UHI Student Accommodation

The Meadows, Dornoch

Archaeological Excavation and Watching Brief

Data Structure Report

AOC Project Number: 70153

October 2016, revised April 2017

AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

UHI Student Accommodation

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Data Structure Report

On Behalf of:	**O'Brien Construction Park Lane Thurso Caithness KW14 8JZ**
Planning reference:	**16/00887/FUL**
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This document has been prepared in accordance with AOC standard operating procedures.

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Abstract

This report details the findings of an archaeological excavation and watching brief carried out to record an area of archaeology uncovered on a new site for UHI student accommodation in Dornoch.

An evaluation undertaken ahead of the works highlighted potential for buried archaeological remains on a proposed student accommodation block development in Dornoch.

AOC Archaeology was commissioned to undertake a follow up excavation phase and subsequent watching brief. Several pits, a shell midden and a shallow ditch were identified and excavated. A large amount of modern disturbance was encountered across the site, which was located on the east side of an early medieval to medieval site excavated in 1997.

The results of the study have shown that the truncated remains formed a continuation of the 9th-11th century features excavated in 1997. Post-excavation work consisted of processing and analysing environmental samples and analysis of charcoal, marine shell and animal bone. The results have shown that the early medieval occupation was partly sealed below a shellfish midden layer, containing predominantly cockle shell. Most of the 2016 features represented the eastern edge of a 9th-10th century structure overlain by a later enclosure ditch. The predominance of cattle, dog and sheep/goat, cockle shell and hulled barley and oat on the site represents the same type of material recovered in 1997. The present analysis suggests that the midden waste represents a mainly meat-based economy alongside small scale shellfish exploitation, while the 1997 results also indicate that improved agricultural practices were taking place on a site of more marginal land. Later features on the site included the remains of a calf burial of unknown date. The full set of results is contained within appendices at the end of this report.

1 Introduction

1.1 Project Background

1.1.1 AOC Archaeology Group undertook an archaeological excavation and subsequent watching brief on behalf of O'Brien Construction ahead of construction of new student accommodation at the former abattoir site at the Meadows, Dornoch (Highland Council planning reference 16/00887/FUL). The site is located on the west side of Shore Road at the south end of Dornoch, in the former glebe area of the town.

1.1.2 Prior to the excavation, an archaeological evaluation had been undertaken by Highland Archaeology Services (HAS) (2016). Five trenches had been investigated to evaluate the potential for archaeological remains to survive on the site. While the majority of the site appeared to have suffered modern disturbance, one trench, Trench 2, contained archaeological features. These were interpreted as pits and linear cuts similar to features found in 1997 in the area (HAS 2016).

1.1.3 The HAS report provides location plans and several section drawings of the pits evaluated during the previous works. While the interpretation was limited, it indicated that the archaeological remains were likely associated with sites recorded to west side of the development site.

1.1.4 The development site lies within the administrative area of Highland Council, which is advised on archaeological matters by the Historic Environment Team. The archaeological excavation and watching brief was specified in keeping with the policies outlined in *Scottish Planning Policy* (2014) and *PAN 2/2011 Planning And Archaeology* (2011) in order to record all areas of archaeological interest and to establish the presence or absence of further archaeology and the degree of modern disturbance on the site. All work was carried out by a qualified archaeologist in accordance with the Highland Council *Standards for Archaeological Work* (2012).

1.2 Site Location and Description

1.2.1 Dornoch is located in Sutherland on the northeast coast of Scotland. It is a coastal town situated to the north side of the Dornoch Firth which runs into the Moray Firth and the North Sea. The Portmahomack peninsula is located at the east end, and Tain on the south side, of the Dornoch Firth, both in close proximity by sea to Dornoch.

1.2.2 The development site, which measures approximately 60m E-W by 50m, is located on the south side of Dornoch town centre at the junction of Shore Road and The Meadows (**Figure 1**). It occupies an area of derelict ground, on the former site of an abattoir and what was historically the glebe area of the town.

1.3 Archaeological and Historical Background

1.3.1 There is a long history of settlement in the south-eastern part of Sutherland around Dornoch. Many recorded prehistoric sites such as Neolithic chambered cairns (NHRE No. NH78NE1, NH78NE12) and Iron Age hut circles (Camore Wood, Scheduled Ancient Monument 5898) provide evidence of very early settlement in the fertile plains and sheltered bays around the Dornoch Firth. A large collection of carved symbol stones in Dunrobin Museum in Golspie, recovered in Caithness and Sutherland, seems to demonstrate a prosperous Pictish population in the region before the Viking occupation in the 9th century (Simpson 1968).

1.3.2 Dornoch supposedly contained an early ecclesiastical community, tenuously linked to the 6th century St Finbarr, although there is no confirmed proof of this (Hook 2005). However, the proximity of the location to the monastic site and 6th-8th Pictish centre at Portmahomack would suggest a connection between the sites.

1.3.3 By the start of the 11th century, Sutherland and the Dornoch area would have been affected by pressure from Viking rule in Caithness under Sigurd I and later his son Thorfinn. While the first documented mention of Dornoch is from the mid 12th century by David I, Dornoch may have already been considered strategically important as a potential stronghold against Norse incursion (Hook 2015).

1.3.4 By the 13th century, Dornoch became as seat of the bishopric. Construction of Dornoch Cathedral was begun in 1245 by Gilbert de Moravia, who moved the diocese to Dornoch and was responsible for the construction of the Bishop's Palace (*ibid).* In the mid 16th century, Bishop Robert Stewart abandoned the bishopric to the Earl of Caithness and the Protestant Mackays of Strathnaver, enemies of the Catholic Earl of Sutherland. Subsequent disputes between the Sutherlands and Mackays ultimately resulted in the destruction of the town in 1567 (*ibid*).

1.3.5 Royal Burgh status was given to Dornoch in 1628 under King Charles I, which afforded the privilege of markets and fairs and results in a period of increased prosperity. During this period, the main street probably ran east-west along High Street with the castle at the east end near the burn crossing. While there would have been higher status professionals living in the town in the 17th century, there are no clear records of these residences (i*bid*).

1.3.6 In the 18th century, the main revenue for the town came through fairs and some improvements were made in the sanitation infrastructure and construction of a new prison. Dornoch never really prospered beyond this period, with minimal growth owing to the lack of a decent harbour for the town (i*bid*).

1.3.7 The Statistical Account of Scotland written in the 1790s describes Dornoch as having a population of about 500, engaged in primitive agriculture and little trade, a town in the "last stage of decay" (*Ibid*). In the early 19th century the future Duke of Sutherland cleared the houses on the south side of High Street and turned the castle into a prison and courthouse. During this time, the burn was straightened and Castle and Bridge Streets laid out (*ibid*).

1.3.8 In 1997, archaeological work in the Meadows Business Park site uncovered a significant archaeological site, representing occupation from around the 9th century and up to the 15th century (section 4.1.3f).

2 Objectives

2.1 Excavation work was required as a secondary phase of works informed by the previous archaeological evaluation. The purpose of the work was to thoroughly investigate and record the archaeological site prior to destruction during development. Upon completion of the excavation, an archaeological watching brief was undertaken across the remainder of the development site.

2.2 The aims of the excavation and watching brief were:

i) To remove by hand any overburden in order to expose the archaeological deposits
ii) To plan, excavate, sample and record all archaeological features
iii) To identify, excavate and record any further archaeological remains uncovered during site clearance
iv) To sample deposits for post-excavation work, including environmental analysis and dating

v) To make recommendations for further measures necessary to mitigate the impact of the development

vi) To make recommendations for post-excavation work

2.3 The excavation and watching brief was undertaken in accordance with the Chartered Institute for Archaeologists (CIfA) *Standards and Guidance for an Archaeological Watching Brief* (2014) and Highland Council's *Standards for Archaeological Work* (2012).

3 Methodology

3.1 An area measuring approximately 10m around the evaluation trench from the previous phase was stripped using a mechanical excavator with a flat bladed bucket. All machine excavation was supervised by an archaeologist and was carried out until the first significant archaeological horizon or natural subsoil was reached. The opened area exposed the full extent of all of the archaeological features in the area.

3.2 The exposed area was cleaned by hand to reveal the location, extent and condition of the site. Disturbance from the previous evaluation and modern interference caused difficulty in excavation and recording. All features were recorded in plan, followed by excavation, sampling and recording. A full photographic and written record of the works was maintained. All features of potential archaeological significance were excavated by hand in order to establish their date, nature, extent and the state of preservation of the deposits and were fully recorded in accordance with AOC's standard recording methodologies. All finds and samples were retained for a programme of post-excavation analysis. The locations of all archaeological features were plotted using a Trimble Geo-XR Rover capable of centimetre accuracy.

3.3 Upon completion of excavation, an archaeological watching brief was undertaken across the remainder of the development site, with the exception of a 15-20m strip along the eastern boundary that had been reportedly stripped under supervision by HAS. There were no further archaeological features identified during the watching brief.

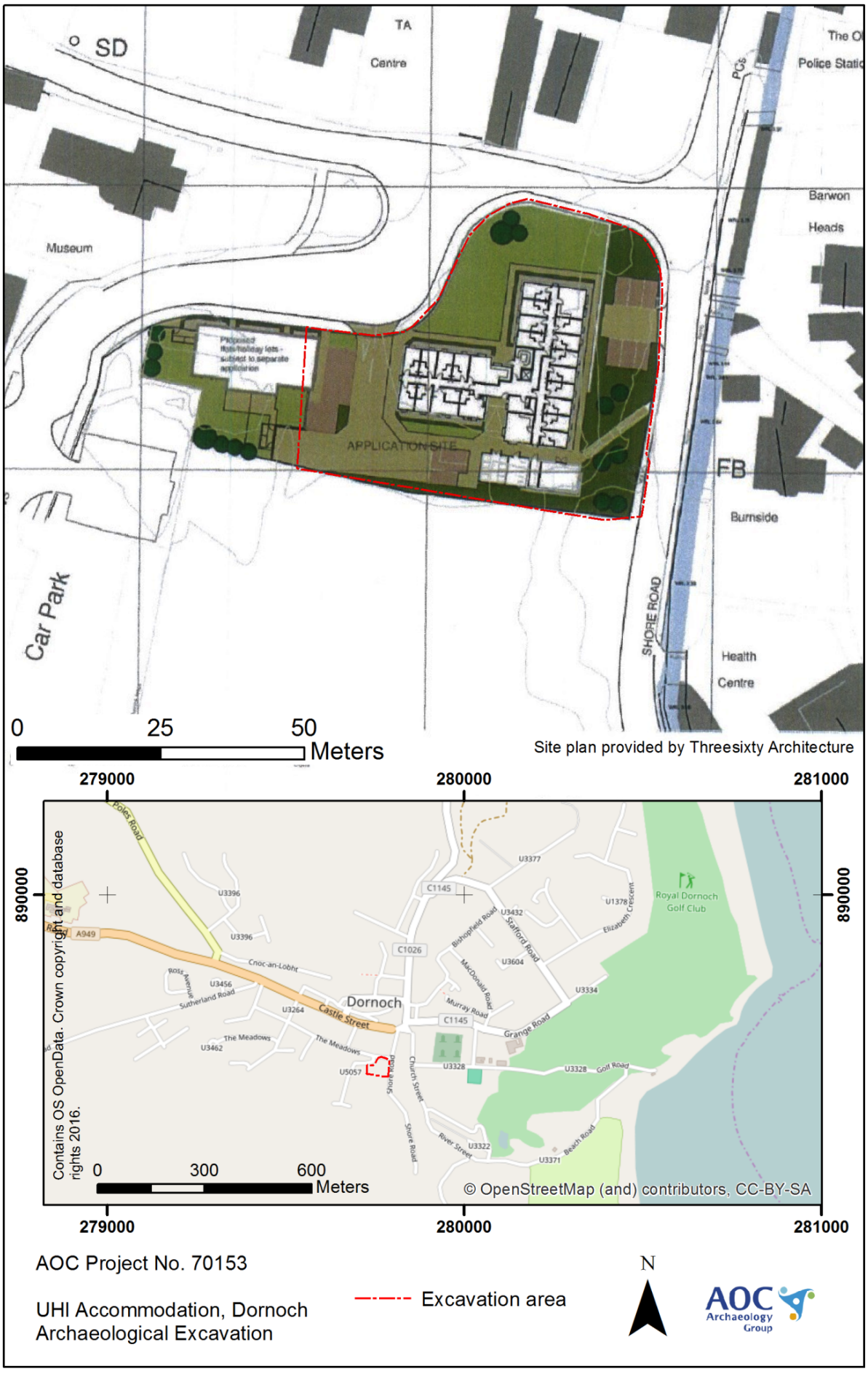

Figure 1: Location of the archaeological evaluation

4 Results

4.1 Desk Based Assessment

4.1.1 The site of the development falls within the parish of Dornoch and is on the edge of the royal burgh of Dornoch, established in 1628 by Charles I. It is depicted on the 1872 1st Edition Ordnance Survey Map as enclosed fields with several structures along the north east corner and eastern edge (**Figure 2**).

4.1.2 Within the development site there is one site depicted on the Highland Historic Environment Record (HER):

a) MHG46250 Abattoir NH 7971 8948

Former abattoir, now demolished and demolition debris spread across the site. A garage is noted on the same site (MHG52787).

