



**ARO65: Discovery of an Antonine Wall
Roman Fortlet at Boclair Road, Bearsden**

By Maureen C. Kilpatrick

With contributions from Michael Bamforth, Nysa
Noelle Loudon, Coralie Mills, Susan Ramsay,
Katharine Warden and Nicki Whitehouse

ARO65: Discovery of an Antonine Wall Roman Fortlet at Boclair Road, Bearsden

Published by GUARD Archaeology Ltd, www.archaeologyreportsonline.com

Editor Beverley Ballin Smith

Design and desktop publishing Gillian Sneddon

Produced by GUARD Archaeology Ltd 2026.

ISBN: 978-1-0686870-8-2

ISSN: 2052-4064

Requests for permission to reproduce material from an ARO report should be sent to the Editor of ARO, as well as to the author, illustrator, photographer or other copyright holder. Copyright in any of the ARO Reports series rests with GUARD Archaeology Ltd and the individual authors.

The maps are reproduced by © Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

The consent does not extend to copying for general distribution, advertising or promotional purposes, the creation of new collective works or resale.

Contents

Summary	5
Introduction	7
Location, Geology and Topography	7
Archaeological and Historical Background - Katharine Warden	7
Results of the Fieldwork	8
BR/A	8
BR/C	9
Geophysical Survey	14
BR/A and BR/B	14
Specialist Analysis	21
The Radiocarbon Dates	21
Archaeobotany - Susan Ramsay	22
Wood Dating Assessment - Coralie Mills	26
Hair Moss from BR/C - Nysa Noelle Loudon	26
Waterlogged Wood - Michael Bamforth	27
Fossil Beetle (Coleoptera) Fauna and Bayesian Analysis - Nicki J. Whitehouse	30
General Discussion - Maureen Kilpatrick	46
Topography and Landscape	47
Environment	48
Roman Fortlets	49
Conclusion	50
Acknowledgments	51
Project Archive	51
Cartographic Sources	51
Bibliography	51
Appendix	55

List of Figures

Figure 1: Location of BR/A, BR/B and BR/C Boclair Road, Bearsden	6
Figure 2: Excerpt from Roy's Military Survey of Scotland map. (© British Library Board. All Rights Reserved)	8
Figure 3: Location of evaluation trenches at BR/A	9
Figure 4: Detailed of stone base	10
Figure 6: Relationship of stone base (1003) in BR/A with ditch (009) in BR/C	11
Figure 5: Linear stone base with kerbing (1003) at BR/A	11
Figure 7: Exposure of ditch (009) with deposits (006/007)	12
Figure 8: Slot 1 through ditch (009) at south end of trench	12
Figure 9: Excavation of south end of ditch (009)	13
Figure 10: Close-up of hair moss following its excavation (010)	13
Figure 11: Plan of trench C with wood (011) in situ	13
Figure 12: NW-facing section at north end of trench showing ditch (009)	13
Figure 13: In situ wood (011) after cleaning	14

List of Figures *(continued)*

Figure 14: Gradiometry Survey results BR/C	15
Figure 15: Resistivity Survey results BR/C	16
Figure 16: Resistivity Survey results BR/A	17
Figure 17: Gradiometry Survey results BR/A	18
Figure 18: Resistivity Survey results BR/B	19
Figure 19: Gradiometry Survey results BR/B	20
Figure 20: Cross sections of Wood 1 and Wood 3, as orientated in ground	30
Figure 21: Bayesian OxCal Sequence model plot for BR/C	34
Figure 22: Insect assemblage in Sample 17, context 010	37
Figure 23: <i>Aphodius contaminatus</i> ; Photo: © D. Mann, Oxford University Museum	38
Figure 24: Sample 009, Context 007; <i>Hydrobius fuscipes</i> may be seen in the centre (large elytra)	38
Figure 25: Sample 009, Context 007; <i>Aphodius niger</i> close-up	39
Figure 26: Sample 008, context 007; note large <i>Geotrupes stercorarius</i> elytra top left and leg below	39
Figure 27: Insect assemblage in Sample 007, context 007.	40
Figure 28: <i>Scathophaga</i> yellow dung flies on cow pat (Photo: David Smith).	41
Figure 29: Showing mottling and erosion of materials in Sample 007, context 007.	42
Figure 30: Sample 005, context 007; close-up of insect sub-fossils.	42
Figure 31: Excerpt from 1898 Ordnance Survey 25" ed. (Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699)	47
Figure 32: Contour map with location of present work and Bearsden Roman fort	48
Figure 33: Antonine Wall base in Old Kilpatrick Cemetery, Bearsden	50
Figure 34: The Boclair Road Roman Fortlet as it may once have been, by Eduardo Pérez-Fernández	50

List of Tables

Table 1: Radiocarbon dates from BR/C	21
Table 2: Botanical remains from BR/A	22
Table 3: Results of the archaeobotanical analysis	23-24
Table 4: Condition scoring system (After Van de Noort et al. 1995: Table 15.1)	28
Table 5: Waterlogged wood catalogue	29
Table 6: Description of samples processed	32
Table 7: OxCal results table for BR/C	33
Table 8: Categorized data, Boclair Road, Coleoptera assemblage	35
Table 9: List of insect remains recovered from BR/C.	55

Summary

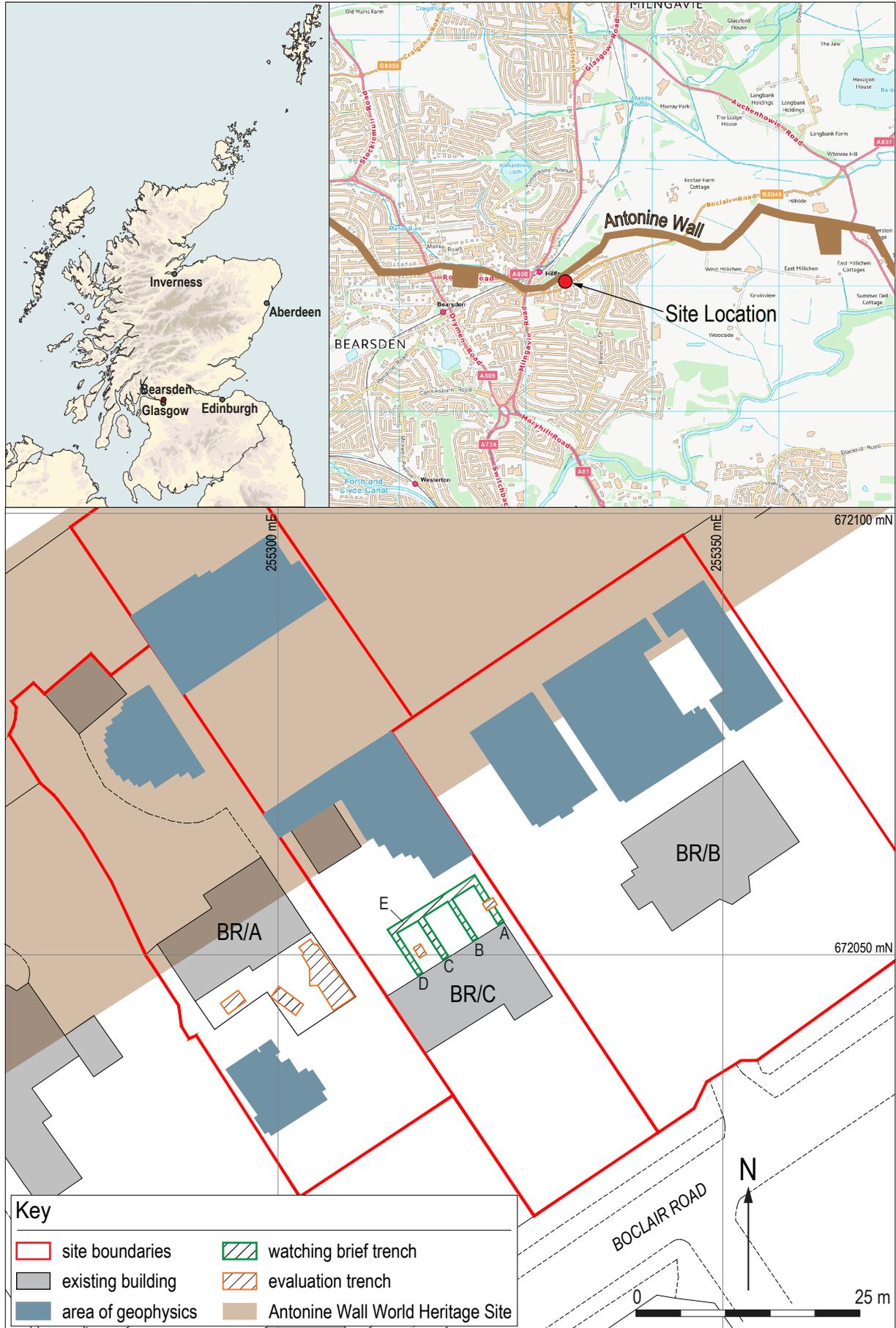
Archaeological investigations that included a watching brief, evaluation, geophysical survey and excavation took place within the gardens at three adjacent residential properties¹ along Boclair Road, Bearsden by GUARD Archaeology Ltd in 2017. The remains of a previously unknown Roman fortlet associated with the Antonine Wall were uncovered.

