	2B	2045, etc	General view of trench, following initial exposure of division wall, 2045	NE
2	2B	2045, etc	General view of trench, following initial exposure of division wall, 2045	SE
3	2B	2045, etc	General view of trench, following initial exposure of division wall, 2045	SE
4	2B	2045, etc	General view of trench, following initial exposure of division wall, 2045	NW
5	2B	2045, etc	General view of trench, following initial exposure of division wall, 2045	NW
6	2B	2045, etc	General view of trench, following initial exposure of division wall, 2045	SW
7	2B	2045	Detail of division wall, 2045	SE
8	2B	2045	Detail of division wall, 2045	NW
9	2B	2052	Detail of stone pillar, 2052, in E face of division wall	NE and above
10	2B	2052	Detail of stone pillar, 2052, in E face of division wall	SE and above
11	2B	2052	Detail of stone pillar, 2052, in E face of division wall	SW
12	2C	2044, 2048	General view of trench, following removal of demolition layers, 2044/8	N
13	2C	2044, 2048	General view of trench, following removal of demolition layer	W
14	2C	2044, 2048	General view of trench, following removal of demolition layer	S
15	2C		Section through rabbit hole, just west of Tr 2C	NW

No	Area	Context No(s)	Description	From
16	2B	2064	Working shot, showing timbers, 2064, beginning to appear	E
17	2B	2064	Working shot, showing timbers, 2064, beginning to appear	W
18	2B	2064	Working shot, showing timbers, 2064, beginning to appear	N
19	2B	2064	Working shot, showing timbers, 2064, beginning to appear	E
20	2B	2064	Working shot, showing timbers, 2064, beginning to appear	W
21	2B	2064	Working shot, showing timbers, 2064, beginning to appear	N
22	2B	2064	Working shot, showing timbers, 2064, beginning to appear	S and above
23	2B	2065	Working shot, showing floor slabs, 2065, emerging on E side of division wall	SE
24	2B	2065	Working shot, showing floor slabs, 2065, emerging on E side of division wall	NW
25	2B	2065	Working shot, showing floor slabs, 2065, emerging on E side of division wall	NW and above
26	2B	2050, etc	General view of trench on W side of partition wall	W
27	2B	2050, etc	General view of trench on W side of partition wall	SW
28	2B	2050, etc	General view of trench on W side of partition wall	SE
29	2B	2050, etc	General view of trench on W side of partition wall	NW
30	2B	2064	Detail of timbers, 2064	W and above
31	2B	2064	Detail of timbers, 2064	S and above
32	2B	2064	Detail of timbers, 2064	N and above
33	2B	2065, etc	General view of trench on E side of partition wall	NW
34	2B	2065, etc	General view of trench on E side of partition wall	SE
35	2B	2065, etc	General view of trench on E side of partition wall	W
36	2B	2065, etc	General view of trench on E side of partition wall	S
37	2B	2055, 2067	Detail of opposed fireplaces in partition wall	NW and above
38	2B	2055, 2067	Detail of opposed fireplaces, 2055 and 2067, in partition wall	SE and above
39	2B	2055, 2067	Detail of opposed fireplaces, 2055 and 2067, in partition wall	SE and above
40	2B	2067	Fireplace, 2067, on E side of partition wall	NE and above
41	2B	2055	Fireplace, 2055, on W side of partition wall	SW and above
42	2B	2077	Socket, 2077, for jamb on NW side of fireplace on W side of partition wall	SW
43	2B	2077	Socket, 2077, for jamb on NW side of fireplace on W side of partition wall	SW
44	2B	2076	Socket, 2076, for jamb on SE side of fireplace on W side of partition wall	SW and above
45	2C	2059, etc	Trench 2C, following excavation	N and above
46	2C	2059, etc	Trench 2C, following excavation	S and above
47	2C	2059, etc	Trench 2C, following excavation	W and above
48	2C	2059, etc	Trench 2C, following excavation	E and above
49	2C	2059, etc	E half of trench 2C, following excavation	E and above
50	2C	2059, etc	E half of trench 2C, following excavation	W and above
51	2C	2062, etc	E facing section of trench, following excavation	E
52	2C	2062, etc	S facing section of trench, following excavation	S