4.1.3 Several archaeological sites and investigations are depicted on the HER, all of which are outwith the development area but in close proximity to the site:

a) **MHG11790 Franciscan Friary NH 7980 8950**

A Franciscan Friary is said to have stood at the southeast corner of Dornoch on the road leading to the links. No other information is known.

b) **MHG11838 Bishops Palace NH 7971 8959**

This site consists of a former Bishops Palace, now converted to a hotel. The components that remain include a high tower, a crow-stepped gable and a round stair turret. The kitchens with vaulted roof, huge fireplace and chimney stalk also still remain though building was heavily modernised 1813.

c) **EHG681 Watching Brief NH 7971 8948**

A watching brief to the rear of the main abattoir structure for a lorry yard in February 2002 found no archaeological remains. Topsoil finds did include a sherd of medieval redware.

d) **EHG1420 Evaluation NH 7964 8941**

An evaluation was carried out in the southern section of Dornoch Business Park in June 2002 by Rathmell Archaeology. This uncovered a rich medieval ploughsoil, with frequent animal bone and shell lenses. A series of seven, possibly modern pits and a shallow ditch were also identified. A subsequent watching brief in this area by Highland Heritage Archaeological Consultancy in November 2002 (EHG1456) revealed more pits and postholes.

e) **EHG475 Watching Brief NH 7971 8953**

A watching brief carried out by SUAT, May 1997 on an area across the north of the retail park development, over the access road. An area 59m by 22m was watched. The watching brief discovered topsoil rich in medieval and post-medieval finds, which sealed earlier medieval features. The watching brief results led to an excavation which followed on immediately from the work (EHG385).

f) **EHG385 Excavation, SUAT NH 7971 8953**

The area adjacent to the development was the subject of an archaeological excavation by SUAT in 1997 prior to the development of the Meadows retail park. The site was identified during a watching brief (EHG475) which uncovered many unstratified topsoil finds of medieval and post-medieval date. In addition, the excavation work recorded a building, ditched enclosures and evidence for iron working

all sealed under the finds-rich topsoil. Finds included iron slag, bog ore, fragments of a furnace, whalebone, a bone counter and a bone pin-beater (Coleman, 2001). Animal bone, pottery and shell indicated midden deposits from settlement. Metal detecting finds included medieval and post-medieval iron slag, burnt clay, buckles, buttons and harness fittings, coins and nails. These finds suggested a long tradition of metal working in this area from the early medieval through to the medieval period (Coleman et al 2009). Radiocarbon dates placed the first activity on the site in the 8th-9th C AD, with the main phase of activity on the site in the 10th-11th C AD. Later activity was dated to 15th C AD confirming this area has been the site of activity over an extended period of time. These dates and activity substantiate the theory that this region was a boundary between the Norse and the Picts in the early medieval period, highlighting that "the Dornoch Firth was a crucial place in the emergence of the Scottish nation (Crawford, 1995)." The features identified during this excavation were noted to potentially extend beyond the boundaries of the development site at that time (Coleman 1997).

4.1.4 The site of the development is situated across the road from the medieval settlement evidence investigated by SUAT. It sits on an area of undulating land that has likely been foreshore in early prehistoric times when sea level was much higher (substantiated by the underlying geology of sand and the deep deposits of windblown sand encountered during excavation). As sea levels receded the area has likely been cultivated. In the more recent past the site has housed several building along the north edge of the site and was the site of a now demolished abattoir and associated structures. The site was flattened and to some extent landscaped with demolition debris spread across the site prior to the evaluation taking place.

4.1.5 HAS was commissioned to undertake an evaluation of the site, which took place in September 2016. The evaluation consisted of five trenches spaced across the site. Apart from Trench 2, the evaluation trenches only encountered rubble from the demolition of the abattoir, sometimes overlying remnant topsoil which sealed natural yellow sand. Trench 2 contained several features cut into this natural yellow sand including three pits, two possible postholes and a deposit of shell midden (**Figure 3**). Results were written up into an interim report and an excavation phase in this area recommended based on these results. AOC Archaeology was commissioned to undertake the excavation and subsequent watching brief phase.

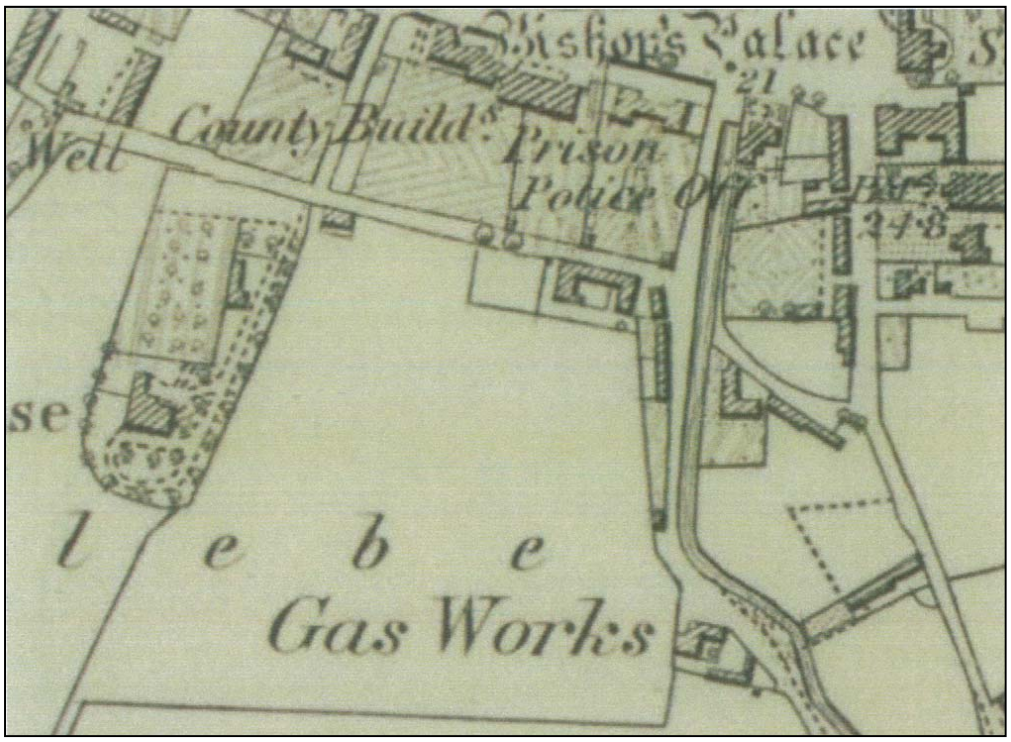

Figure 2: Extract from the 1st Edition Ordnance Survey Map, Sutherland, Sheet CXIII, 1872, depicting the development site

Figure 3: Development site: location of evaluation trenches and archaeological features

4.2 Archaeological Excavation

4.2.1 The fieldwork was carried out on 13-14 and 17-18 October 2016 and 3 November 2016 by Cathy MacIver and Lindsey Stirling. The weather was mostly fine and dry with some days of intermittent light rain showers. Many of the archaeological features had been previously exposed and partially excavated by the previous contractor, which provided some limitations in excavation and recording of complete features.

4.2.2 The development site was covered in rubble (201) associated with demolition of the abattoir. The rubble layer overlay the natural sand subsoil (202) across some of the site, with the remains of the topsoil layer (205) surviving between 0.2-0.5m deep. Numerous pits and cut features were found to pertain to modern contamination of the site, including engineering test pits and boreholes.

4.3 Archaeological Features

4.3.1 A summary of the archaeological features follows. All archaeological features identified were concentrated on the western edge of the development site (**Figures 4; 5**). The full details of all of the archaeological records are in the Appendices.

4.3.2 The main archaeological feature identified in the evaluation trench was (222) a shell midden deposit underlying the demolition rubble (201). The shell midden was composed of a spread of material that varied in depth, extended approximately 8m NE-SW and about 2m wide. The deposit appeared to continue under the road debris at the edge of the pavement along the western edge of the trench, but is likely to have been truncated beyond this by the road construction. The main midden deposit was composed primarily of cockle shells with some mussel, clam and other bivalve shells. Fragments of animal bone, mostly cattle and dog, were also present, more towards the base of the midden, and included a sheep skull. Scattered cereal grains were also present in the deposit. Underlying this was another layer of sand midden material (250) that appeared in lenses, and contained mostly cockle and some razor shells as well as infrequent mammal bone. This suggests multiple depositional events forming the midden. The midden deposit sealed pits [227] and [244] and linear cut [225] (**Figure 6**).

4.3.3 A 4m long linear cut [225] was identified partly underlying the shell midden (222). It ran roughly north east – southwest adjacent to pit [227], measuring 0.5m wide by 0.3m deep (**Figure 7**). It was filled with a mostly sterile redeposited yellow sand (226), that contained a small amount of mammal bone, and probably comprised the remnants of a truncated shallow ditch (**Figure 6**).

4.3.4 Pit [244] was a sub-circular cut measuring 0.7 by 0.5 by 0.6m in extent, sealed under the midden (222) and filled with redeposited sand (245). Pit [227] was formed by a curvilinear cut that was only partially exposed. It extended for c. 4m NE-SW by 1m (truncated) and measured 0.35m deep. The undulating profile (**Plate 7**) suggested that it may have formed a linear feature, possibly a double ditch. It was filled with mid greyish brown sand (228) (**Figure 6**) and contained the highest proportion of charcoal fragments, predominantly birch and a substantial amount of cattle and dog bone.

4.3.5 Two other pits were identified and recorded to the north of the shell midden, sealed by the remnant topsoil layer (205) (**Figure 7**). Pit [206] comprised a very shallow scoop measuring 0.3m by 0.3m by 0.08m, with a shell-rich fill (207). Pit [203] to the north of this was larger, and only partially visible in the trench due to truncation but the road on the west. It measured 1.1m by 0.6m (truncated) by 0.65m and may have been re-cut, although this was hard to determine. It was filled with pale white sand (251), probably windblown. This was overlain by layer (241), firmly compacted greyish brown clay with occasional charcoal. The uppermost fill (240) comprised a mixed yellow-brown sand with small pebbles. It formed the matrix of (252), a group of large irregular boulders that were sitting on the surface of the feature.

4.3.6 Pit [246] was located to the south of the shell midden, sealed by the remnant topsoil layer (205). It consisted of a shallow sub-rectangular pit measuring 1.1m by 0.8m by 0.15m. The pit contained a dark black brown sand (247) with occasional animal bone and possible iron slag.

4.3.7 Pit [210] consisted of a sub-rectangular pit that probably post-dated the shell midden (222). It was only partly visible in the trench and had been truncated to the west by the road. It contained mixed mid-dark brown sand (211) containing partially articulated leg and pelvis bones of a small mammal in addition to two sherds of bottle glass. It was interpreted as a stock burial pit that cut through slot [208].

4.3.8 A shallow linear cut [242] extended for 8m south east from the western edge of the development site. It then curved slightly, to run east-southeast for c. 20m (**Figure 4**). It measured 0.9m at its widest point, but narrowed in several areas, forming a meandering feature that ran out at its eastern extent. It was filled with greyish brown silty sand containing frequent cockle and mussel shell (243) and could have formed part of a shallow ditch or slot related to a boundary (**Figure 7**).

4.4 Post-excavation

4.4.1 The programme of post excavation work included processing and analysis of the environmental samples. The main charred macroplant remains derived from pits [204], [206], [210], [227], linear slot [208], ditch [242] and the shell midden (222) and were generally poorly preserved. There were 95 cereal caryopses that could be identified: 10 hulled barley, 16 barley and 21 oat. Other plant species identified were five flax seeds, one turnip and two fragments of hazelnut shell. The hulled barley and oat grains found at this site were in keeping with the 1997 assemblage and were also similar to medieval assemblages from Perth and Aberdeen.

4.4.2 The charcoal assemblage was also small and interpreted as representative of fuel debris. The tree species of hazel, pine, alder and birch would have been accessible to the community living at Dornoch. As the charred macroplant and charcoal remains were limited and often from disturbed contexts no further analyses or radiocarbon dating was recommended. The limited and poor preservation of the remains made it hard to use them to characterise the function of features on the site; but it was suggested that the cereal and charcoal assemblages were formed through the disposal of domestic food and fuel waste.

4.4.3 The shell analysis found that the dominant species was the common cockle, which accounted for 94.3% of the assemblage, followed by the common mussel 2.5%, common razor shell 2%, common periwinkle 0.7%, common limpet 0.3% and the trough shell 0.2%. This predominance of cockle shells most likely represents the deliberate disposal of domestic food waste. The concentrations of shell both within and below the midden layer suggests that this part of the site was deliberately used for the long term disposal of shell. The shell assemblage clearly demonstrated that common cockle was the most economically important shellfish. Other marine species were eaten but never in the same quantity. The common cockle may have been more accessible than these other species and was used to supplement the diet in times of other food shortages.

4.4.4 The analyses of the animal bone on the site showed that the assemblage was small and the preservation poor. Species identified included fragments of bone from: cattle (39), sheep/goat (11), pig (2), dog (13), rodent (20) and domestic fowl (1). Other than the pit containing the partial remains of an articulated calf, most of the animal bone was scattered through various features across the site and did not show evidence of selective disposal. There were also a small number of fish bones identified.

4.4.5 The articularted calf burial in pit [210] most likely post-dates the medieval phase of the site, given its location cutting through the underlying slot [208]. The remaining cattle bone fragments from the site

mostly came from pit [227] and represented at least two individuals, which were possibly slaughtered for consumption, although there was no evidence of butchery on site other than one mammal bone.

4.4.6 The sheep/goat remains were concentrated within pit [227] and the age of death for these individuals is typical of use for consumption. A single pig was identified, culled at a young age and a single bone from a domestic fowl was identified from the overlying shell midden.

4.4.7 Ten dog bones were concentrated within pit [227], from which a humerus, metapoidals and phalanges were recovered. These likely represent the remains of a pet that was buried in a pit on the site that had been disturbed by modern activity. A dog skull and two loose teeth were recovered from the shell midden. The presence of dogs on medieval sites is common.