The works were instigated by the discovery of the remains of a section of a linear stone base with kerbing within the rear garden at BR/A Boclair Road during a routine evaluation. While a small evaluation was required at the neighbouring property of BR/C, no archaeology was apparent. From the nature and potential of the archaeological evidence, Historic Environment Scotland identified the investigations as a rare but important opportunity to discover more information about this particular area to the south of the World Heritage Site of the Antonine wall. Historic Environment Scotland commissioned a geophysical survey of the garden of BR/C and a watching brief during the digging of foundations for the proposed extension to the property. During the watching brief a small section of ditch containing peat deposits, wood and vegetation was discovered: it had a similar orientation to the section of wall discovered in the garden of BR/A, both lying perpendicular to the line of the Antonine Wall. A wider geophysical survey was also commissioned across the gardens of BR/A and BR/B to establish if other elements of a possible fortlet survived. Several anomalies were identified in its results but they were not investigated further.

Radiocarbon dating of the contents of the ditch with subsequent Bayesian analysis suggested a date of use between the middle of the 2nd century AD and the middle of the 3rd century AD, i.e. contemporary with the Antonine Wall, which lay directly to the north.

The identification and location of a possible fortlet on an area of high ground and next to the Antonine Wall suggests that it was an integral part of the Roman Wall defences which included forts and fortlets along its length. The siting of the fortlet at this location meant it had commanding views over the landscape, particularly to the north of the Antonine Wall, which was beyond Roman control, and was also intervisible with Bearsden Roman fort which lay close-by to the west on lower lying ground.

1 The addresses of the three properties have been anonymised for this publication (BR/A, BR/B & BR/C).



© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 1: Location of BR/A, BR/B and BR/C Boclair Road, Bearsden.

Introduction

In 2017 a small programme of archaeological work that included evaluations, watching briefs, excavations and geophysical survey was carried out at three adjacent domestic properties at BR/A, BR/B and BR/C Boclair Road in Bearsden, East Dunbartonshire (Kilpatrick and Rennie 2017; Rennie 2017; Spence 2017a and Spence 2017b; Figure 1). While the initial work for BR/A and BR/C were carried out to satisfy the relevant planning condition for proposed extensions to the properties, the geophysical survey, watching brief and excavation for BR/B was carried out on behalf of Historic Environment Scotland (HES) with advice from East Dunbartonshire Council's archaeological advisor; the geophysical survey of properties BR/A and BR/B was also commissioned by HES. Parts of each of the gardens to the north were within the Antonine Wall UNESCO World Heritage Site boundary which route traverses through the town of Bearsden, effectively dividing the town into the area to the south which was within the Roman Empire and the area to the north which was classed as beyond its bounds. The Antonine Wall and its associated structures included forts, fortlets, a military way and bathhouses.

Location, Geology and Topography

The three dwellings were adjacent to each other on the north side of Boclair Road, which is located on the eastern side of the town of Bearsden in East Dunbartonshire (centred on NGR: NS 55322 72050) and within the Old Bearsden Conservation Area. They were surrounded by housing and streetscape to the west, east and south, while to the north was a linear, fairly broad band of trees and Douglas Park Golf Course that lies within the Antonine Wall UNESCO World Heritage Site Buffer Zone. Topographically, the gardens were fairly flat and contained landscape features including a rockery, formal seating areas and ponds. They are situated between 68 m and 70 m OD with a slight slope to the north.

The bedrock at Boclair Road is Limestone Coal Formation-Sedimentary Rock Cycles, while the superficial deposits are Till (British Geological Survey 2024).

Archaeological and Historical Background

by Katharine Warden

The Antonine Wall marks the north-western limit of the Roman Empire in the second century AD and stretches for 62 km (c. 38 miles) across central Scotland between Old Kilpatrick at the Firth of Clyde in the west and Bridgeness at the Firth of Forth in the east (Hanson and Breeze 2020). The Antonine Wall is a component part of the Frontiers of the Roman Empire UNESCO World Heritage Site (Breeze and Jilek 2008) and is the most substantial and important Roman monument in Scotland.

Construction of the frontier system began in AD 142, in the reign of the emperor Antoninus Pius, with the Roman General Quintus Lollius Urbicus given the task of constructing the wall. The wall represented a planned advance by the Romans from the previous frontier at Hadrian's Wall which extends across Cumbria and Northumberland in northern England. Unlike Hadrian's Wall, the Antonine wall was constructed mainly of turf with mixed earth or clay with turf revetting found to the east of Watling Lodge (Romankiewics *et al.* 2020). This material was positioned on a solid stone base measuring between 4.3 m to 4.9 m in width with kerb stones lining each side and intersected by culverts for drainage, to a minimum height of c. 3 m (Hanson and Breeze 2020). On the northern side of the wall was a mound of up-cast material and a broad, deep V-shaped ditch. To the south of the wall was the Military Way, a road that linked the forts and fortlets, and allowed the rapid movement of troops, goods and materials. Forts, such as that at Bearsden, approximately 700 m to the west of the present site, were constructed about every 3.2 km (2 miles) along the wall, and temporary camps that housed the troops during construction of the wall are found at regular distances along its length; Summerston Farm Temporary Camp is an example of one such structure.

In addition to its defensive function, the Antonine Wall was a method of frontier control whereby access to the Roman Empire was managed, allowing the movement of people to be monitored, and goods to be taxed.

Large portions of the Antonine Wall must have been visible in the post-medieval period, as the route of the wall was mapped in the mid-seventeenth century (Gordon and Gordon c. 1636-52) and by General Roy in the mid-eighteenth century (Figure 2). Such were the proportions of the Antonine Wall that it was named “Grahame’s or Grime’s, that is the devil’s, Dyke because they [the local people] thought it beyond the power of man to construct” (McCardel 1949, 12).

Very little of the monument survives today in an upstanding condition, a casualty of the expansion and urbanization of the Central Belt, including Bearsden. However, several sections are recorded within Bearsden itself. The nearest visible section to the present areas of investigation is 90 m to the north-east and is known as Antonine Wall, Ferguston Muir to New Kilpatrick Cemetery Scheduled Monument (SM 7340) and is located along a ridge. This section comprises the rampart, the ditch, the berm (area between rampart and ditch) and the upcast mound.

Seventeen forts and approximately 17 fortlets have been recorded along the length of the Antonine Wall; the most recently discovered fortlet was found in a field near Carleith Primary School in Duntocher, Clydebank, West Dunbartonshire via geophysical survey.

Results of the Fieldwork

BR/A

An archaeological evaluation was carried out at BR/A Boclair Road, Bearsden (Spence 2017a; Figure 3) prior to the redevelopment of a section of the rear garden to accommodate a new extension and terraced area. The house front was located along the course of the Antonine Wall WHS but no archaeological remains survived above ground at this location. Three trenches were excavated within the footprint of the extension with only Trench 1 revealing the remains of a linear sandstone base (1003) orientated NW/SE (Figures 4 and 5) which sat directly above a patchy, very thin 10 mm - 20 mm thick silty clay deposit with high concentrations of organic material and some roots (1007). The sandy clay subsoil was found at a depth of only 0.35 m below the present ground surface. Following its discovery, the area around the wall was extended at its north-west and south-east ends, both extensions revealing that the wall did not survive. It was truncated at its north-west end probably during the construction of the present property and at its south-west end due to garden landscaping and tree growth. The exposed wall section measured 5.9 m in length and between 2.8 m and 2.9 m in width. It survived as one



© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 2: Excerpt from Roy's Military Survey of Scotland map. (© British Library Board. All Rights Reserved).