No	Area	Context No(s)	Description	From
53	2C	2062, etc	W facing section of trench, following excavation	W
54	2C	2062, etc	N facing section of trench, following excavation	N
55	2B	2051, etc	W facing section of trench, following excavation	W
56	2B	2042, etc	S facing section of trench, following excavation	S
57	2B	2043, etc	N facing section of trench, following excavation	N
58	2B	2043, etc	E facing section of trench, following excavation	E
59	2B	2047, etc	S facing section of trench, on E side of partition wall	S
60	2B	2047, etc	S facing section of trench, on E side of partition wall	S
61	2B	2045, 2047	N facing section of trench, on E side of partition wall	N
62	2B	2045, 2047	N facing section of trench, on E side of partition wall	NE
63	2B	2067	Fireplace, 2067, on E side of partition wall	SE and above
64	2B	2067	Fireplace, 2067, on E side of partition wall	E and above
65	2B	2067	Fireplace, 2067, on E side of partition wall	E and above
66	2B	2067	Fireplace, 2067, on E side of partition wall	E
67	2B	2084, 2091, 2092	Stakes, 2084/91, and stakehole, 2092, close to S wall of building	N and above
68	2B	2084, 2091, 2092	Stakes, 2084/91, and stakehole, 2092, close to S wall of building	N
69	2B	2084, 2091, 2092	Stakes, 2084/91, and stakehole, 2092, close to S wall of building	W
70	2B	2084, 2091, 2092	Stakes, 2084/91, and stakehole, 2092, close to S wall of building	W and above
71	2B	2087	Pit, 2087, against S wall of building	N
72	2B	2087	Pit, 2087, against S wall of building	N
73	2B	2091	Stake, 2091, following excavation	N
74	2B	2091	Stake, 2091, following excavation	N and above
75	2B	2050, etc	Section through floor deposits in centre of building	W and above
76	2B	2101	Heat reddened sand, 2101, under fireplace, 2055, on W side of partition wall	W and above
77	2B	2101	Heat reddened sand, 2101, under fireplace, 2055, on W side of partition wall	N and above
78	2B	2072	Sand, 2072, under floor slabs on E side of partition wall	E
79	2B	2094, 2096, 2098, 2102	Stakeholes, 2094/6/8, and rake-out pit, 2102, on W side of partition wall	W and above
80	2B	2094, 2096, 2098, 2102	Stakeholes, 2094/6/8, and rake-out pit, 2102, on W side of partition wall	S and above
81	2B	2094/5	Stakehole, 2094/5	W and above
82	2B	2096/7	Stakehole, 2096/7	W and above
83	2B	2094/5	Stakehole, 2094/5, following excavation	W and above
84	2B	2094/5	Stakehole, 2094/5, following excavation	S and above
85	2B	2096/7	Stakehole, 2096/7, following excavation	W and above
86	2B	2096/7	Stakehole, 2096/7, following excavation	W and above
87	2B	2094/5	Stakehole, 2094/5, following removal of chock stones	W and above
88	2B	2102, etc	Rake-out pit, 2102, on W side of partition wall, following removal of clay	W and above

No	Area	Context No(s)	Description	From
89	2B	2100	Pan-scratch, 2100, under floor slab in front of hearth on E side of partition wall	N and above

Trench 2 (aerial)

No	Context No(s)	Description	From
1	2064, etc	General view of trench, following exposure of timbers, 2064	W and above
2	2064, etc	General view of trench, following exposure of timbers, 2064	W and above
3	2064, etc	General view of trench, following exposure of timbers, 2064	S and above
4	2064, etc	General view of trench, following exposure of timbers, 2064	E and above
5	2064, etc	General view of trench, following exposure of timbers, 2064	E and above
6	2064, etc	General view of trench, following exposure of timbers, 2064	E and above
7	2064, etc	General view of trench, following exposure of timbers, 2064	N and above