4.4.8 The animal bone assemblage from the site was small but similar to other late medieval sites in Scotland such as Edinburgh, Perth and Aberdeen, where cattle, sheep/goat, pig and domestic fowl all formed part of the diet. The haphazard disposal of the animal bone suggests that the material represents domestic food and cooking waste, despite the lack of butchery evidence. This interpretation ties in with the evidence from the charcoal, macroplant and shell analyses**.**

5 Discussion

5.1 The pits and linear features identified during the 2016 excavation directly relate to the site excavated by SUAT in 1997 (Coleman 2001). The 2016 excavation area was located directly adjacent to the east side of the 1997 area (Figure 8), with the archaeology representing a continuation of the features excavated in 1997. This places the majority of the site to within the early medieval – medieval periods, and predominantly 9th-11th to judge by the 1997 excavation results (Coleman and Photos-Jones 2009).

5.2 Figure 8 shows the relationship of the 2016 results alongside the 1997 results. It is clear that the enclosure ditch on the south side of the site forms the continuation of the 10th-11th century ditch (phase 3) excavated in 1997. The plan also shows that this ditch cut through a series of smaller curvilinear slots (phase 2) that continued outside of the 1997 excavated area to the east. These features were interpreted as a structure, with a parallel ditch on the north side. A sample of charred barley taken from within the structure provided a 9th-10th century date (Coleman and Photos-Jones 2009). Opposite from this structure in the 2016 excavation area was curvilinear cut [227], which ran out of the site area on the west end. A slot excavated through the feature revealed a probable double-ditch profile, interpreation of which now suggests that it formed part of the east end of the structure. This indicates that the structure measured approximately 10m E-W by 5m internally. The subrectangular foundation slot had rounded corners and probably more than one central post. This building and the features associated with it contained frequent strong evidence for iron-working activity taking place during this phase (Coleman and Photos-Jones 2009).

5.3 The results of the environmental work also relate directly to the findings from the 1997 analysis. Similar species of fauna and flora were identified, with cattle, dog, and sheep/goat present, hulled barley and oat present and cockle shells also dominating both assemblages. Interestingly, a substantial amount of rye was recovered in 1997. This was interpreted as possibly representing an increase in cultivation of marginal land and improved agricultural practices during this time (Coleman and Photos-Jones 2009).

5.4 The 1997 excavation recovered significant evidence for iron-working, to include iron slag, bog ore, a tuyere fragment and fired clay. In contrast, there was no metal-working debris recovered in 2016. This suggests two things: 1) modern disturbance resulted in a loss of archaeological material and 2) the

2016 archaeological features represent the periphery of the site. The area to the east and south of the cluster of features had been heavily disturbed by modern activity, making it is hard to say whether the site would have extended further or if these features form the outer edge of activity for this site. Although the extensive disturbance on the site and poor survival of the archaeology made it difficult to interpret the function and form of the features from fieldwork alone, analysis of the results alongside the 1997 results provides definite evidence that the area represents the edge of a significant 9th-11th century site.

5.5 Analysis of the 2016 assemblage and excavation results showed that well-stratified environmental evidence was limited and at times poorly preserved. As a result, radiocarbon dating was not recommmend for the site. However, there was a significant amount of information provided on the type and quantity of cereal grains and fuel waste, shell and animal bone. This information has confirmed that the material represents similar economic evidence as the 1997 results found. It also showed that this activity was sealed below a shell midden layer, indicating a continuity of use of the site, as also was shown in the 1997 report.

6 Conclusion

6.1 Although only limited archaeological remains survived by the time of the excavation, the post-excavation analysis had definitely concluded that the 2016 site is directly related to the pits and linear cuts identified adjacent to the site in 1997. As a result, the features represent 9th-11th century occupation and different phases of structural remains and enclosures combined with midden deposits.

6.2 The conclusions of the 1997 study indicated that the site had been subject to both Norse and Pictish influences. The results also suggested that the site may represent monastic activity, possibly a semi-industrial zone on the outer edge of an early Christian site in Dornoch (Coleman and Photos-Jones 2009). While the 2016 excavation site contained heavily disturbed structural remains and limited environmental information, the work has been extremely valuable to bring a more complete conclusion to the 1997 excavation site, providing a better understanding of Dornoch during the eary medieval – medieval period.

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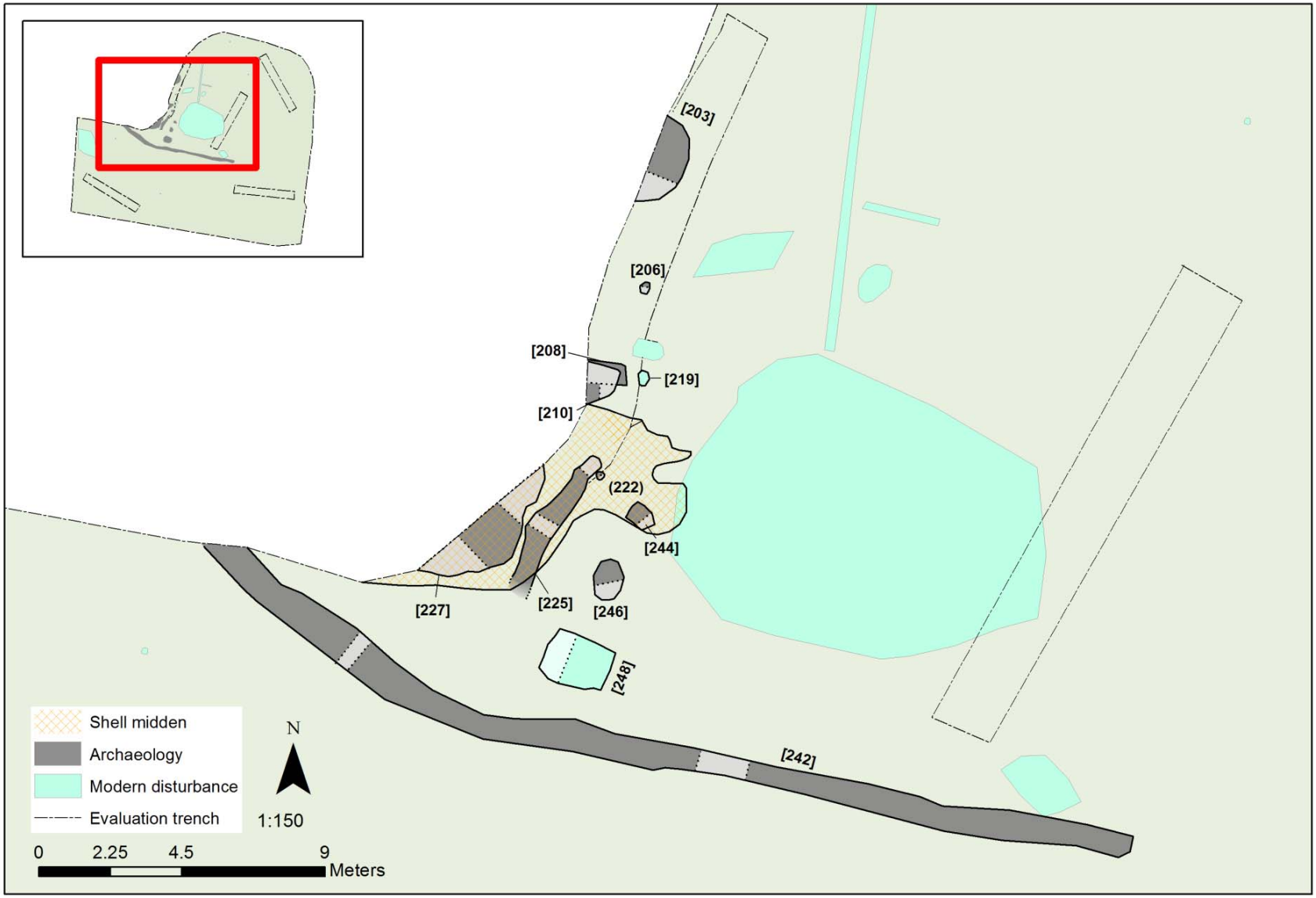