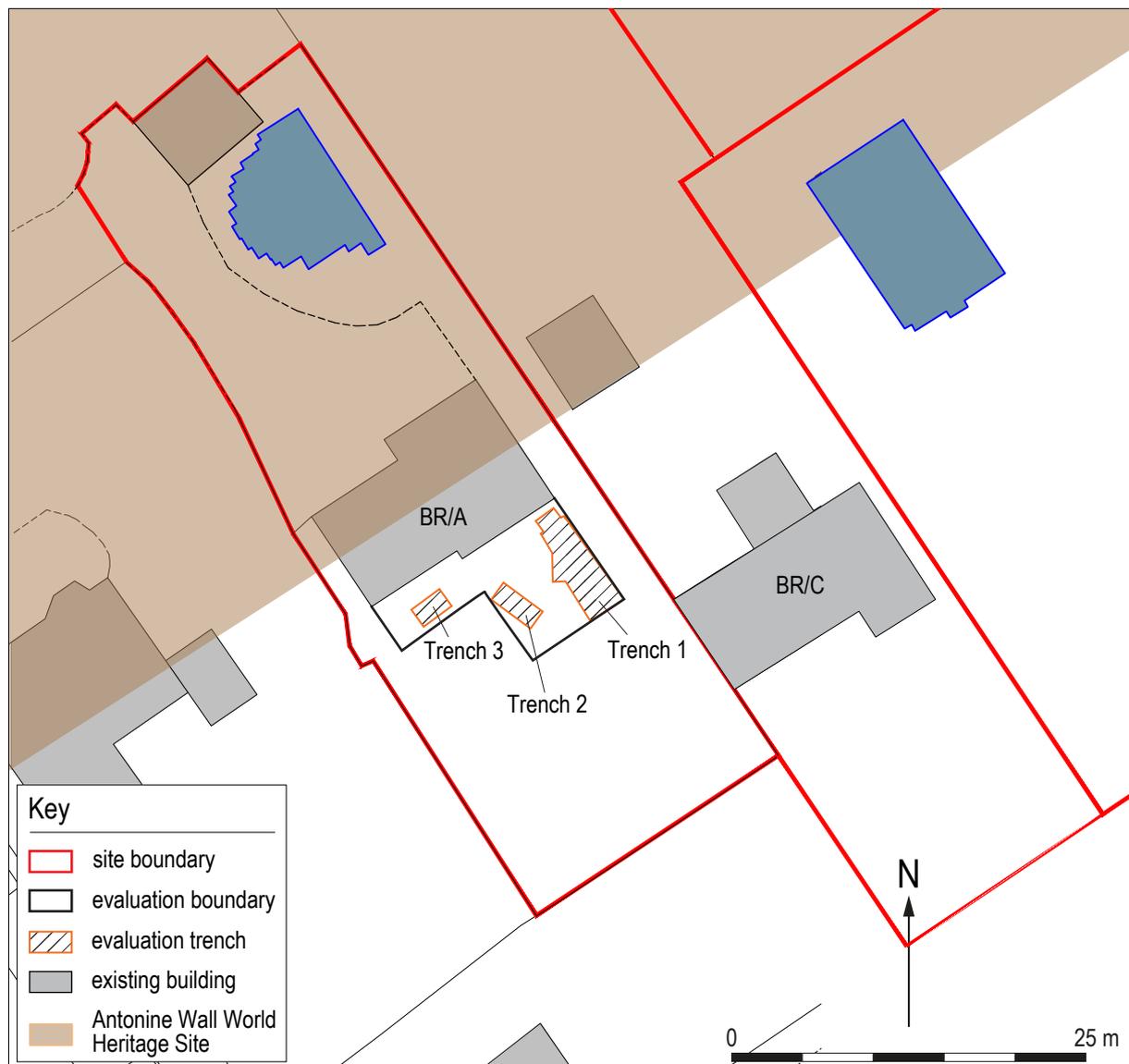
course, or between 0.18 m and 0.25 m high. The stones were unbonded but were bordered by a linear row of kerb stones along their western side. A small trench was later excavated by Geoff Bailey, a Roman specialist and former Keeper of Archaeology and Local History at Falkirk Council who returned to site following the completion of the evaluation. He uncovered two possible Roman pottery sherd fragments within a silty layer below the stones. The pottery sherds do not form part of this analysis.

The evaluation was followed by a watching brief phase during the excavation of the foundation trenches for the house extension. No further features of archaeological significance were encountered.

BR/C

A small evaluation comprising two trenches was excavated in the rear garden at BR/C (Spence 2017b) prior to the construction of a new extension. No archaeological remains were found in either trench, both of which measured 1.6 m by 1.1 m. Only modern levelling and construction debris was recorded above the subsoil that probably related to the construction of the dwelling.

The evaluation was followed by a watching brief (Figure 6) during the excavation of the new extension foundations, with the new footprint measuring 11.4 m by 5.5 m. Despite the lack of findings from the initial evaluation, given the



© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 3: Location of evaluation trenches at BR/A.

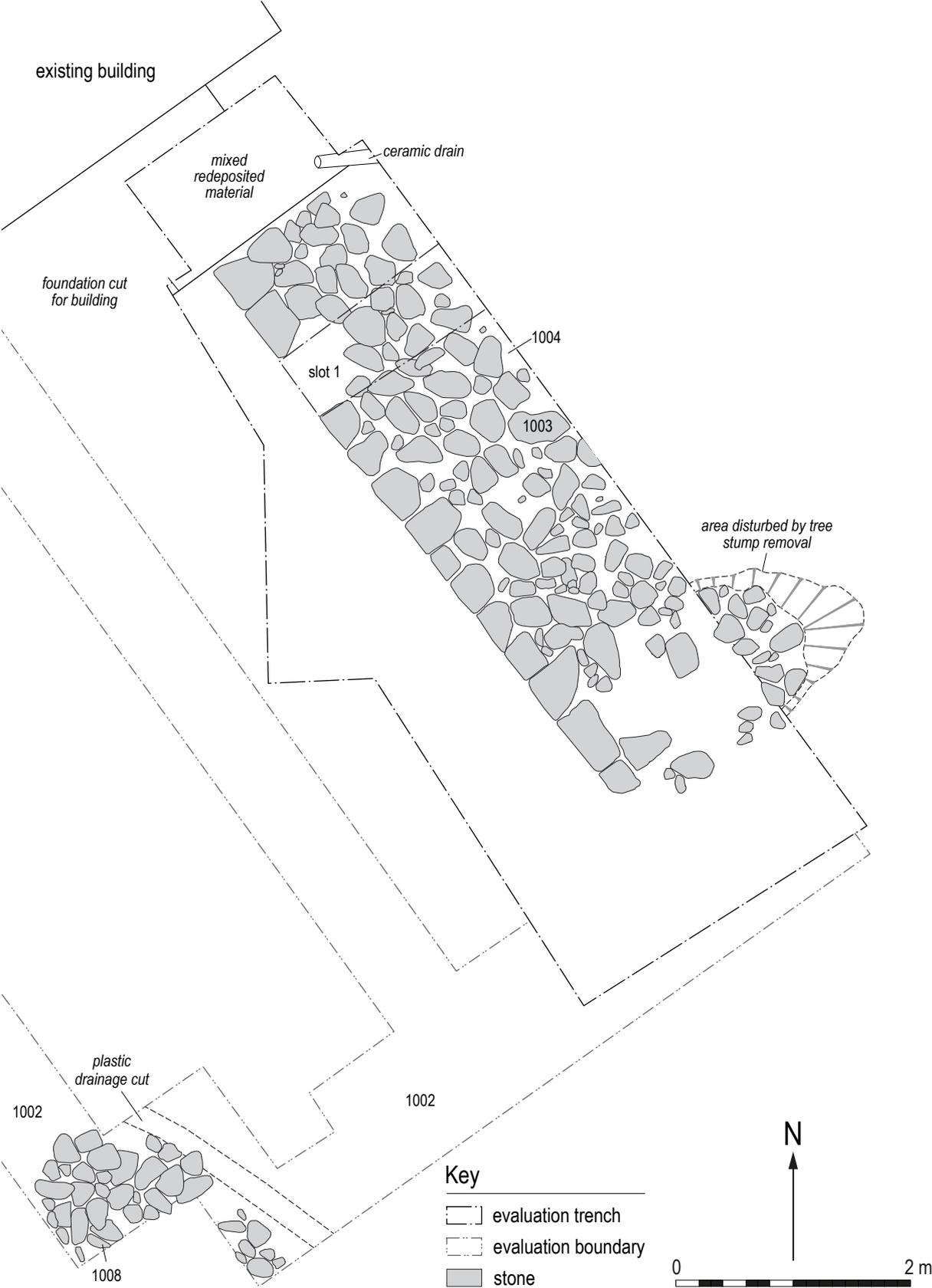


Figure 4: Detailed of stone base.