Trench 4

No	Context No(s)	Description	From
1	4010/1	General view of trench, following clearing down to clay/rubble demolition layers	N
2	4010/1, 4208	General view of trench, following clearing down to clay/rubble demolition layers; interface with coal road deposits on outside of wall, 4003, in foreground	S
3	4010/1, 4208	General view of trench, following clearing down to clay/rubble demolition layers; interface with coal road deposits on outside of wall, 4003, in foreground	S
4	4010/1, 4171/2	General view of trench, following clearing down to clay/rubble demolition layers; robber trench for N wall visible on right hand side	E and above
5	4010/1, 4171/2	General view of trench, following clearing down to clay/rubble demolition layers; robber trench for N wall visible on right hand side	E and above
6	4010/1, 4171/2	General view of trench, following clearing down to clay/rubble demolition layers; robber trench for N wall visible on right hand side	E
7	4010/1, 4208	General view of trench, following clearing down to clay/rubble demolition layers; interface with coal road deposits on outside of wall, 4003, on left hand side	E and above
8	4010/1, etc	E facing section of trench	E
9	4010/1, etc	E facing section of trench	E
10	4036, 4057	Detail of field wall and associated sandstone fragments in E facing section	E
11	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	W
12	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	
13	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	E
14	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	E

No	Context No(s)	Description	From
15	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	E
16	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	S
17	4224, etc	General view of trench, following removal of clay/rubble, 4010/11	S
18	4089, etc	General view of trench, following removal of windblown sand, 4224	E
19	4089, etc	General view of trench, following removal of windblown sand, 4224	E
20	4003, 4208	Coal deposits, 4208, on outside of S wall, 4003	W and above
21	4224, 4145, 4089	Demolition deposits on outside of N wall, 4003	N and above
22	4224, 4145, 4089	Demolition deposits on outside of N wall, 4003	W
23	4224, 4145, 4089	Demolition deposits on outside of N wall, 4003	E
24	4224, 4145, 4089	Demolition deposits on outside of N wall, 4003	E and above
25	4143, 4174	General view of trench, following removal of demolition deposits	E
26	4143, 4174	General view of trench, following removal of demolition deposits	E
27	4143, 4174	General view of trench, following removal of demolition deposits	N
28	4089	Roof collapse, 4089, on outside of N wall, 4003	N
29	4089	Roof collapse, 4089, on outside of N wall, 4003	E
30	4089	Roof collapse, 4089, on outside of N wall, 4003	W
31	4003	View along robbed out N wall, 4003	W and above
32	4003	View along robbed out N wall, 4003	E and above
33	4003	View along robbed out N wall, 4003	SE
34	4003	View along robbed out S wall, 4003	W and above
35	4003	Detail of robbed out S wall, 4003	W and above
36	4003	View along robbed out S wall, 4003	E and above
37	4003	View along robbed out S wall, 4003	NE
38	4229	Linear cut, 4229 against outside face of S wall, 4003	N
39	4143, 4174	Working shot, following removal of demolition layers, 4089, etc and sectioning of pit, 4143	NE
40	4143, 4174	Working shot, following removal of demolition layers, 4089, etc and sectioning of pit, 4143	E
41	4143, 4174	Working shot, following removal of demolition layers, 4089, etc and sectioning of pit, 4143	SE
42	4143, 4174	Working shot, following removal of demolition layers, 4089, etc and sectioning of pit, 4143	NW
43	4143, 4174	Working shot, following removal of demolition layers, 4089, etc and sectioning of pit, 4143	NW
44	4143, 4144	Working shot, following sectioning of pit, 4143	W and above
45	4229, 4230	Brick lining, 4230, of linear cut, 4229	W and above
46	4229, 4230	Brick lining, 4230, of linear cut, 4229	W and above
47	4229, 4230	Brick lining, 4230, of linear cut, 4229	N and above
48	4229, 4230	Brick lining, 4230, of linear cut, 4229	N
49	4143	John illustrating scale of pit, 4143!	W