Figure 4: Plan of archaeological features

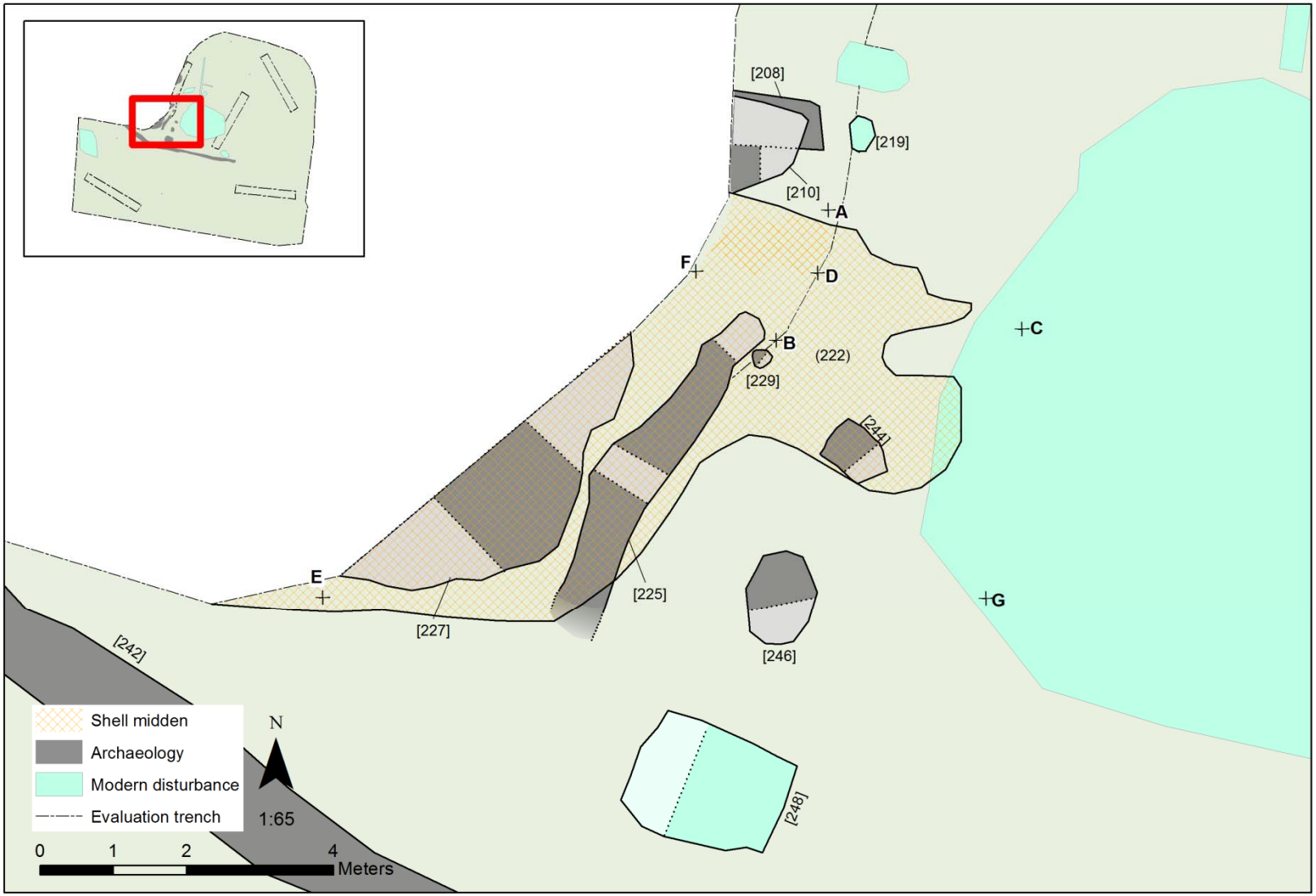

Figure 5: Close-up view archaeological features and location of sections

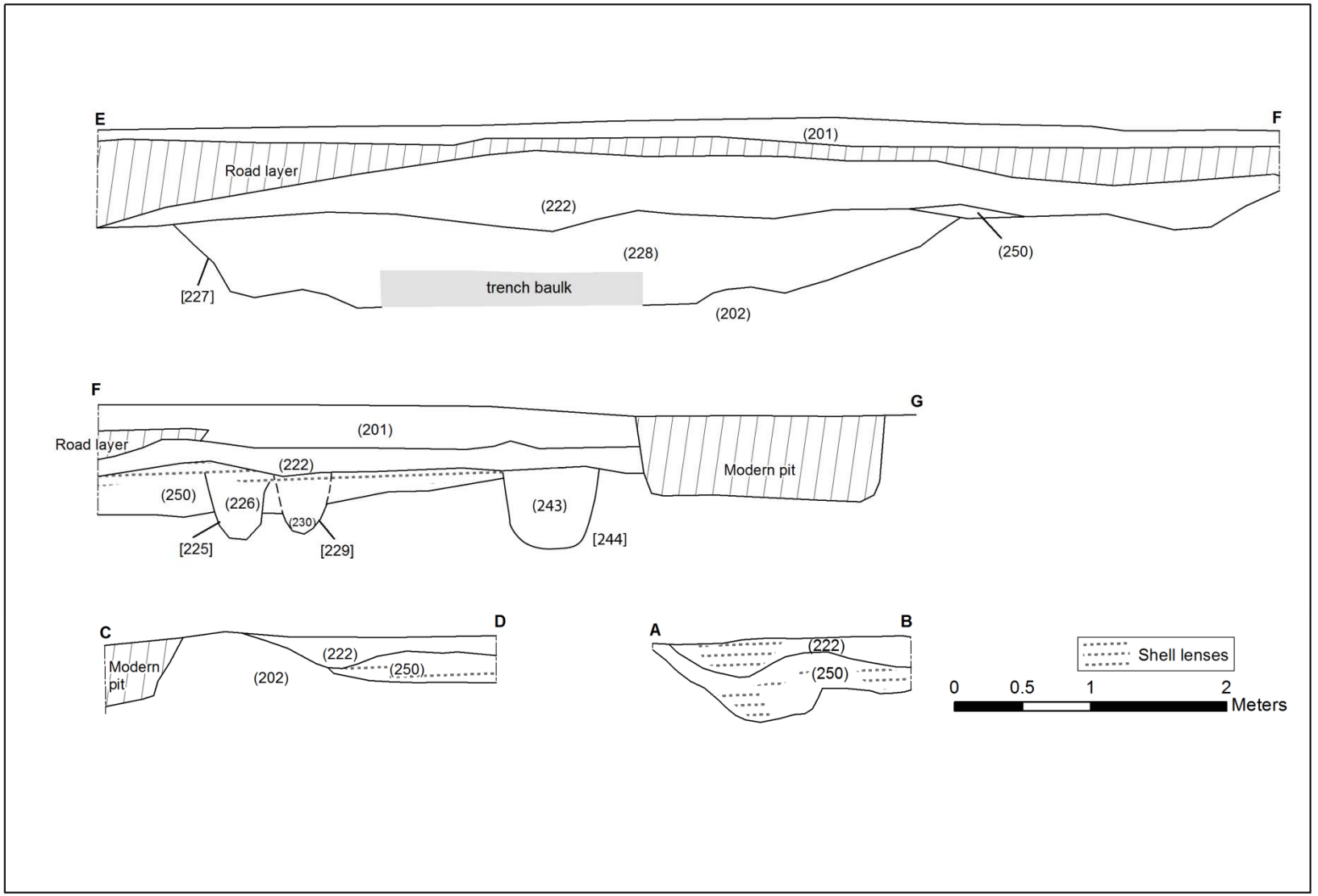

Figure 6: Section illustrations of midden deposit and pit [227]

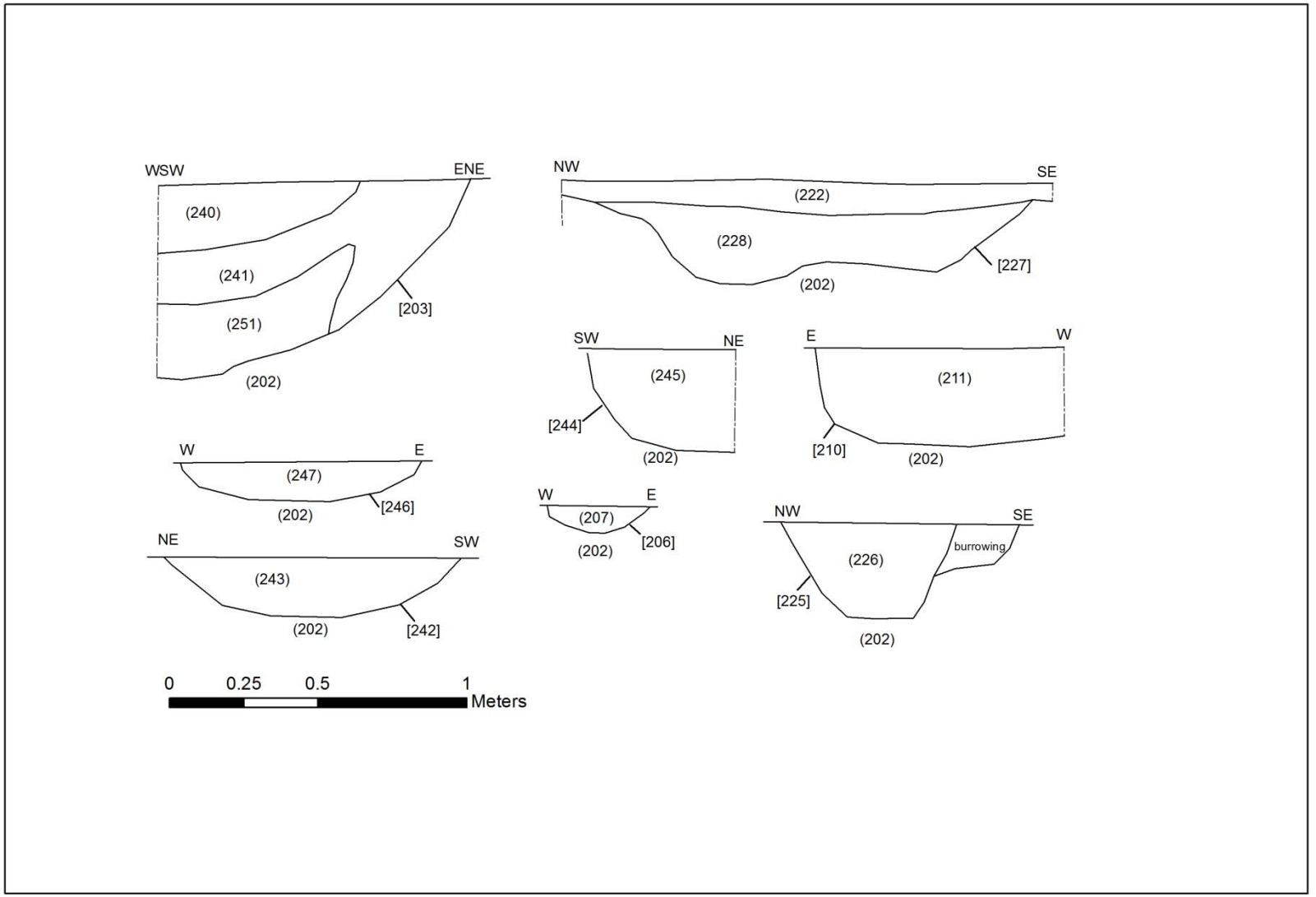

Figure 7: Section illustrations of pits and linear features [242] and [225]

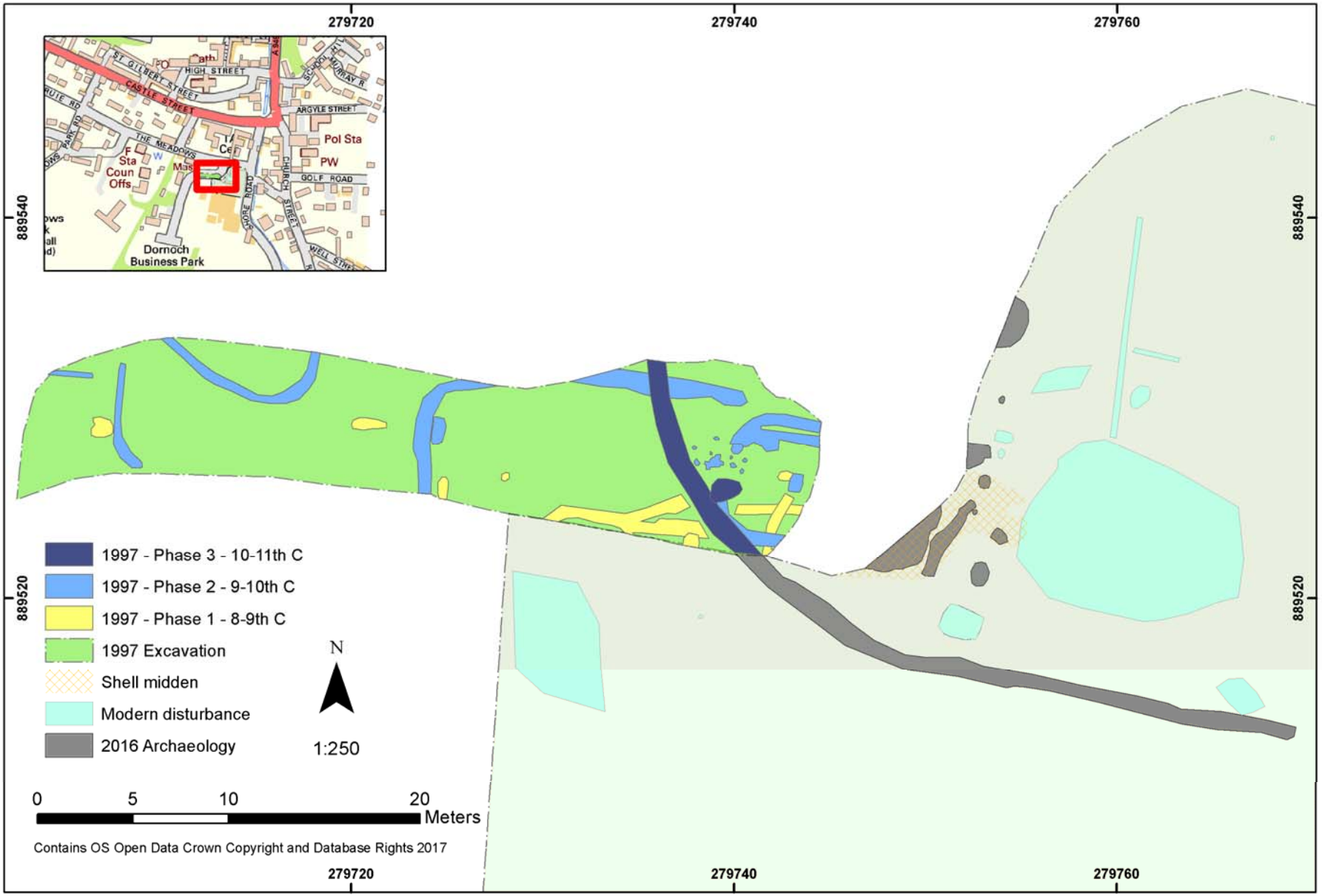

Figure 8: Combined plan of 1997 excavation site and 2016 excavation site

Plate 1: Development site prior to excavation with demolition rubble (201) spread across it

Plate 2: Shell midden (222) visible along western edge of development area

Plate 3: Shell midden (222) and (250) truncated to east (left) by modern pit

Plate 4: East facing section of shell midden (222) and (250) with undulating base

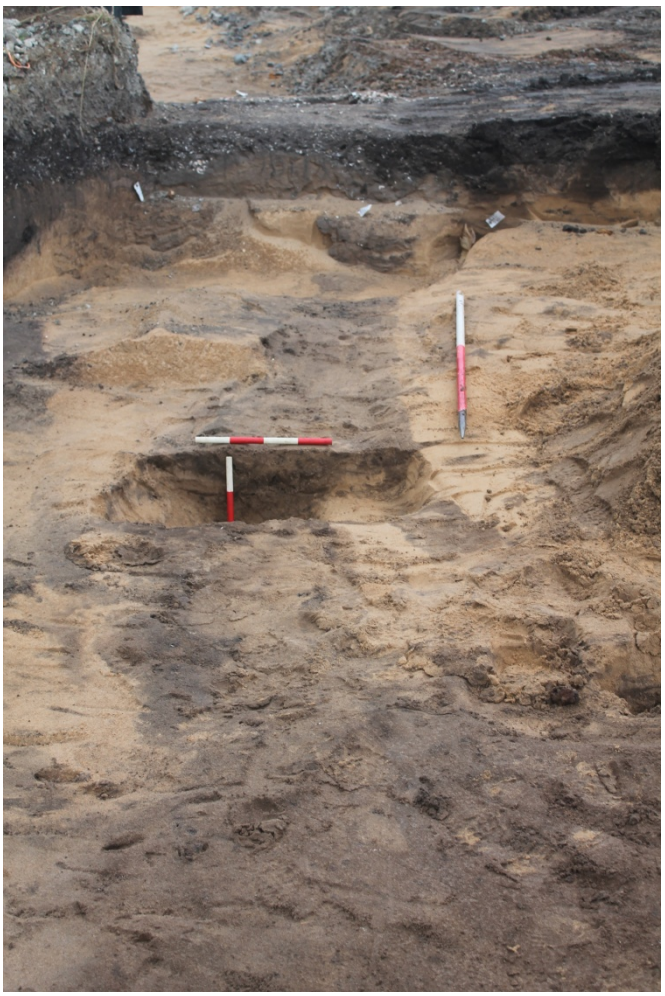

Plate 5: North east facing section through linear cut [225]

Plate 6: Evaluation trench with initial edge of pit [227] visible in foreground

Plate 7: South west facing section of large pit [227] visible up against western edge of trench

Plate 8: South facing section of pit [246]

Plate 9: Pit [210] with animal burial, cuts through linear slot [208]

Plate 10: Articulated section of animal leg bone in pit [210]