Figure 5: Linear stone base with kerbing (1003) at BR/A.



© Crown copyright and database rights 2025 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 6: Relationship of stone base (1003) in BR/A with ditch (009) in BR/C.

higher potential indicated by the kerbed wall base in the neighbouring garden of BR/A, Historic Environment Scotland assisted by funding the watching brief and subsequent excavation works. Only foundation 'C' uncovered archaeological remains, a small section of ditch (009) (Kilpatrick and Rennie 2017), the other foundations (A, B, D and E) were archaeologically sterile with only modern overburden deposits (001 and 003), silt deposits (004 and 005) and silty clay subsoil (002) encountered. The foundation trenches were excavated to a depth of between 0.9 m and 1 m from the ground surface and were 0.6 m in width.

The ditch (009) was found at the base of the foundation trench C and had truncated the silty clay subsoil (002). It was only partially exposed but revealed a straight, steep side with a flat base (Figures 7-9). The width of the ditch was not observed and neither was its length as only 3.1 m of it was exposed. It was orientated roughly NW/SE and contained five deposits. The lowest deposit (008) was a thin layer of orange brown silt which was 30 mm thick and was only found in the southern end of the trench. The central and northern parts of the ditch were lined with coarse vegetation (010) 50 mm to 100 mm thick including Hair moss (Figure 10). Above these deposits was a peat layer (012), which lay directly below waterlogged wood fragments (011) with occasional nuts (see *Archaeobotany*, below) (Figures 11, 12 and 13). The extent of the wood was not fully revealed as it continued into the side of the foundation trench, but a 1.8 m length of it was exposed. Above the wood was a peat layer (006/007), which filled the full length of the exposed ditch section. The excavated ditch section survived 0.35 m in depth at its southern end and 0.5 m depth at its northern end.



Figure 7: Exposure of ditch (009) with deposits (006/007).



Figure 8: Slot 1 through ditch (009) at south end of trench.



Figure 9: Excavation of south end of ditch (009).



Figure 10: Close-up of hair moss following its excavation (010).

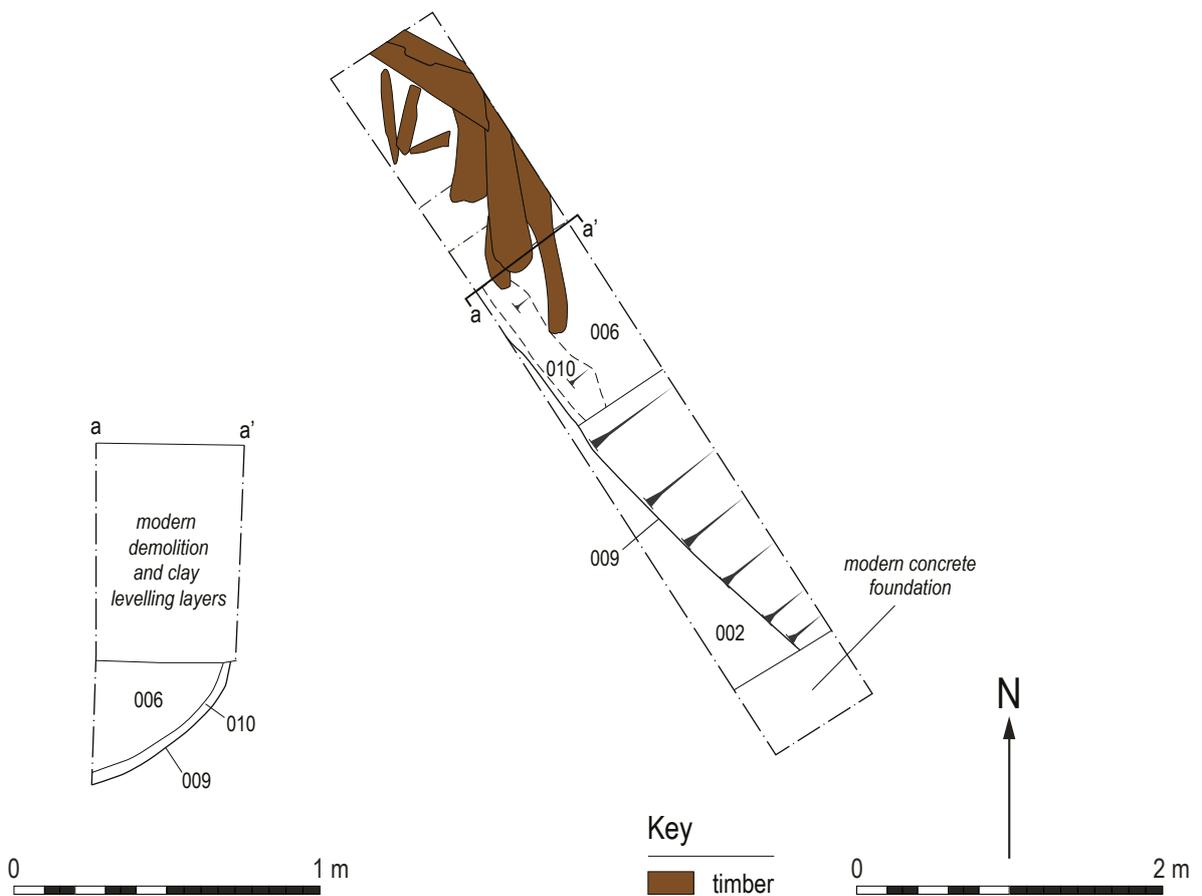


Figure 11: Plan of trench C with wood (011) in situ with Figure 12: NW-facing section at north end of trench showing ditch (009).



Figure 13: In situ wood (011) after cleaning.

Geophysical Survey

Both gradiometry and resistivity surveys were carried out in two areas of the rear garden of BR/C. The gradiometry survey revealed two anomalies that could represent drainage and/or power cables. They did not appear on the resistivity survey suggesting that they may be at a depth of over 0.5 m (Figure 14).

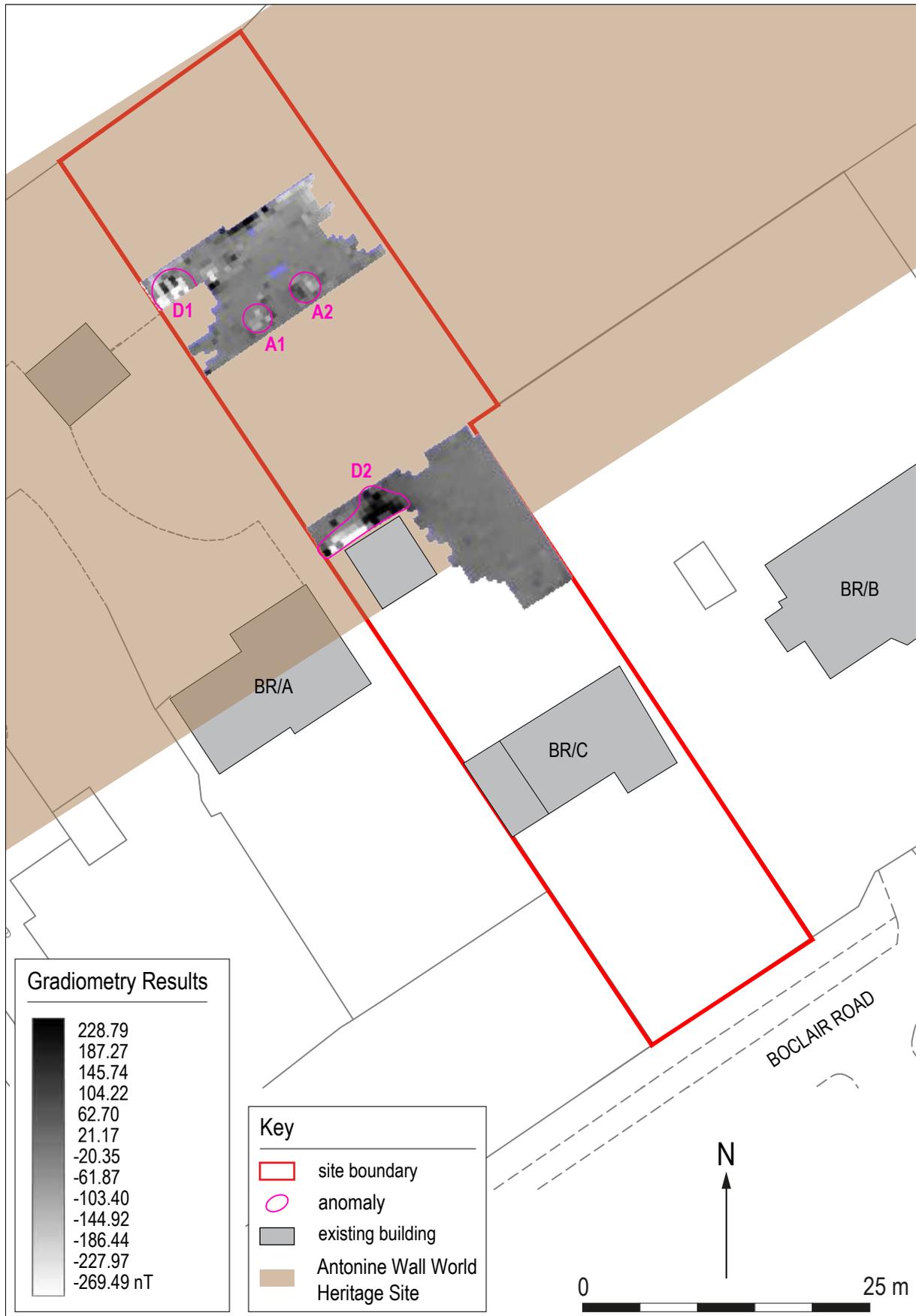
The resistivity survey (Figure 15) exposed no anomalies within the trees at the northern part of the site, while the survey area nearest the house revealed a linear band of relatively higher resistance (Anomaly C) which measured approximately 9 m in length, up to 5 m in width and was orientated approximately SW/NE. This anomaly was on the same alignment as the ditch in foundation C and the kerbed stone-linear feature uncovered in the garden of BR/A (Spence 2017a). It was truncated in the north by the limit of the geophysical survey, but may have continued on this alignment within the dense shrubbery beyond the garden area. The higher resistance recorded over this anomaly is indicative of a feature that comprised stone or rubble, or was a heavily compacted path or track. Given the proximity to the stone-built wall base at BR/A, it may also represent a buried wall. Anomaly D was less well-defined and measured about 4 m by 2 m. Like Anomaly C, it was truncated in the north by the limit of the geophysical survey. The higher resistance at this location may also represent a sub-surface stone feature.