No	Context No(s)	Description	From
50	4143	Pit, 4143, following sectioning	W and above
51	4229, 4230	Linear cut, 4229/30, following exposure of full length	W and above
52	4229, 4230	Linear cut, 4229/30, following exposure of full length	W and above
53	4229, 4230	Linear cut, 4229/30, following exposure of full length	E and above
54	4229, 4230	Linear cut, 4229/30, following sectioning	E and above
55	4229, 4230	Linear cut, 4229/30, following sectioning	E
56	4229, 4230, 4237	Eastern part of linear cut, 4229/30, with square cut, 4237, at its E end	S and above
57	4229, 4230, 4237	Eastern part of linear cut, 4229/30, with square cut, 4237, at its E end	S and above
58	4229, 4230, 4237	Eastern part of linear cut, 4229/30, with square cut, 4237, at its E end	S and above
59		General view of trench, following excavation	N
60		General view of trench (N half), following excavation	W
61		General view of trench (S half), following excavation	W and above
62		General view of trench, following excavation	S
63		General view of trench, following excavation	E and above
64		General view of trench (S half), following excavation	E and above
65		General view of trench (S half), following excavation	E and above
66		Detailed view of S part of trench, following excavation	E
67		Detailed view of S part of trench, following excavation	E
68	4003, 4057, etc	E facing section of trench, following excavation	E
69	4003	E face of W gable, 4003	E
70	4242, etc	Detailed view of central part of trench, showing deposits on either side of partition, 4242	E and above
71	4239, 4240	Detailed view of possible floor deposits on W side of partition, 4242, in S half of building	E
72	4239, 4240, 4242	Detailed view of possible floor deposits on W side of partition, 4242, in S half of building	E
73	4239, 4240, 4242	Detailed view of possible floor deposits on W side of partition, 4242, in S half of building	S and above
74	4239, 4240, 4242	Detailed view of possible floor deposits on E side of partition, 4242, in S half of building	N and above
75	4239, 4240, 4241, 4242	Detailed view of possible floor deposits on either side of partition, 4242, in S half of building	N
76	4239, 4240, 4241, 4242	Detailed view of possible floor deposits on either side of partition, 4242, in S half of building	N
77	4239	Detailed view of possible floor deposits on W side of partition, 4242, in S half of building	N
78	4091, 4249	Detailed view of deposits, 4249, under floor slabs, 4091	W and above
79	4091, 4249	Detailed view of deposits, 4249, under floor slabs, 4091	W
80	4243	Construction deposit, 4243, on N side of building	N and above
81	4143, 4245	Deposits at base of pit, 4143	NE and above
82	4143, 4245	Deposits at base of pit, 4143	N
83	4239	Working shot, showing pan scratch within 4239	N and above
84	4239	Working shot, showing section through 4239	E
85	4239	Working shot, showing section through 4239	E
86	4249	Section through ?floor deposits, 4249, against S wall of building	S

No	Context No(s)	Description	From
87	4249	Detail of section through ?floor deposits, 4249, against S wall of building	S
88	4249	Detail of section through ?floor deposits, 4249, against S wall of building	S

Trench 4 (aerial)

No	Context No(s)	Description	From
1	4003, 4010/1, 4208	General view of trench, following exposure of clay/rubble	W and above
2	4003, 4224, 4208	General view of trench, following removal of clay/rubble	E and above
3	4003, 4224, 4208	General view of trench, following removal of clay/rubble (SLR camera)	E and above
4	4003, 4224, 4208	General view of trench, following removal of clay/rubble (SLR camera)	N and above
5	4143, 4174	General view of trench, following removal of demolition layers, 4089, etc	W and above
6	4143, 4174	General view of trench, following removal of demolition layers, 4089, etc	W and above
7	4143, 4174	General view of trench, following removal of demolition layers, 4089, etc	E and above
8	4003, 4143, 4243, etc	General view of trench, following excavation	N and above
9	4003, 4143, 4243, etc	General view of trench, following excavation	N and above
10	4003, 4143, 4242, etc	General view of trench, following excavation	N and above
11	4003, 4143, 4242, etc	General view of trench, following excavation	E and above
12	4003, 4143, 4242, etc	General view of trench, following excavation	E and above
13	4003, 4143, 4242, etc	General view of trench, following excavation	E and above