Appendix 1: List of Contexts

Context No.	Type	Description	Interpretation	Fill of	Filled by
201	Deposit	Rubble layer from demolished abattoir	Assigned by previous works phase - rubble spread	-	-
202	Deposit	Natural sand subsoil	Assigned by previous works phase - natural subsoil	-	-
203	Cut	Large pit, re-cut as (204)	Assigned by previous works phase - same as (204)	-	-
204	Cut	Large subcircular pit with a U-shaped profile up to 0.65m deep; half of it previously truncated	Large pit, part-excavated during previous works; possibly re-cut	-	240, 241, 251,252
205	Deposit	Remnant topsoil, below (222)	Assigned by previous works phase - same as (204)	-	-
206	Cut	Small, subcircular pit measuring 0.38m by 0.3m and 0.08m deep with a shallow, bowl-shaped profile	Cut for shallow, small pit; part-excavated during previous works	207	-
207	Fill	Dark brown sand with fragments of cockle and mussel shell inclusions	Fill of pit [206]	206	-
208	Cut	Linear, rectangular pit measuring up to 1.1m up to the road and 0.4m wide, straight-sided with flat base	Linear cut, underlying [210]	-	209
209	Fill	Compact dark grey-brown sand with few small pebbles	Fill	208	-
210	Cut	A subrectangular pit with straight sides measures 0.85m x 0.8m and up to 0.32m deep; extended below road	Animal (calf) burial pit, probably post-dates shell midden (229); part-excavated during previous works; partly truncated and buried by road	-	211
211	Fill	Mixed mid-dark brown sand containing partially articulated leg bones and pelvis of a small mammal; 2 sherds of bottle glass	Mixed backfill of cow (?) burial pit [210]	210	-
212	Fill	Upper fill of pit (203)	Upper fill of pit (203); assigned by previous works phase	203	-
213	Fill	Middle fill of pit (203/204)	Middle fill of pit (203/204); assigned by previous works phase	203	-
214	Fill	Middle fill of pit (203)	Middle fill of pit (203); assigned by previous works phase	203	-
215	Fill	Lower fill of (215)	Lower fill of pit (203); assigned by previous works phase	203	-
216	VOID	VOID	VOID	VOID	VOID
217	Deposit or cut?	Linear feature, cut by (208) and (210)	Assigned by previous works phase		218
218	Fill	Fill of (217)		217	
219	Cut	Small subcircular pit measuring 0.4m in diameter and up to 0.2m deep	Modern disturbance, part-excavated by previous works		220
220	Fill	Mid brown silty sand	Fill of pit [219]	219	

Context No.	Type	Description	Interpretation	Fill of	Filled by
221	Cut	Possible cut for a pit	Assigned and excavated by previous works phase; pit sealed below shell midden (222)	-	-
222	Deposit	A shell midden layer spread up to 9m NE-SW by 3-4m wide and extending below the road; measures 0.2-0.3m deep; contains mostly cockle shells and infrequent mussel, clam and razor shell fragments; occasional charcoal flecks and rare animal bone; lies over a dark brown soily sand	Shell midden, overlies earlier midden layer (250)	-	-
223	Pit	Possible pit - non feature	Non-feature	-	224
224	Fill	Fill of (223)	Assigned by previous works phase	223	-
225	Cut	Linear ditch slot measuring 5m long NE-SW; 0.5m wide and up to 0.3m deep; U-shaped profile with steep sides	Assigned by previous works phase	-	226
226	Fill	Mid yellow-grey sand with occasional shell, bone and charcoal fragments	Sealed below shell midden (250)	225	-
227	Cut	Large pit only partly exposed with NW side previously excavated; measures 5m x 1.5m and up to 0.34m deep; steep sided cut with a flat base	Large pit of unknown use, sealed below shell midden (222)	-	228
228	Fill	Mid grey-brown sand with 5% shell fragments and animal bones in upper half and charcoal flecks throughout; thin, blackened lens in base could suggest two infill events	Sealed below shell midden (222)	227	-
229	Cut	Possible pit measuring 0.3m across and 0.2m deep with indistinct edges	Animal burrowing	-	230
230	Fill	Mixed pale yellow-brown sand	Fill of [229] - burrowed material	229	-
240	Fill	Mixed mid-pale yellow-brown sand with some small-medium rounded stones, overlies (241); below a stony, rubble layer (252)	Upper Fill of pit [204]	204	-
241	Fill	Mid-dark grey-brown silty sand, moderately compact with occasional small patches of clay and charcoal flecks; overlies (251)	Middle fill of pit [204]	204	-
242	Cut	Curvilinear ditch aligned WNW-ESE, extends below road and cuts through sand subsoil; measures 0.7-0.9m wide and up to 0.27m deep	Cut for a linear ditch	-	243
243	Fill	Mid-dark grey-brown silty sand with frequent cockle shell fragments and occasional mussel shell fragments and some fish bone and animal bone; contains 5% small pale yellow clay lumps and small sandstone fragments	Fill of ditch [242]	242	-
244	Cut	Subcircular pit measuring 0.7m x 0.5m and 0.6m deep; U-shaped profile with steep sloping sides	Cut for pit, sealed below shell midden (250)	-	245
245	Fill	Mixed grey-yellow sand with occasional charcoal flecks and small fragments of shell and bone	Fill of pit [244]	244	-
246	Cut	Subrectangular cut measuring 1.1m x 0.8m and 0.15m deep; shallow sloping sides with a bowl-shaped base	Cut for shallow pit of unknown use	-	247

Context No.	Type	Description	Interpretation	Fill of	Filled by
247	Fill	Dark black-brown sand with occasional bone, shell and slag inclusions and rare small pebbles	Fill of pit [246]	246	-
248	Cut	Subrectangular/oval pit measuring 2.1m WNW-ESE x 1.5m and greater that 0.5m deep; vertical sides with sharp corners	Cut for subrectangular pit - modern test pit	-	249
249	Fill	Very mixed sand with layers of black-brown and mid grey-brown sandy soil; contains concrete and rubble inclusions, small shells and bone inclusions	Fill of pit [248]	248	-
250	Deposit	Mid yellow-brown silty sand with darker patches; contains occasional cockle shell and animal bone, including sheep skull; some razor, clam and mussel shell fragments; appears to have formed in lenses to suggest possibly multiple depositional events present	Lower layer of shell midden, contains more clam shells than overlying layer (222); post-dates/seals pits [221], [225], [227] and [244];	-	-
251	Fill	Pale cream sand	Basal fill/ silting in base of pit [204]	204	-
252	Deposit	Large, subangular stones overlying upper fill (244) of pit [204]	Rubble layer?	-	-

Appendix 2: List of Finds

Find No.	Context No.	Material	Description
001	250	Stone	Circular stone disc from base of shell midden
002	250	Ceramic	Lump of daub/clay or small ceramic fragment
003	211	Glass	2 x sherds of bottle glass

Appendix 3: List of Samples

Context No.	No. of Bags	Description
206	1	
209	1	
211	2	
222	1	Shell midden
222	1	Animal bone and teeth
222	1	Animal bone
222	6	
226	1	Contains shell
228	2	Upper and lower fills, contains shell, animal bone and charcoal
230	1	
240	1	
241	1	
243	1	Slot 1, contains shells, animal bone, charcoal, fish bone
245	1	Contains shell and animal bone
247	1	Contains shell, animal bone, and possibly metal slag
249	1	
250	1	Slot 2
251	1	

Appendix 4: List of Drawings

Drawing No.	Contexts	Description	Scale	Initials	Date
201	203	S-facing section of large pit	1:10	LS	14/10/2020
202	206	S-facing section of small pit	1:10	LS	14/10/2020
203	210	N-facing section of pit	1:10	LS	14/10/2020
204	227	SW-facing section of slot 1	1:10	LS	15/10/2020
205	242	NW-facing section of slot 1	1:10	LS	15/10/2020
206	225	SW-facing section	1:10	LS	15/10/2020
207	244	SE-facing section	1:10	LS	15/10/2020
208	247	S-facing section	1:10	LS	15/10/2020
209	222, 227	SE-facing section, edge of evaluation trench	1:20	CM	18/10/2020
210	222, 225, 229	NW-facing section, edge of baulk	1:20	CM	18/10/2020
211	222	NE-facing section, edge of baulk and 222	1:10	LS	19/10/2020
212	222	NE-facing section, edge of baulk and 222	1:10	LS	19/10/2020

Appendix 5: List of Site Photographs

Photo No.	Trench	Context No.	Description	Direction Facing	Taken By	Date
1	TE	205	Pre-excavation: General view of evaluation trench	E	CMac	14/10/2020
2	TE	205	Pre-excavation: General view of evaluation trench	NE	CMac	14/10/2020
3	TE	205	Pre-excavation: NW-facing section of trench (SW end)	SE	CMac	14/10/2020
4	TE		Pre-excavation: NW-facing section of trench (NE end)	SE	CMac	14/10/2020
5	TE	225	Pre-excavation: Close up of shell midden and baulk	NE	CMac	14/10/2020
6	TE	225	Pre-excavation: Close up of shell midden and baulk, from above	WNW	CMac	14/10/2020
7	TE		Pre-excavation: General view along evaluation trench	NE	CMac	14/10/2020
8	TE	227	Pre-excavation: Record shot of feature from evaluation	SW	CMac	14/10/2020
9	TE	210, 219	Pre-excavation: Record shot of features from evaluation (note C.210 label is incorrectly placed in cut 219)	E	CMac	14/10/2020
10	TE	219	Pre-excavation: W-facing section of feature from evaluation	N	CMac	14/10/2020
11	TE	206	Pre-excavation: S-facing section of feature from evaluation	N	CMac	14/10/2020
12	TE	203, 204	Pre-excavation: S-facing section of pit from evaluation	NE	CMac	14/10/2020
13	TE		Pre-excavation: SE-facing section of trench from evaluation		CMac	14/10/2020
14	T2	242	Pre-excavation shot of linear ditch	SSE	CMac	14/10/2020
15	T2	242	Pre-excavation shot of linear ditch	SE	CMac	14/10/2020
16	T2	242	NW-facing section of slot 1	SE	CMac	14/10/2020
17	T2	242	SE-facing section of slot 1	NW	CMac	14/10/2020
18	T2	219	Record shot of modern dog burial cut through topsoil	SE	CMac	15/10/2020
19	T2	219	Record shot of modern dog burial cut through topsoil	SE	CMac	15/10/2020
20	T2	244	Pre-excavation shot of possible pit	NE	CMac	15/10/2020
21	T2	244	Pre-excavation shot of possible pit	NE	CMac	15/10/2020
22	T2	229	Post-excavation shot of possible pit	NE	CMac	15/10/2020
23	T2	227	Pre-excavation shot of feature	NW	CMac	15/10/2020
24	T2	227	Pre-excavation shot of feature	NNE	CMac	15/10/2020
25	T2	227	Pre-excavation shot of feature	NNE	CMac	15/10/2020
26	T2	225	Pre-excavation shot of linear feature	NNE	CMac	15/10/2020
27	T2	225	SW-facing section of feature	NE	CMac	15/10/2020
28	T2	225	SW-facing section of feature, close up	NE	CMac	15/10/2020

Photo No.	Trench	Context No.	Description	Direction Facing	Taken By	Date
29	T2	225	SW-facing section of feature	NE	CMac	15/10/2020
30	T2	244	SW-facing section of pit	NE	CMac	15/10/2020
31	T2	222	SW-facing section of rubble and shell midden, panorama	NE	CMac	15/10/2020
32	T2	246	Pre-excavation shot of pit	ENE	CMac	15/10/2020
33	T2	246	ESE-facing section of pit	ENE	CMac	15/10/2020
34	T2	227	SW-facing section of slot 1	NE	CMac	15/10/2020
35	T2	227	SW-facing section of slot 1	NE	CMac	15/10/2020
36	T2	227	Post-excavation shot of slot 1	N	CMac	15/10/2020
37	T2	227	Post-excavation shot of slot 1, showing trench edge section	NW	CMac	15/10/2020
38	T2	227	Post-excavation shot of slot 1	N	CMac	15/10/2020
39	T2	248	Pre-excavation shot of feature	ESE	CMac	18/10/2020
40	T2	248	Pre-excavation shot of feature	NNE	CMac	18/10/2020
41	T2		General site photographs		CMac	18/10/2020
42	T2		General site photographs		CMac	18/10/2020
43	T2		General site photographs		CMac	18/10/2020
44	T2		General site photographs		CMac	18/10/2020
45	T2		General site photographs		CMac	18/10/2020
46	T2		General site photographs		CMac	18/10/2020
47	T2	222	Mid-excavation shot of shell midden cut by road and pit	E	CMac	18/10/2020
48	T2	222	Post-excavation shot of slot 1 through midden	SE	CMac	18/10/2020
49	T2	222	Post-excavation shot of slot 2 through midden	S	CMac	19/10/2020
50	T2	222	Post-excavation shot of slot 2 through midden	SW	CMac	19/10/2020
51	T2	222	Post-excavation shot of slot 2 through midden	SW	CMac	19/10/2020
52	T2	222	Post-excavation shot of slot 2 through midden	SW	CMac	19/10/2020
53	T2	222	Post-excavation shot of slot 2 through midden	SW	CMac	19/10/2020
54	T2	222	Post-excavation shot of slot 2 through midden	SW	CMac	19/10/2020
55	T2	248	WNW-facing section of feature	ESE	CMac	19/10/2020
56	T2	248	WNW-facing section of feature	ESE	CMac	19/10/2020
57	T2	222	NW-facing section of shell midden	SE	CMac	19/10/2020
58	T2	222	NW-facing section of shell midden	SE	CMac	19/10/2020
59	T2	222	NW-facing section of shell midden	SE	CMac	19/10/2020
60	T2	222	NW-facing section of shell midden	SE	CMac	19/10/2020
61	T2	222	NW-facing section of shell midden	SE	CMac	19/10/2020
62	T2		Area of site access and modern pit	NW	CMac	19/10/2020
63	T2		Area of site access and modern pit	W	CMac	19/10/2020
64	T2	208, 210	Pre-excavation shot showing slot from evaluation	WNW	CMac	19/10/2020