BR/A and BR/B

Following the above work, HES commissioned GUARD Archaeology to conduct a geophysical survey within the gardens of BR/A and BR/B. Both resistivity and gradiometry survey were used (Rennie 2017).

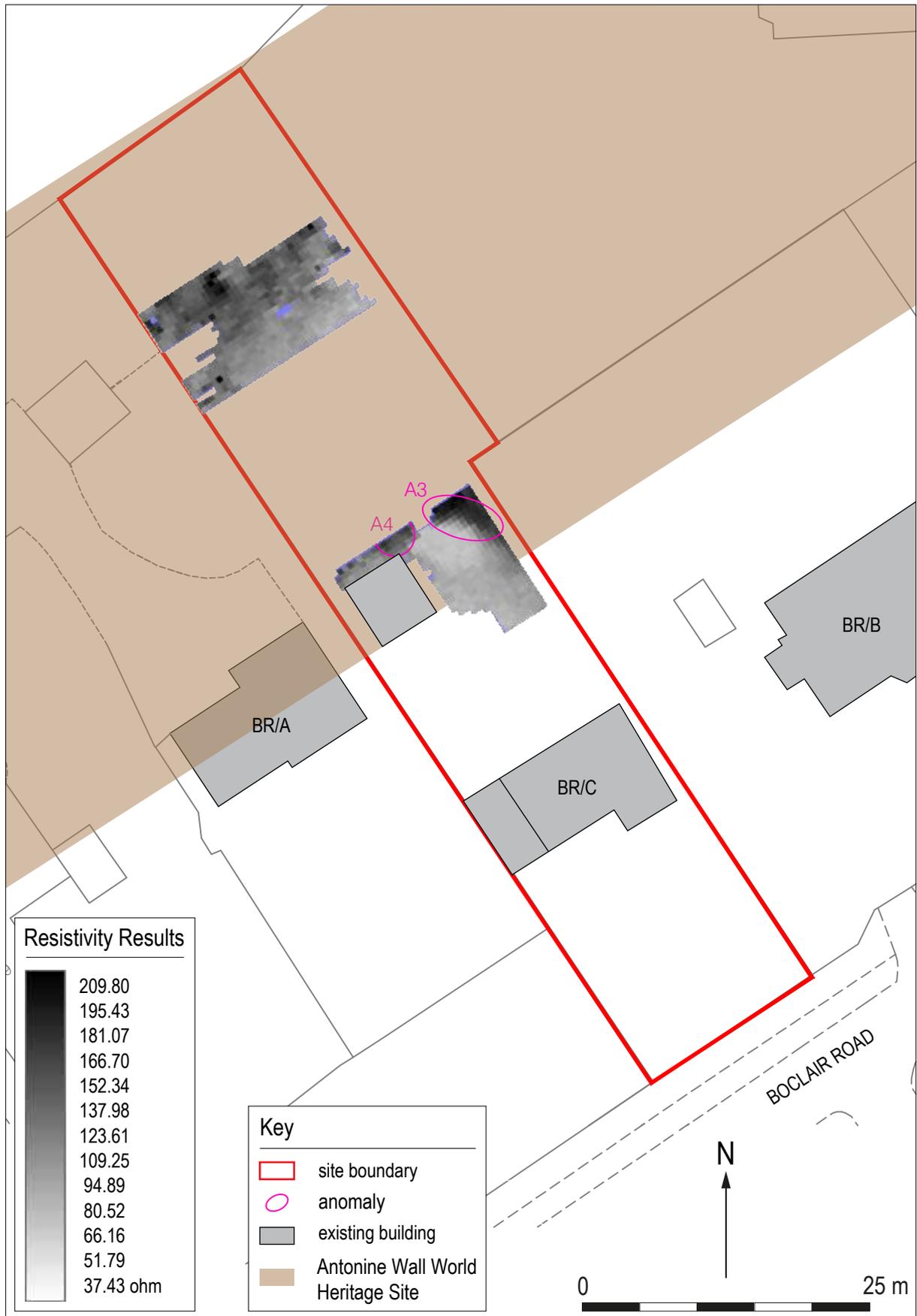
Within the property of BR/A a small anomaly (A) was recorded over the Antonine Wall. This appeared to be linear on the resistivity plot (Figure 16) but was more amorphous on the gradiometry plot (Figure 17). The anomaly was a small area of higher resistance and high positive magnetism located adjacent to an ornamental rockery. It measured about 5.5 m by 3.5 m and appeared to be aligned approximately SW/NE.

In the garden at BR/B the resistivity survey (Figure 18) recorded two roughly rectangular features that, given the break in the survey, are most likely to represent a single feature, its western side's visible dimensions were approximately 12 m by 8 m, while the eastern part measured c.13 m by 8 m. The higher resistance recorded over the anomaly suggests that this is an area of buried stone or of heavily compacted subsoil. The morphology and dimensions of the anomaly were consistent with the sub-surface remains of a structure or structures. The gradiometry survey (Figure 19) produced markedly different results to the resistivity survey, and did not record the rectangular features. Instead, an intermittent curvilinear line of high positive readings was recorded at the western end of the garden. General ground disturbance was recorded around the formal eating area and is almost certainly not archaeological in origin. The single dipole was most likely to have been caused by the presence of a buried metal object or objects. None of the anomalies noted for BR/A or BR/B were investigated.