Trench 7

No	Context No(s)	Description	From
1	7008, etc	General view of trench, following initial cleaning, with wagon road in centre	E
2	7008, etc	General view of trench, following initial cleaning, with wagon road in centre	W
3	7009, etc	General view of trench, following initial cleaning, showing mound of midden material	W
4	7009, etc	General view of trench, following initial cleaning, showing mound of midden material	W
5	7009, etc	General view of trench, following initial cleaning, showing mound of midden material	E
6	7009, etc	Detail of W side of mound of midden material	N
7	7009, etc	Detail of W side of mound of midden material	N
8	7003, etc	N facing section, between mound and wagon road	N
9	7003, etc	N facing section of sondage, across wagon road (W side)	N

No	Context No(s)	Description	From
10	7003, etc	N facing section of sondage, across wagon road (E side)	N
11	7003, etc	N facing section of sondage, at E end of trench (W side)	N
12	7003, etc	N facing section of sondage, at E end of trench (E side)	N
13	7008, 7010	Wagon road, following cleaning	W
14	7008, 7010	Wagon road, following cleaning	W
15	7008, 7010	Wagon road, following cleaning	E
16	7008, 7010	Wagon road, following cleaning	E
17		General view along trench	E
18	7009	Working shot, showing large piece of salt making waste within 7009	S and above
19	7009	Working shot, showing large piece of salt making waste within 7009	S and above
20	7008, 7010	Wagon road, following sectioning (W side)	S and above
21	7008, 7010	Wagon road, following sectioning	S and above
22	7008, 7010	Wagon road, following sectioning	N and above
23	7008, 7010	Wagon road, following sectioning	W
24	7008, 7010	Wagon road, following sectioning	E
25	7008, 7010	Wagon road, following sectioning	E
26	7009	Midden material, 7009, at E end of trench	S and above
27	7009	Midden material, 7009, at E end of trench	E and above
28	7009	Midden material, 7009, at E end of trench	W and above
29	7009	Striations in natural sand, following removal of midden material, 7009	S and above
30	7009	S facing section of trench, following excavation of 7009	S and above
31	7009	Striations in natural sand, following removal of midden material, 7009	E and above
32	7009	Striations in natural sand, following removal of midden material, 7009	W and above
33	7009	General view of striations in natural sand, following removal of midden material, 7009	W and above
34	7009	General view of striations in natural sand, following removal of midden material, 7009	E and above
35	7010	Section through wagon road, 7010, following excavation	S and above
36	7010	Section through wagon road, 7010, following excavation	N and above
37	7003, etc	S facing section through wagon road, following excavation	S
38	7003, etc	S facing section through wagon road, following excavation (W side)	S
39	7003, etc	S facing section through wagon road, following excavation (E side)	S

Trench 7 (aerial)

No	Context No(s)	Description	From
1		General view of trench, following initial cleaning	E and above
2		General view of trench, following initial cleaning	E and above
3		General view of trench, following initial cleaning	E and above
4		General view of trench, following initial cleaning	E and above
5		General view of trench, following initial cleaning	E and above
6		General view of trench, following initial cleaning	W and above
7		General view of trench, following initial cleaning	W and above
8		General view of trench, following excavation	E and above

No	Context No(s)	Description	From
9		General view of trench, following excavation	E and above
10		General view of trench, following excavation	E and above
11	2010	Wagon road, following exposure of cobbling, 2010	W and above
12	2010	Wagon road, following exposure of cobbling, 2010	W and above
13	2010	Wagon road, following exposure of cobbling, 2010	W and above

9.7 Harris Matrix, Trench 4, 2009