Photo No.	Trench	Context No.	Description	Direction Facing	Taken By	Date
65	T2	210	NNE-facing section of slot from evaluation	SSW	CMac	19/10/2020
66	T2	210	Possible articulated bones in 210	W	CMac	19/10/2020
67	T2	210	Possible articulated bones in 210	S	CMac	19/10/2020
68	T2	227	Post-excavation shot of large pit, slot 2	NE	CMac	19/10/2020
69	T2	227	Post-excavation shot of large pit, slot 2	SW	CMac	19/10/2020
70	T2	227	Post-excavation shot of large pit, slot 2	SW	CMac	19/10/2020
71	T2	242	Record shot of faint linear feature	E	CMac	19/10/2020
72	T2	242	Record shot of faint linear feature	E	CMac	19/10/2020
73	T2		Area of modern pit disturbance	NE	CMac	19/10/2020
74	T2		Services in W end of site area	N	CMac	19/10/2020
75	T2		Services in W end of site area	N	CMac	19/10/2020
76	-	-	General site view	-	LS	03/11/2016
77	-	-	General site view	-	LS	03/11/2016
78	-	-	General site view	-	LS	03/11/2016
79	-	-	General site view	-	LS	03/11/2016
80	-	-	General site view	-	LS	03/11/2016
81	-	-	General site view	-	LS	03/11/2016
82	-	-	General site view	-	LS	03/11/2016
83	-	-	General site view	-	LS	03/11/2016
84	-	-	General site view	-	LS	03/11/2016
85	-	-	General site view	-	LS	03/11/2016
86	-	-	General site view	-	LS	03/11/2016
87	-	-	General site view	-	LS	03/11/2016
88	-	-	Working shot of NE area	NE	LS	03/11/2016
89	-	-	Working shot of NE area showing modern disturbance	NE	LS	03/11/2016
90	-	-	Working shot of S area	SW	LS	03/11/2016
91	-	-	Working shot of S area	W	LS	03/11/2016

Appendix 6: Table 1 Charred Macroplant

Feature			Eval	Eval	Eval	Pit 203	Pit 203	Pit 206	Pit 210	Pit 227	Pit 227	Pit 244	Pit 246	Pit 248	Linear 208	Ditch 242	Shell Mid
Context			206	222	230	240	241	207	211	228 Upper	228 Lower	245	247	249	209	243 Slot 1	222
Area			Eval	Eval	Eval	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	Tr 2	2
Sample Vol (l)			2.5	6	1	2	2	2	7	4	3	3.5	4	3.5	5	4	38
% Sort			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Species	**Name**	**Part**															
Cereal crops																	
Hordeum vulgare L.	Hulled barley	Caryopsis/ es				2							2			4	2
Hordeum sp.	Barley	Caryopsis/ es		2		1		2		1				2		6	2
Avena sp.	Oat	Caryopsis/ es		1		7							2			8	3
Cereal	Cereal	Caryopsis/ es	2	5	2	3		1		3	1		9	7	2	8	5
Economically useful plants																	
Linum usitatissimum L.	Flax	Seed(s)											3			2	
Brassica cf *campestris* L.	Turnip	Seed(s)														1	
Corylus avellana L.	Hazel	Shell frag(s)										2					
Weed taxa																	
Carex sp.	sedge	Fruit(s)								1						2	1
Chenopodium album L.	Fat hen	Seed(s)														1	
Graminae sp.	Grass	Caryopsis/ es											1				
Leontodon autumnalis L.	Autumnal hawkbit	Achene(s)				1											
Persicaria lapathifolium L.	Pale persicaria	Fruit(s)															1
Ranunculus sp.	Buttercup	Achene(s)							1								
Raphanus raphanistrum L.	Wild radish	Pod frag(s)												1		5	
Rumex acetosella agg	Sheep's sorrel	Fruit(s)						1									1

Feature			Eval	Eval	Eval	Pit 203	Pit 203	Pit 206	Pit 210	Pit 227	Pit 227	Pit 244	Pit 246	Pit 248	Linear 208	Ditch 242	Shell Mid
Spergula arvensis L.	Corn spurrey	Seed(s)				2				1			1				
Stellaria media L.	Chickweed	Seed(s)								1			1				
Indet	Unknown	Seed/fruit	1	1			1						2			2	3

Appendix 7: Table 2 Charcoal Species

Feature	Context	Species	Name	Frag	Weight (g)
Ditch 225	226	*Corylus avellana* L.	Hazel	1	
Ditch 225	226	*Quercus* sp.	Oak	1	0.1
Ditch 242	243	*Betula* sp.	Birch	4	
Ditch 242	243	*Corylus avellana* L.	Hazel	1	1.5
Eval	206	*Alnus glutinosa* L.	Alder	2	
Eval	206	*Pinus* sp.	Pine	1	0.2
Linear 208	209	*Alnus glutinosa* L.	Alder	4	0.4
Pit 206	207	*Corylus avellana* L.	Hazel	1	
Pit 206	207	*Quercus* sp.	Oak	1	0.3
Pit 210	211	*Alnus glutinosa* L.	Alder	1	0.01
Pit 227	228 - Upper	*Betula* sp.	Birch	9	
Pit 227	228 - Upper	*Quercus* sp.	Oak	1	2.9
Pit 227	228 - Lower	*Betula* sp.	Birch	10	0.5
Shell Mid	222	*Alnus glutinosa* L.	Alder	3	
Shell Mid	222	*Betula* sp.	Birch	11	
Shell Mid	222	*Corylus avellana* L.	Hazel	1	
Shell Mid	222	*Quercus* sp.	Oak	2	3.8

Appendix 8: Table 3 Shell

Feature	Context	Species	Name	Number	Weight (g)
Burrow 229	230	*Cerastoderma edule* L.	Common cockle	9	54.7
Ditch 225	226	*Cerastoderma edule* L.	Common cockle	4	29.1
Ditch 242	243	*Cerastoderma edule* L.	Common cockle	29	
Ditch 242	243	*Littorina littorea* L.	Common periwinkle	4	
Ditch 242	243	*Mytilus edulis* L.	Common mussel	3	309.8
Pit 206	206	*Cerastoderma edule* L.	Common cockle	4	90
Pit 206	207	*Cerastoderma edule* L.	Common cockle	2	
Pit 206	207	*Ensis ensis* L.	Common razor shell	1	
Pit 206	207	*Patella vulgata* L.	Common limpet	1	80.3
Pit 210	211	*Cerastoderma edule* L.	Common cockle	9	100.6
Pit 227	228 - Upper	*Cerastoderma edule* L.	Common cockle	12	
Pit 227	228 - Upper	*Mytilus edulis* L.	Common mussel	1	151
Shell midden	222	*Cerastoderma edule* L.	Common cockle	1093	
Shell midden	222	*Ensis ensis* L.	Common razor shell	8	
Shell midden	222	*Littorina littorea* L.	Common periwinkle	5	
Shell midden	222	*Mactridae* sp.	Trough shell	1	
Shell midden	222	*Mytilus edulis* L.	Common mussel	23	
Shell midden	222	*Patella vulgata* L.	Common limpet	3	20409.8
Shell midden	250	*Cerastoderma edule* L.	Common cockle	50	
Shell midden	250	*Ensis ensis* L.	Common razor shell	16	
Shell midden	250	*Mactridae* sp.	Trough shell	1	
Shell midden	250	*Mytilus edulis* L.	Common mussel	5	476.5

Appendix 9: Table 4 Animal Bone

Key:

L/M= large mammal, M/M=medium mammal, S/M=mammal, I/M= indeterminate mammal, Frag=fragment, P/F= proximal fused, D/F= distal fused, UF=unfused, Indet=Indeterminate, N/A=not applicable, L/B=long bone, LM=lower molar, UM=upper molar, dm=deciduous molar

Size (mm): A=<10, B=10-50, C=50-100, D=100-150, E=150-200, F=>250

Surface staining= 0= no staining, 1=<10%, 2=10-50%, 3=50-75%, 4=75-100%

Feature	Find	Context No.	Element	Species	Side	No of frags	Fusion	Age	Zone	Preserv -ation	Size	Stain	Butchery	Patho -logy	Burnt	Gnawing	Measured	Comments
Burrow 229	RT	230	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	A	4	No	No	Yes	No	No	Burnt white
Burrow 229	RT	230	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Ditch 225	RT	226	Molar 3	Cattle	Indet	1	N/A	N/A	N/A	Adeq	B	1	No	No	No	No	No	No wear
Ditch 225	RT	226	Premolar	Cattle	Indet	1	N/A	N/A	N/A	Adeq	B	1	No	No	No	No	No	No wear
Ditch 225	RT	226	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	B	4	No	No	Yes	No	No	Burnt black
Ditch 225	RT	226	Frag	L/M	Indet	4	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Ditch 225	RT	226	Mandible	L/M	Indet	2	N/A	N/A	1	Poor	C	1	No	No	No	No	No	
Ditch 242	RT	243	Frag	I/M	Indet	10	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Ditch 242	RT	243	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	A	4	No	No	Yes	No	No	Burnt white
Ditch 242	RT	243	Frag	L/M	Indet	9	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Ditch 242	RT	243	Rib	L/M	Indet	1	Indet	N/A	2	Adeq	C	1	No	No	No	No	No	
Ditch 242	RT	243	Vertebra	L/M	N/A	1	N/A	N/A	4	Adeq	C	1	No	No	No	No	No	
Ditch 242	RT	243	Mandible	M/M	Indet	1	N/A	Indet	4	Poor	B	1	No	No	No	No	No	
Ditch 242	RT	243	Rib	M/M	Indet	3	Indet	N/A	2	Adeq	B	1	No	No	No	No	No	
Ditch 242	RT	243	Rib	M/M	Indet	1	Indet	N/A	1,2	Adeq	B	1	No	No	No	No	No	
Ditch 242	RT	243	Rib	M/M	Indet	1	Indet	N/A	1	Poor	B	1	No	No	No	No	No	
Ditch 242	RT	243	Skull frag	M/M	Indet	1	N/A	N/A	N/A	Poor	B	2	No	No	No	No	No	
Ditch 242	RT	243	Foot bone	Rodent	Indet	2	Indet	Indet	Shaft	Adeq	A	0	No	No	No	No	No	
Ditch 242	RT	243	Frag	Rodent	Indet	6	Indet	Indet	Frag	Adeq	A	0	No	No	No	No	No	

Feature	Find	Context No.	Element	Species	Side	No of frags	Fusion	Age	Zone	Preserv -ation	Size	Stain	Butchery	Patho -logy	Burnt	Gnawing	Measured	Comments
Ditch 242	RT	243	L/B shaft	Rodent	Indet	4	Indet	Indet	Shaft	Adeq	B	0	No	No	No	No	No	
Ditch 242	RT	243	Vertebra	Rodent	Indet	3	Indet	N/A	1,2,3,4	Adeq	A	0	No	No	No	No	No	
Ditch 242	RT	243	Metacar pal	Sheep/ goat	Right	1	PF		1,2,5,6, 7,8	Adeq	C	2	No	No	No	No	No	
Eval	RT	206	Frag	I/M	Indet	4	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Eval	RT	206	Frag	I/M	Indet	2	Indet	Indet	Frag	Poor	B	4	No	No	Yes	No	No	Burnt black to white
Eval	RT	206	Frag	I/M	Indet	5	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Eval	RT	206	Frag	Rodent	Indet	3	Indet	Indet	Frag	Poor	A	0	No	No	No	No	No	
Linear 208	RT	209	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	In same bag as fish
Pit 204	RT	240	Frag	I/M	Indet	6	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Pit 204	RT	241	Frag	I/M	Indet	5	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Pit 206	RT	207	Frag	I/M	Indet	9	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Pit 206	RT	207	Frag	I/M	Indet	5	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Pit 210	RT	211	Frag	I/M	Indet	39	Indet	Indet	Frag	Poor	A	2	No	No	No	No	No	
Pit 210	RT	211	Frag	L/M	Indet	18	Indet	Indet	Frag	Poor	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Carpal/ta rsul	Cattle	Indet	2	N/A	N/A	Complete	Adeq	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Mandible	Cattle	Right	1	N/A		1	Adeq	C	2	No	No	No	No	No	pm2 erupting, pm3 present no wear, dpm4 slight wear to first cusp
Pit 227	RT	228 upper	Phalanx 1	Cattle	N/A	1	PF		Complete	Adeq	C	2	No	No	No	No	No	Slight damage to prox end
Pit 227	RT	228 upper	PM	Cattle	Indet	1	N/A	N/A	N/A	Adeq	B	2	No	No	No	No	No	Extremely worn
Pit 227	RT	228 upper	Radius	Cattle	Left	1	DF		8,9,10,3 ,4, G,H, J	Good	D	1	No	No	No	No	No	
Pit 227	RT	228 upper	UM1/2	Cattle	Indet	1	N/A	N/A	N/A	Poor	B	2	No	No	No	No	No	Extreme wear
Pit 227	RT	228 upper	Humerus	Dog	Right	1	DF			Good	C	2	No	No	No	No	No	
Pit 227	RT	228 upper	Metapodi al	Dog	Indet	2	Indet	Indet	Frag	Adeq	B	1	No	No	No	No	No	
Pit 227	RT	228 upper	Metapodi al	Dog	N/A	2	P/D Fused		Complete	Excel	C	2	No	No	No	No	No	