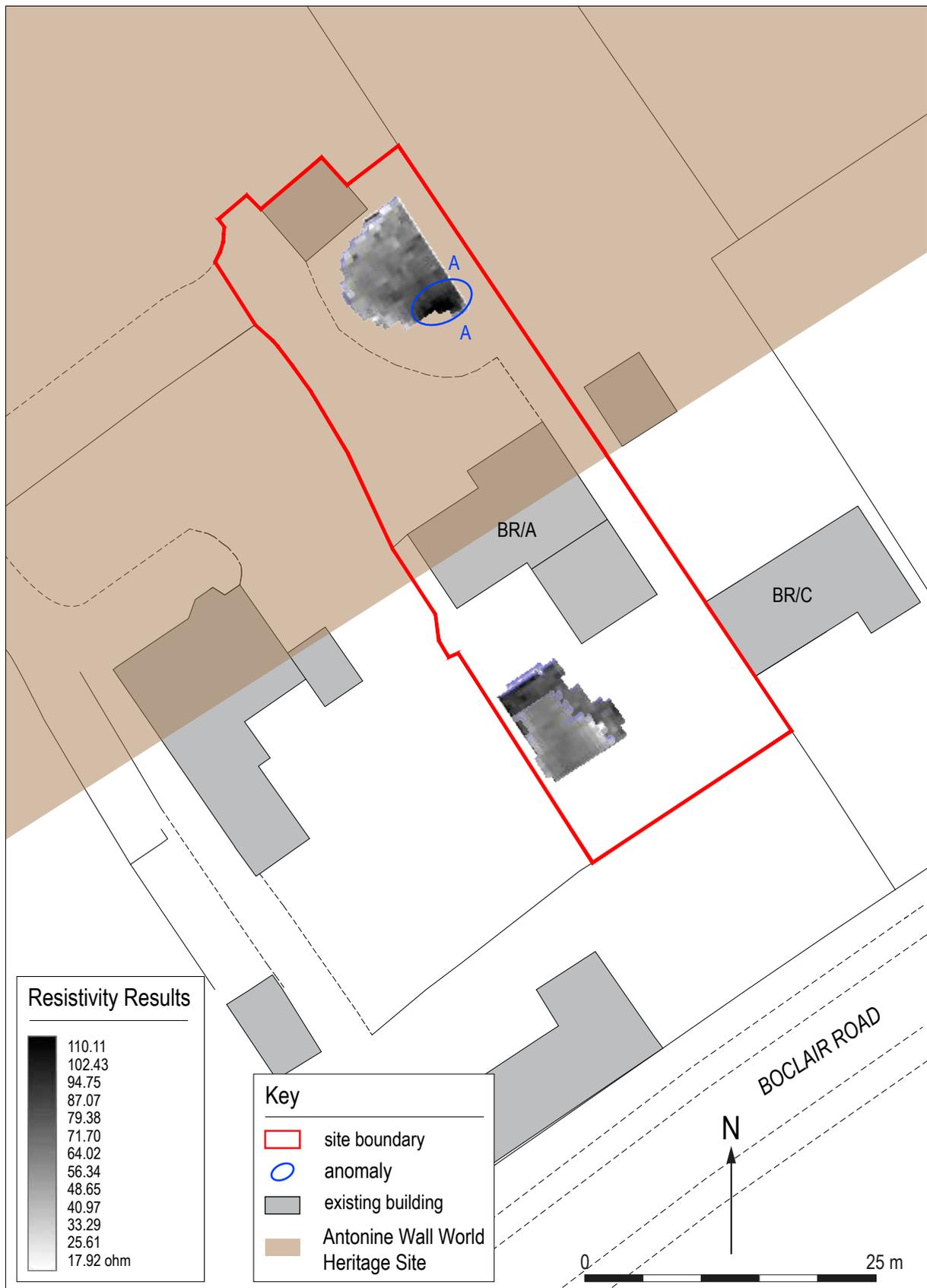
© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 14: Gradiometry Survey results BR/C.



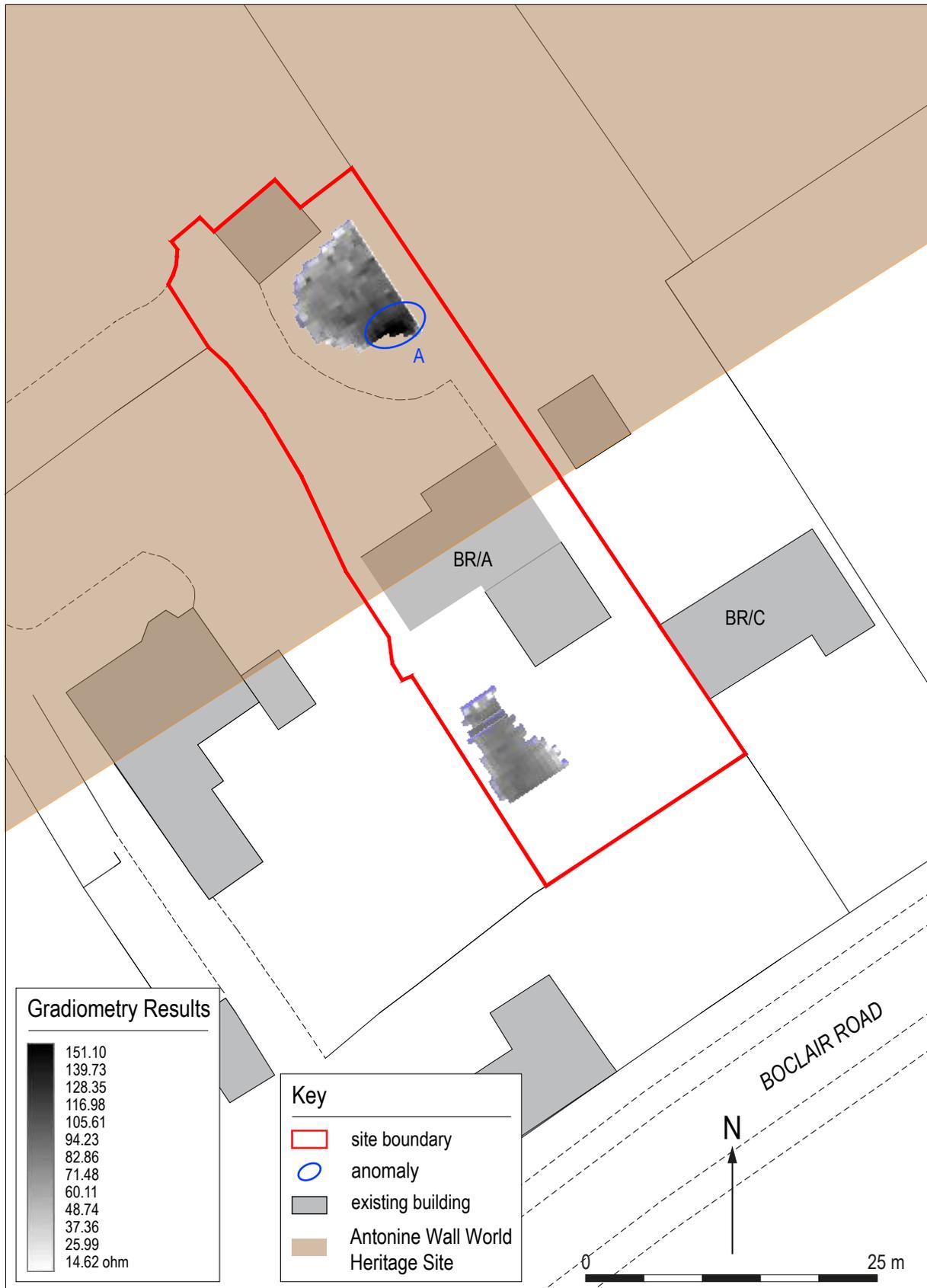
© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 15: Resistivity Survey results BR/C.



© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 16: Resistivity Survey results BR/A.