Feature	Find	Context No.	Element	Species	Side	No of frags	Fusion	Age	Zone	Preserv -ation	Size	Stain	Butchery	Patho -logy	Burnt	Gnawing	Measured	Comments
Pit 227	RT	228 upper	Metapodi al	Dog	N/A	1	PF		1,2	Adeq	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Metapodi al	Dog	N/A	1	DF		2,3	Adeq	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Phalanx 1/2/3	Dog	Indet	3	Fused	Indet	Complete	Excel	B	1	No	No	No	No	No	Fits together into one toe
Pit 227	RT	228 upper	Frag	I/M	Indet	23	Indet	Indet	Frag	Poor	A	2	No	No	No	No	No	
Pit 227	RT	228 upper	Frag	I/M	Indet	7	Indet	Indet	Frag	Poor	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Frag	I/M	Indet	7	Indet	Indet	Frag	Poor	A	2	No	No	No	No	No	
Pit 227	RT	228 lower	Frag	L/M	Indet	3	Indet	Indet	Frag	Poor	C	2	No	No	No	No	No	
Pit 227	RT	228 lower	Frag	L/M	Indet	2	Indet	Indet	Frag	Poor	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Frag	L/M	Indet	23	Indet	Indet	Frag	Poor	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	L/B shaft	L/M	Indet	1	Indet	Indet	Shaft	Poor	C	4	No	No	Yes	No	No	Burnt grey
Pit 227	RT	228 upper	L/B shaft	L/M	Indet	1	Indet	Indet	Shaft	Poor	D	2	No	No	No	No	No	
Pit 227	RT	228 upper	L/B shaft	L/M	Indet	1	Indet	Indet	Shaft	Poor	C	2	No	No	No	No	No	
Pit 227	RT	228 upper	Mandible	L/M	Indet	1	Indet	Indet	6	Poor	D	3	No	No	No	No	No	Weathered
Pit 227	RT	228 lower	Atlas	M/M	N/A	1	Indet	N/A	1	Adeq	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Eye socket	M/M	Indet	1	N/A	N/A	N/A	Adeq	B	2	No	No	No	No	No	
Pit 227	RT	228 lower	Foot bone	M/M	Indet	1	Indet	Indet	Frag	Poor	B	4	No	No	Yes	No	No	Burnt white
Pit 227	RT	228 upper	L/B shaft	M/M	Indet	4	Indet	Indet	Shaft	Poor	C	2	No	No	No	No	No	
Pit 227	RT	228 upper	Mandible	M/M	Indet	1	N/A	N/A	3,4,5	Poor	B	2	No	No	No	No	No	
Pit 227	RT	228 upper	Metapodi al	M/M	Indet	1	Indet	Indet	Shaft	Poor	C	2	No	No	No	No	No	
Pit 227	RT	228 upper	Rib	M/M	Indet	2	Indet	Indet	2	Adeq	C	2	No	No	No	No	No	
Pit 227	RT	228 lower	Femur	Sheep/ goat	Left	1	PJF		1,3,5,4, 3	Adeq	B	2	No	No	No	No	No	
Pit 227	RT	228 lower	Humerus	Sheep/ goat	Left	1	Indet	Indet	7,8	Poor	B	2	No	No	No	No	No	

Feature	Find	Context No.	Element	Species	Side	No of frags	Fusion	Age	Zone	Preserv -ation	Size	Stain	Butchery	Patho -logy	Burnt	Gnawing	Measured	Comments
Pit 227	RT	228 upper	Mandible	Sheep/ goat	Left	1	N/A		1	Adeq	B	2	No	No	No	No	No	dpm2, dpm3, dpm4 present with wear, M1 present but loose no wear
Pit 227	RT	228 upper	Max	Sheep/ goat	Left	1	N/A		N/A	Adeq	B	2	No	No	No	No	No	pm2 erupting, pm2, pm3, m1 m2 present all worn
Pit 227	RT	228 upper	UM1/2	Sheep/ goat	Indet	1	N/A	N/A	N/A	Adeq	B	2	No	No	No	No	No	Wear
Pit 244	RT	245	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Pit 244	RT	245	Frag	I/M	Indet	3	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Pit 246	RT	247	Frag	I/M	Indet	15	Indet	Indet	Frag	Poor	A	2	No	No	No	No	No	
Pit 246	RT	247	Frag	I/M	Indet	3	Indet	Indet	Frag	Poor	B	2	No	No	No	No	No	
Pit 246	RT	247	Frag	I/M	Indet	9	Indet	Indet	Frag	Poor	B	4	No	No	Yes	No	No	Burnt black to white
Pit 246	RT	247	Frag	I/M	Indet	4	Indet	Indet	Frag	Poor	A	4	No	No	Yes	No	No	Burnt white
Pit 246	RT	247	Rib	S/M	Right	2	Fused	N/A	1,2,3	Good	D	1	No	No	No	No	No	Prob dog
Pit 248	RT	249	Frag	I/M	Indet	4	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	In same bag as fish
Shell mid		222	Humerus	Cattle	Right	1	PUF/DF		11,10,9, 6,7,6,5, 3,4	Adeq	E	3	No	No	No	No	No	Weathered difficult to id
Shell mid		250	Humerus	Cattle	Right	1	DF		7,8,3,5, 6	Good	E	1	No	No	No	No	No	
Shell mid		222	Phalanx 1	Cattle	N/A	1	PUF		2,3	Adeq	C	2	No	No	No	No	No	Recent damage
Shell mid		250	PM	Cattle	Right	1	N/A		N/A	Good	B	1	No	No	No	No	No	Wear
Shell mid	RT	222	UM1/2	Cattle	Right	1	N/A	N/A	N/A	Good	B	1	No	No	No	No	No	No wear
Shell mid	RT	222 Eval	Incisor	Dog	Indet	1	Indet	Indet	N/A	Poor	B	2	No	No	No	No	No	Wear
Shell mid	RT	222 Eval	Molar	Dog	Indet	1	Indet	Indet	N/A	Adeq	B	2	No	No	No	No	No	Little wear

Feature	Find	Context No.	Element	Species	Side	No of frags	Fusion	Age	Zone	Preserv -ation	Size	Stain	Butchery	Patho -logy	Burnt	Gnawing	Measured	Comments
Shell mid		250	Skull frag	Dog	N/A	1	N/A		Complete	Excel	E	1	No	No	No	No	No	Right PM2 lost during life healed, P3, P4, M1 have wear M2 slight wear, Left P2, P3, P4 all have more wear than right wear, M1 missing slight wear to M2
Shell mid	RT	222	Frag	I/M	Indet	>100	Indet	Indet	Frag	Poor	A	4	No	No	Yes	No	No	Burnt black to grey
Shell mid	RT	222	Frag	I/M	Indet	35	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Shell mid	RT	250	Frag	I/M	Indet	16	Indet	Indet	Frag	Poor	A	0	No	No	No	No	No	
Shell mid	RT	222 (2)	Frag	I/M	Indet	3	Indet	Indet	Frag	Poor	A	1	No	No	No	No	No	
Shell mid	RT	222 (2)	Frag	I/M	Indet	1	Indet	Indet	Frag	Poor	A	4	No	No	Yes	No	No	Burnt black
Shell mid	RT	222 Eval	Frag	I/M	Indet	22	Indet	Indet	Frag	Poor	A	2	No	No	No	No	No	
Shell mid	RT	222	Frag	L/M	Indet	14	N/A	Indet		Poor	B	1	No	No	No	No	No	
Shell mid	RT	222	Frag	L/M	Indet	2	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222	Frag	L/M	Indet	5	Indet	Indet	Frag	Poor	B	4	No	No	Yes	No	No	Burnt black to grey
Shell mid		250	Frag	L/M	Indet	1	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222 (2)	Frag	L/M	Indet	4	Indet	Indet	Frag	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222 Eval	Frag	L/M	Indet	15	Indet	Indet	Frag	Poor	B	2	No	No	No	No	No	
Shell mid	RT	250	L/B shaft	L/M	Indet	1	Indet	Indet	Shaft	Poor	B	4	No	No	No	No	No	Burnt black
Shell mid	RT	222	Mandible	L/M	Indet	1	N/A	N/A	5	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222	Metapodial	L/M	Indet	1	Indet	Indet	Shaft	Adeq	C	1	Yes	No	No	No	No	Marrow cracked
Shell mid	RT	222	Scapula	L/M	Indet	1	Indet	Indet	6	Poor	B	1	No	No	No	No	No	

Feature	Find	Context No.	Element	Species	Side	No of frags	Fusion	Age	Zone	Preserv -ation	Size	Stain	Butchery	Patho -logy	Burnt	Gnawing	Measured	Comments
Shell mid	RT	222	Skull frag	L/M	N/A	2	N/A	N/A	Frag	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222	Skull frag	L/M	N/A	1	N/A	N/A	N/A	Poor	C	1	No	No	No	No	No	
Shell mid		250	Vertebra	L/M	Indet	1	Indet		4	Poor	B	1	No	No	No	No	No	
Shell mid		222	Vertebra e	L/M	N/A	2	Unfused	N/A	1,2,3	Adeq	D	2	No	No	No	No	No	
Shell mid	RT	222 Eval	Canine	M/M	Indet	1	Indet	Indet	N/A	Poor	B	4	No	No	Yes	No	No	Burnt grey to white
Shell mid	RT	222	L/B shaft	M/M	Indet	1	Indet	Indet	Shaft	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222	Rib	M/M	Indet	2	Indet	Indet	2	Adeq	B	1	No	No	No	No	No	
Shell mid	RT	222	Rib	M/M	Indet	1	Indet	Indet	2	Adeq	C	1	No	No	No	No	No	
Shell mid	RT	222 (2)	Rib	M/M	Indet	1	Indet	N/A	2	Adeq	B	1	No	No	No	No	No	
Shell mid		222	Metapodial	Pig	Indet	1	DUF		3	Adeq	C	2	No	No	No	No	No	
Shell mid	RT	222 (2)	Frag	Rodent	Indet	2	Indet	Indet	Frag	Poor	A	0	No	No	No	No	No	
Shell mid		250	Mandible	S/M	Indet	1	Indet		5	Poor	B	1	No	No	No	No	No	
Shell mid	RT	222	Molar	S/M	Indet	1	N/A	N/A	N/A	Adeq	B	1	No	No	No	No	No	No wear prob dog
Shell mid	RT	222 (2)	Rib	S/M	Indet	2	Indet	N/A	2	Adeq	B	1	No	No	No	No	No	
Shell mid		250	Mandible	Sheep/ goat	Right	1	N/A		1,2,7	Good	E	1	No	No	No	No	No	M2, M3 present wear
Shell mid		250	Mandible	Sheep/ goat	Right	1	N/A		1,2,7	Good	D	1	No	No	No	No	No	P3, P4 little wear, M1,M2, with wear M3 erupting
Shell mid	RT	222	Phalanx 1	Sheep/ goat	N/A	1	PJF		1,2	Adeq	B	1	No	No	No	No	No	

Appendix 10: Environmental Report

March 2017
Jackaline Robertson

Factual Data

A total of 18 bulk samples were submitted for environmental analyses from the excavation and watching brief undertaken at the Meadows in Dornoch. The bulk samples were collected from a series of pits, a shell midden and a ditch believed to be in use from the early to the late medieval period. The site had been noticeably disturbed by modern activity and this has made it difficult to interpret the function of some of the archaeological features. The main objective of this report was to analyse the charred macroplant and charcoal assemblages in conjunction with each other to help characterise the archaeological features and date them if required.

Methodology

The bulk samples were processed in their entirety in laboratory conditions using a floatation method designed to retrieve charred macroplant remains and artefacts (cf. Kenward *et al*. 1980). The sediment consisted of a sandy silt that did not require any pre-treatment. All plant macrofossils were subsequently examined at magnifications of x10 and up to x100, where necessary, to aid identification. Identifications were confirmed using modern reference material and seed atlases stored at AOC Edinburgh (Cappers *et al* 2006; Jacomet 2006). Taxonomy and nomenclature for plants follows Stace (2010).

The charcoal assemblage from the Meadows, Dornoch is especially small and to ensure as much information as possible was obtained the following criteria were used as guidelines for interpreting feature usage. Those samples which contained two or more species were typically designated as fuel waste, whereas large concentrations of single species where viewed as more likely to represent structural burning. Consequently, the conclusions presented in the discussion can only be described as interpretive assumptions. The interpretation of the charcoal evidence is therefore arbitrary.

Results

The results are presented in Table 1: the charred macroplant and Table 2: the charcoal. Nomenclature for plants follows Stace (2010).

The macroplant
A total of 136 charred macroplants were recovered from 15 contexts. There were 14 plant remains in three samples collected from the watching brief. A further 122 remains were collected from 12 samples from the excavation from pits [204], [206], [210], [227], linear [208], ditch [242] and the shell midden. The macroplants were generally poorly preserved with only a small number described as adequate. The plant assemblage fell into three distinct categories: cultivated crops, wild food resources and weed taxa.

There were 95 cereal caryopses identified as 10 hulled barley (*Hordeum vulgare* L), 16 barley (*Hordeum* sp) and 21 oat (*Avena* sp). The remaining 48 cereal caryopses could not be identified further due to poor preservation. The potentially economically useful plant species were five flax seeds (*Linum usitatissimum* L), one turnip (*Brassica* cf *campestris L*) and two fragments of hazelnut shell (*Corylus avellana* L).

The weed species totalled 23 remains identified as a mix of autumnal hawkbit (*Leontodon autumnalis* L.), buttercup (*Ranunculus* sp), chickweed (*Stellaria media* L), corn spurrey (*Spergula arvensis* L), fat hen (*Chenopodium album* L), grass (*Graminae* sp), pale persicaria (*Persicaria lapathifolium* L), sedge (*Carex* sp), Sheep's sorrel (*Rumex acetosella* agg) and wild radish (*Raphanus raphanistrum*). A further ten plant remains could not be identified further. These taxa are found growing in a range of habitats and soil conditions. They are usually common agricultural contaminants and/or waste ground species.

The plant assemblage was scattered throughout the features in small quantities with no evidence of selective or deliberate disposal of any remains within specific features. The cereal remains, flax, vegetable and hazelnut have accumulated in these features through the disposal of domestic food refuse whereas the weed taxa were either crop contaminates accidently transported to site or were species growing on nearby wasteground that were inadvertently charred.

The charcoal assemblage

The charcoal assemblage was small (9.7g) and was recovered from nine contexts. The species were alder (*Alnus glutinosa* L), birch (*Betula* sp), hazel (*Corylus avellana* L), pine (*Pinus* sp) and oak (*Quercus* sp). The dominant species was birch, which formed 63% of the assemblage, followed by alder 19%, oak 9%, hazel 7% and pine 2%. There was no evidence of any round wood or worked wood off cuts within this assemblage. The charcoal fragments were scattered among context [206] from the watching brief, pit [206], pit [210], pit [227], linear [208], ditch [225], ditch [242] and the shell midden, with no evidence of selective or deliberate disposal. These remains are representative of fuel debris.

Discussion

The charred macroplant remains

The cereal assemblage, while small, is still similar to those recovered from other sites in the north of Scotland in the medieval and post-medieval periods. In both Aberdeen and Perth the two major cereal crops were barley, in particular hulled barley, and oat (Robertson forthcoming (a), Fraser *et al* 2011, 75-76, Fraser 1982, 241). The dominance of barley in the north of Scotland is due to the environment and soil conditions which favour the cultivation of barley over other cereal species which require more forgiving growing conditions to thrive. Turnip was a common source of vegetables used to supplement diet and has been recovered from both Aberdeen and Perth (Robertson forthcoming (a), Fraser *et al* 2011, 76). Flax had multiple uses in the medieval period as a food source, medicine and in textile and oil production and was cultivated throughout this region in Scotland (Fraser 1982, 241). The only evidence for the exploitation of wild foods at this site in Dornoch was hazelnut.

The weed seeds are a mix of common agricultural contaminants and heathland plants. The weed seeds were probably brought to site as an accidental inclusion within the harvested crops or they could have grown on or near to the settlement in disturbed wasteground. Weed species such as fat hen, chickweed and corn spurrey have been used to bulk out cereal grain or to add flavouring to flour and or ale (Robertson forthcoming (b), Robinson 1987). There is, however, no evidence that any of these species were used in this capacity at Dornoch.

Charcoal

The charcoal assemblage, while small, is representative of fuel debris and these tree species would have been accessible to the community living at Dornoch. Hazel tends to grow in hedgerows; alder and birch normally favour more damp habitats whereas pine is adaptable to surviving in poor soil conditions not normally favourable for other species (Linford 2009; Martynoga 2012).

Recommendations

Given the disrupted nature of the archaeological features at the Meadows, Dornoch the archaeological security of the ecofact assemblage has undoubtedly been compromised to some degree. It is therefore recommended that if any material is required for dating, the larger concentrations and better preserved cereal caryopses and charcoal fragments are given preference.

Conclusion

The disrupted condition of many of these features, coupled with the small size and poor preservation of the charred macroplant and charcoal assemblage, prohibited any real attempt to characterise the function of the archaeological features from which they were collected. Instead, what can be determined is that the cereal and charcoal assemblages have formed through the disposal of domestic food and fuel waste. These remain have been scattered among the pits, ditches and shell midden. The macroplant and charcoal assemblages demonstrate that the population living at Dornoch had access to a range of cultivated and wild resources in the form of crops, wild edible foods and woodland species.

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Appendix 11: Shell Report

March 2017
Jackaline Robertson

Factual data

A large assemblage of marine shell (21.7kg) was submitted for analysis from the excavation and watching brief undertaken at the Meadows in Dornoch. The shell was collected from nine bulk samples that derived from a series of pits, a midden and a ditch in use from the early to the late medieval period. The shell assemblage was concentrated within midden context [222], with smaller quantities scattered in the remaining eight contexts. The main objectives of this analysis were to identify the shell to species and to establish their economic importance within the diet of the population living at Dornoch in the medieval and late medieval period.

Methodology

The apical fragments of shell were identified to species using reference material and guides stored at AOC Archaeology Group (Hayward *et al* 1996). Whole shells were recorded by counting the shell apices for gastropods and valve umbos for bivalve species. Given the large size of this assemblage and the abundant numbers of broken fragments, no attempt was made to count these and they were instead quantified by weight.

Results

The results are recorded in table 1: the marine shell.

The species identified were the common cockle (*Cerastoderma edule* L), common mussel (*Mytilus edulis* L), common periwinkle (*Littorina littorea* L.), common limpet (*Patella vulgata* L) common razor shell (*Ensis ensis* L) and trough shell (*Mactridae* sp). The dominant species was the common cockle, which accounted for 94.3% of the assemblage, followed by the common mussel 2.5%, common razor shell 2%, common periwinkle 0.7%, common limpet 0.3% and the trough shell 0.2%. Preservation of the whole shell was generally good but there were a large number of mostly fragmentary cockle shells present in all ten samples.

The shell was concentrated within midden context [222], which contained 20.4kg. This large cache of what were predominantly common cockle shells is representative of the deliberate disposal of specific types of domestic food waste. Smaller concentrations of shell were also noted within midden context [250] and pit [227], which was sealed below the shell midden. This indicates that this part of the site was deliberately used long term for the disposal of shell. The remainder of the shell assemblage was scattered throughout evaluation context [206] and excavation pits [206] and [210], burrow [229] and ditches [225] and [242] in small quantities. It has derived from the disposal of domestic food waste, some of which has been re-deposited through modern activity that has affected the archaeological security of a number of these features.

Discussion

The marine species at the Meadows, Dornoch are all edible, are typical finds from around the Scottish coast, and must have been collected deliberately (Hayward *et al* 1996, 188-234). The large number of cockle shells suggests that this species was especially abundant in the Dornoch coastal landscape, while also being easily accessible thereby ensuring it became a popular source of food. Given the small quantities of mussel, razor shells and periwinkle, it is clear their economic significance within the diet of this site was minimal. The most obvious explanation for this is that they were either less favoured or, more likely, that they were not as abundant or as easily accessible as cockle. Common limpets are also found on the Scottish coast but were traditionally less well-regarded than other marine resources and only tended to be eaten in times of food shortages; this may explain why so few were recovered from Dornoch (Heppel *et al* 2011, 62). These species could have been harvested directly by the locals from the rocky shores or purchased from food stalls and markets in the town.

Conclusion

The shell assemblage from the Meadows, Dornoch clearly demonstrates that common cockle was the most economically important shellfish. Other marine species were eaten but never in the same quantity. The shell was regularly disposed of within a designated area of the site for an extended period of time. The shellfish from Dornoch is representative of a community which had local and regular access to a large population of common cockle to supplement their diet throughout the medieval period.

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Appendix 12: Animal Bone Report

March 2017
Jackaline Robertson

Introduction

A small assemblage of animal bone (3.6kg) was recovered from the watching brief and excavation undertaken at the Meadows in Dornoch. The animal bone was collected from a series of pits, ditches and a shell midden believed to date from the medieval period. The main aim of this analysis was to identify the species present and use this evidence to help understand the archaeological features from which they derived.

Methodology

The assemblage was identified to element and species with the aid of skeletal atlases (Hillson 1986; Schmid 1972) and the reference collection stored at AOC Archaeology Group (Edinburgh). Where an element could not be identified to species, it was instead described as large mammal (horse/cattle/deer) medium mammal (sheep/goat/pig) or small mammal (dog/cat/rodent). When analysing the assemblage the following criteria were recorded: phase, context, feature, element, species, side, fusion, age, fragmentation, size and evidence of staining on the bone surface.

Epiphyseal fusion, tooth eruption and wear were examined to assess the age of the individual (Payne 1973; Payne 1987; Silver 1969, Grant 1982). The proximal, distal and shaft areas of each fragment was recorded to determine the level of fragmentation within the assemblage (Dobney & Rielly 1988). Assessing the level of staining used the following method: no staining was rated “0”; some staining affecting less than 25% of the bone surface was designated as “1”; less than 50% surface staining was “2”; while 50 – 75% was described as 3” and greater than 75% was rated as “4”. A four point system was used to analysis preservation with excellent, good, adequate and poor. The assemblage was also examined for butchery marks, pathologies, bone working, burning and carnivore gnawing. Only those bones found to be intact were measured (Von Den Driesch 1976).

Results

The results are recorded in catalogue 1: the animal bone.

The bone assemblage was small and 610 fragments (3.5kg) were recovered from 16 contexts. The species and number of fragments identified were cattle (39), sheep/goat (11), pig (2), dog (13), rodent (20) and domestic fowl (1). The rest of the assemblage was described as large mammal (140), medium mammal (29), small mammal (12) or indeterminate (343) where appropriate. A small number of fish bones were recovered but these are not mentioned further in this report. Preservation of these remains was mostly poor, due to taphonomic damage such as burning which had affected 127 fragments plus inadequate soil conditions and prolonged exposure to the elements. The animal bone was concentrated within pits [210], [227] and the shell midden. Of particular note was pit [210], which was found to contain the remains of an articulated calf. The rest of the bone assemblage was scattered throughout the site in small quantities with no evidence of selective or deliberate disposal.

Discussion

Cattle

A total of 39 bones were identified as cattle and these were recovered from pits [210], [227], ditch [225] and the shell midden.

Of note were the 22 bones recovered from pit [210] as these formed part of an articulated burial of a single individual. A section of the rib cage, pelvis the right and left back legs were present. The legs were composed of the femur, patella, tibia, calcaneum, astragalus and the tarsuls. Examination of epiphyseal fusion revealed that none of these elements were fused. This animal certainly died before the age of ten months, but it is possible that this was a late still birth or an animal that died shortly after birth. There is no evidence of any catastrophic injury or pathology which explains the cause of death. Prenatal and postnatal calves which die unexpectedly are rarely eaten and instead are normally disposed of as quickly as possible. It is likely, given the articulated nature of this deposit, that these remains postdate the medieval phases of this site and were buried in a later period.

A further fifteen cattle bones were recovered from ditch [225], pit [227] and the shell midden. The cattle remains were composed of loose teeth, long bones and foot bones. The remains of two individuals were noted within the shell midden. Analysis of fusion, tooth eruption and wear indicate that the youngest individual from the midden expired between the

ages of 24 to 30 months and the oldest was approximately three to four years at time of death. The age at which these animals were slaughtered suggests they were killed primarily for their meat. There was no evidence of any butchery marks or pathology on these remains.

Sheep/goat

Eleven sheep/goat bones were identified from pit [227], ditch [242] and the shell midden. The sheep/goat remains were concentred within pit [227]. The elements were identified as a mix of maxilla, mandible, loose teeth, a humerus, radius, femur and foot bones. Analyses of fusion, tooth eruption and wear suggest that the two oldest individuals in the midden expired between the ages of 22 and 28 months, whereas the youngest died between the ages of 13 and 16 months. A femur from pit [227] belonged to an animal older than three years. The age of death for these individuals is typical of a meat economy. There was no evidence of any butchery or pathology on these remains.

Pig

A pig ulna and metapodial were recovered from the midden. The ulna could not be aged but the metapodial belonged to an animal which died before the age of two years. Pigs are normally culled quickly unless they are required for breeding. The animal at Dornoch appears to have been culled at a young age indicating it was part of a meat economy.

Dog

Ten dog bones were concentrated within pit [227] from which a humerus, metapoidals and phalanges were recovered. A skull and two loose teeth were recovered from the shell midden. The skull belonged to an adult older than one year at time of death. The right second premolar from the maxilla had been lost during the lifetime of this animal as the bone had healed prior to death. The teeth on the left side of the skull all display more wear than those on the right. This suggests that the animal favoured the left side of its mouth when chewing. There was no evidence of any butchery. The dog was probably a pet, disposed of after death, and it is likely the remains have been disturbed during the modern work carried out on this site.

Rodent

The rodent remains totalled 20 and were composed of a mix of vertebrae, long bones and foot bones, none of which could be identified to species. These were recovered from evaluation feature [206], ditch [242] and the shell midden. These rodent fragments were concentrated within ditch [242] and probably belong to one individual. The rodent remains are intrusive and belong to individuals which scavenged from these features or burrowed into them prior to death.

Domestic fowl

A single radius belonging to an adult domestic fowl was recovered from the shell midden. There was no evidence of any butchery or pathology on this bone.

Bone modification

The only evidence for butchery was on a single large mammal metapodial which had been marrow cracked. A total of 127 fragments had been burnt and most of these were smaller than 50mm and could not be identified. The only identifiable fragments were a long bone shaft belonging to a large mammal, a foot bone and part of a tooth belonging to a medium sized mammal. Small quantities of burnt bone were recovered from [206], burrow [229], ditches [225] and [242], and pits [227] and [246] but the greatest concentration was in the shell midden. The majority of these fragments were not completely calcified indicating that they had been exposed to a relatively low temperature during charring.

Conclusion

The animal bone assemblage from the Meadows, Dornoch, while small is similar to other late medieval sites throughout Scotland including Edinburgh, Perth and Aberdeen where animals and birds such as cattle, sheep/goat, pig and domestic fowl all formed part of the diet (Robertson forthcoming; Hodgson *et al* 2011, 41). The animal and bird bone from this site has accumulated through the haphazard disposal of domestic food and cooking waste. Beef, lamb/mutton, pork and chicken all formed part of the diet at this site but it is not possible based on the small size of the assemblage to establish which species if any was the more economically important. The ages at which the cattle and sheep/goat were slaughtered are all indicative of a meat economy, where the animals are slaughtered in their prime rather than being exploited for secondary products. The population living at the Meadows, Dornoch had access to a range of meat sources and used these pits, ditches and shell middens in which to dispose of the domestic food and cooking waste.

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