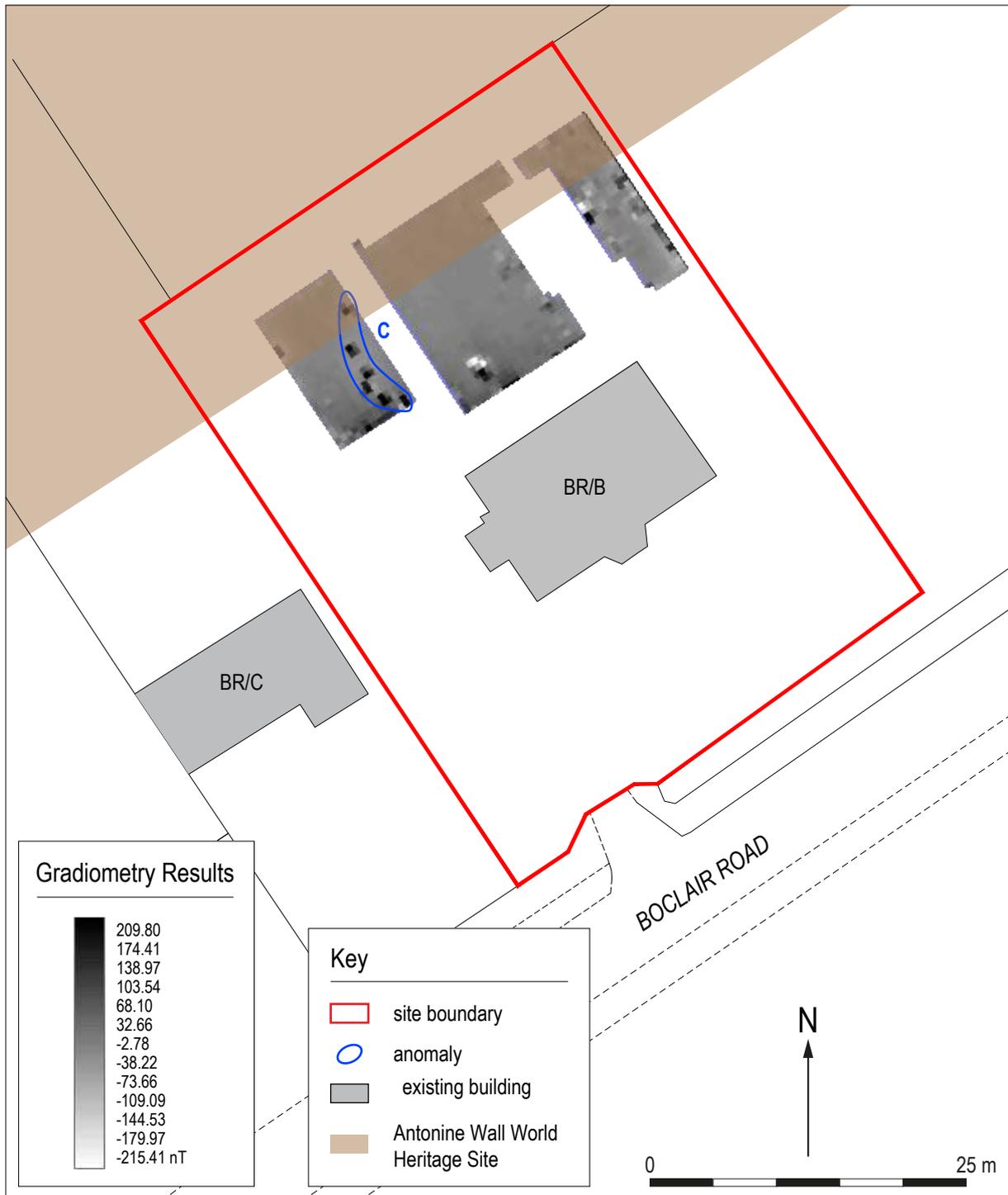
© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 17: Gradiometry Survey results BR/A.



© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 18: Resistivity Survey results BR/B.



© Crown copyright and database rights 2026 OS AC0000817522. Use of this data is subject to terms and conditions.

Figure 19: Gradiometry Survey results BR/B.

Specialist Analysis

The Radiocarbon Dates

Three initial radiocarbon dates were obtained, two from the ditch (009) within foundation trench C at BR/C and one below the stone base at BR/A (1007), and all were submitted to SUERC Radiocarbon Laboratory in East Kilbride for AMS radiocarbon dating (Table 1). The wall base provided a date within the Bronze Age of 1742 – 1612 cal BC (SUERC-87825, GU51926), material at the base of the ditch (010) gave a Roman Iron Age date of cal AD 86 – 238 (SUERC-87826, GU51927) and ditch fill (007) provided a late Iron Age date of between cal AD 240 – 381 (SUERC-87827, GU51928).

Following the recommendation by the *Fossil Beetle* specialist, Professor Whitehouse, an additional two dates were obtained for context (007). They provided dates of between cal AD 220 – 346 (SUERC-127792, GU68699) and cal AD 261 – 531 (SUERC-127879, GU68700). All contexts

(007 and 010) were interpreted using dates at the 95% probability due to its greater accuracy.

The earlier Bronze Age date for deposit (1007) below the wall base is unexpected and not typical in this context and the date therefore is most likely to represent residual material mixed with that from the Roman era.

Bayesian Analysis (see *Fossil Beetle* Coleoptera *Fauna*, below; Table 6) of the BR/C radiocarbon dating results indicated that the fibrous vegetation layer (010) that appeared to line the base of the ditch (009) is dated to between cal AD 127 – 247 (95% probability), whilst the peaty layers above the wood (007) started at cal AD 205 – 335 and ended sometime around cal AD 240 – 444 (95% probability), lasting about 115 years. This suggests that the ditch is comparable in date to the construction and use of the Antonine Wall and could indicate that the feature is related to the overall function of the frontier system. Context (007) probably relates to the abandonment of the ditch, when it was no longer cleaned out and vegetation was allowed to grow and stagnate.

Lab number	Sample number	Context dated	Material dated	Radiocarbon date BP	Calibrated range 68.3% probability	Calibrated range 95.4% probability
SUERC-87825 (GU51926)	001	1007	Charred plant remains: other	3367 ± 26	1677 – 1630 cal BC	1742 – 1710 cal BC 1700 – 1612 cal BC
SUERC-87826 (GU51927)	010	010 lining base of ditch 009	Waterlogged plant remains: other	1845 ± 26	cal AD 131 – 214	cal AD 86 – 110 cal AD 117 – 238
SUERC-87827 (GU51928)	004	007	Betula sp. (wood)	1740 ± 26	cal AD 252 – 305 cal AD 311 – 336	cal AD 240 – 381
SUERC-127792 (GU68699)	009	007	Betula sp. (wood)	1660 ± 23	cal AD 241 – 255 cal AD 285 – 326	cal AD 220 – 264 cal AD 275 – 346
SUERC-127879 (GU68700)	008	007	Betula sp. (wood)	1781 ± 25	cal AD 377 – 426	cal AD 261 – 277 cal AD 345 – 436 cal AD 465 – 475 cal AD 500 – 508 cal AD 515 – 531

Table 1: Radiocarbon dates from BR/C.

Archaeobotany

By Susan Ramsay

In total, 12 bulk samples were analysed from the properties BR/A and BR/C for the presence of botanical remains. The remains of a ditch (009) containing waterlogged peat deposits, wood and other vegetation was uncovered at BR/C (Kilpatrick and Rennie 2017) and a kerbed wall base at BR/A (Spence 2017a), both associated with a possible Roman fortlet.

Methodology

Laboratory sieving of waterlogged samples

Laboratory sieving of waterlogged contexts was undertaken on 11 sub-samples from BR/C but only a single non-waterlogged sample was processed from BR/A. A known volume of soil (50 - 250 ml) was analysed from each sample, depending on the quantity of material available. The sub-sample was soaked in cold water and then sieved through a stack of 1 mm and 500 µm sieves. All material retained on the sieves was scanned using a binocular microscope at variable magnifications of x4-x45. The bulk matrix composition of each sample was recorded and a representative sub-sample of each component part retrieved for storage. A five-point scale was used to score the relative quantities of various vegetative components present in the samples (Wells, Huckerby and Hall 1997), whereas other components such as seeds could be counted numerically. Subsequently, all seeds and other macrofossils were removed, identified and kept under cold conditions. All retained materials were stored in a mixture of glycerine and ethanol, or in water with added thymol to retard fungal growth.

Identification of botanical remains

Wooden fragments were sub-sampled, by taking a very small wood section from them with a razor blade, and then mounting that section on a microscope slide with methylene blue stain. Identification was undertaken using a high-magnification binocular microscope at x100-x400.

The testa characteristics of small seeds and the internal anatomical features of all charcoal

fragments were further identified at x200 magnification using the reflected light of a metallurgical microscope. Reference was made to Schweingruber (1990) and Cappers *et al.* (2006) to aid identifications and vascular plant nomenclature follows Stace (1997).

Results and Discussion

BR/A

A single sample 01, context (1007) from excavations at BR/A (Spence 2017a) was processed by flotation for the recovery of carbonised remains, primarily to provide samples for AMS radiocarbon dating. The results are shown below in Table 2.

Sample 01	Context 1007	
Description	Deposit sealed by the kerb/wall base stones	
Vol charcoal >4 mm	10 ml (mineralised)	
AMS potential	Betula sp (0.24 g)	
	Alnus cf glutinosa (0.04 g)	
Charcoal	Common name	Weight
Alnus cf glutinosa	alder	3 (0.17 g)
Betula spp	birch	1 (0.24 g)
Quercus spp	oak	44 (2.17 g)
Indet charcoal	indet charcoal	8 (0.58 g)

Table 2: Botanical remains from BR/A.

The charcoal assemblage from (1007) is probably the remains of hearth waste rather than evidence for structural remains destroyed by fire.

BR/C

Nine samples, representing three contexts, were analysed from excavations at BR/C (Kilpatrick and Rennie 2017). The results are shown in Table 3.

Samples 003, 006 and 010 from context (010) were small samples of 'coarse vegetation' that appeared to line parts of the sides and base of the ditch (009). Sample 017 represented a bulk sample of material from context (010). The 'coarse vegetation' was mainly identifiable as stems of *Polytrichum commune* (hair moss or haircap moss) up to 100 mm in length (Figure 10). In addition, sample 003 contained a very

Context	007	007	007	007	007	
Sample	004	005	007	008	009	
Description	Fill of ditch (009)	Fill of ditch (009)	Fill of ditch (009)	Fill of ditch (009)	Fill of ditch (009)	
Volume of sample	100 ml	250ml	250ml	250ml	250ml	
AMS potential	Betula sp twig <2 years old (0.09g - dry)	Salix sp roundwood 11 rings (wet)	Betula sp twig <2 years old (0.11g - dry)	Betula sp twig <2 years old (0.13g - dry)	Betula sp twig <2 years old (0.06g - dry)	
Matrix composition						
Mineral 10- 30mm	+	-	-	-	-	
Mineral 2 – 10 mm	++	+	+	-	-	
Mineral <2 mm	++	-	-	-	-	
Sphagnum spp leaves	bog moss leaves	+++++	++	++	++	
Polytrichum commune	haircap moss	++	++	++	+++++	
Other mosses	other mosses	+++++	++	++	++	
Wood fragments	wood fragments	++	+++++	+++	+++++	
Monocot fragments	grass/sedge type fragments	-	++	++	++	
Dicot leaves	'broadleaved' leaves	++	+	++	++	
Wood						
Betula spp twigs (1-2 rings)	birch twigs (1 - 2 rings)	-	-	3	12	24
Salix spp roundwood (to 35mm diam)	willow roundwood (to 35 mm diam)	-	7	-	-	-
Salix spp small frags	willow small frags	-	7	-	-	-
cf Salix spp (blue stained)	cf willow (blue stained)	-	9	-	-	-
Seeds etc						
cf Aethusa cynapium	fool's parsley	2	-	-	-	-
Betula pendula seeds	silver birch seeds	15	5	-	-	-
Betula pubescens seeds	downy birch seeds	-	-	-	-	-
Betula spp seeds	birch seeds	-	44	10	5	22
Betula pendula catkin scales	silver birch catkin scales	5	3	-	-	-
Betula pubescens catkin scales	downy birch catkn scales	-	-	-	2	-
Betula spp catkin scales	birch catkin scales	-	-	-	4	-
Carex spp (biconvex) seeds	sedge (biconvex)	7	1	1	2	4
Carex spp (trigonous) seeds	sedge (trigonous)	-	-	12	26	-
Corylus avellana whole nut	hazelnut (whole)	-	1	-	-	-
Filipendula ulmaria seed cluster	meadowsweet seed cluster	-	-	2	-	1
Potentilla cf erecta	tormentil	-	4	-	-	-
Rubus fruticosus seed	bramble seed	1	-	-	-	-
Other						
Caddisfly larva case	caddisfly larva case	1	-	4	-	-
Daphnia ehippia	water flea egg cases	-	-	5	-	8

Table 3: Results of the archaeobotanical analysis.

	Context	010	010	010	010	012
	Sample	003	006	010	017	016
	Description	Lower fill of ditch (009)	Lower fill of ditch (009)	Lower fill of ditch (009)	Lower fill of ditch (009)	Fill of ditch (009)
Volume of sample		c. 50ml	c.50ml	c.50ml	250ml	250ml
AMS potential		Polytrichum commune stems (0.59g - dry)	Polytrichum commune stems (0.63g - dry)	Polytrichum commune stems (0.13g - dry)	Polytrichum commune stems (0.24g - dry)	Salix sp roundwood 5 rings (wet)
Matrix composition						
Mineral 10- 30mm		-	-	-	-	-
Mineral 2 – 10 mm		-	-	-	-	-
Mineral <2 mm		-	-	-	-	-
Sphagnum spp leaves	bog moss leaves	++	++	++	++++	++
Polytrichum commune	haircap moss	+++++	+++++	+++++	+++++	++
Other mosses	other mosses	++	++	++	++	++
Wood fragments	wood fragments	-	-	-	+	++++
Monocot fragments	grass/sedge type fragments	++	++	++	++	++
Dicot leaves	'broadleaved' leaves	-	-	-	++	++
Wood						
Betula spp twigs (1-2 rings)	birch twigs (1 - 2 rings)	-	-	-	-	21
Salix spp roundwood (to 35mm diam)	willow roundwood (to 35 mm diam)	-	-	-	-	1
Salix spp small frags	willow small frags	-	-	-	-	-
cf Salix spp (blue stained)	cf willow (blue stained)	-	-	-	-	-
Seeds etc						
cf Aethusa cynapium	fool's parsley	-	12	-	8	-
Betula pendula seeds	silver birch seeds	-	-	-	-	>100
Betula pubescens seeds	downy birch seeds	-	-	-	-	>100
Betula spp seeds	birch seeds	1	-	-	1	>100
Betula pendula catkin scales	silver birch catkin scales	-	-	-	-	>50
Betula pubescens catkin scales	downy birch catkn scales	-	-	-	-	>50
Betula spp catkin scales	birch catkin scales	-	-	-	-	-
Carex spp (biconvex) seeds	sedge (biconvex)	-	1	-	-	1
Carex spp (trigonous) seeds	sedge (trigonous)	-	-	-	-	-
Corylus avellana whole nut	hazelnut (whole)	-	-	-	-	-
Filipendula ulmaria seed cluster	meadowsweet seed cluster	-	-	-	-	-
Potentilla cf erecta	tormentil	>200	1	-	-	-
Rubus fruticosus seed	bramble seed	-	-	-	-	-
Other						
Caddisfly larva case	caddisfly larva case	-	-	-	-	-
Daphnia ephippia	water flea egg cases	-	-	-	-	8

Table 3 (continued): Results of the archaeobotanical analysis.

large number of tormentil seeds, with a single birch seed. Sample 006 contained a few seeds of fool's parsley and a single sedge nutlet. The bulk sample 017 also produced fool's parsley seeds and a birch seed. No seeds were recovered from sample 010.

There is evidence for the use of hair moss stems for weaving into 'caps' at the Roman forts of Vindolanda and Newsteads (Harris and Gleba 2015) but the moss stems from Boclair Road show no signs of having been woven into a piece of textile. It is more likely that this moss was simply growing in the wet soil forming the sides and base of the ditch. *Polytrichum commune* is a very common British moss, preferring damp, acidic conditions such as those found in woodlands, bogs and ditches (Watson 1968). Small amounts of bog moss and grass/sedge stems could also have grown on the interior slope of the ditch. Tormentil will grow in a wide range of habitats and so may have been present on the edge of the ditch, hence the very large numbers of seeds, which could represent only a few individual plants. Fool's parsley tends to grow on cultivated, disturbed or waste ground and so probably wouldn't have grown within the ditch itself but could have colonised the surrounding land, either during occupation or perhaps, more likely, once the site had been abandoned.

Five samples, 004, 005, 007, 008 and 009, were analysed from ditch deposit (007). These produced a matrix of large amounts of wood fragments, mosses (including hair moss and bog moss), dicot (broadleaf) leaves and grass/sedge stems and leaves. The wood fragments were generally very small (1-2 year old) birch twigs and larger fragments of willow wood (up to 35 mm in diameter). Birch seeds and catkin scales were also commonly identified from these samples. The birch twigs, seeds and catkin scales probably blew into the ditch deposits from nearby stands of birch trees. Birch seeds have evolved to be dispersed by the wind but the catkin scales and young twigs can also be blown some distance from the parent tree. Birch trees are pioneer species i.e. tend to colonise open ground, and so they may represent the regrowth of trees once the site was abandoned. Willow wood within the ditch could be the remains of wood used within the Roman fortlet but could also

represent regrowth of willow along the edges of the waterlogged ditch after it was no longer in use. In addition, some small fragments of cf willow wood were found to have been stained a very bright blue colour suggesting contact with a copper object, although no evidence of that object was found.

Fool's parsley, sedges and tormentil were identified from deposit (007), as they were in (010). A few clusters of meadowsweet seeds were located in (007). Meadowsweet has important medicinal properties and contains salicylic acid, which is the original form of the drug aspirin. However, it also prefers damp habitats such as those long river banks or ditches and so is likely to be evidence for the natural vegetation of the site rather than evidence for medicinal use within the fortlet.

In addition, evidence for two potential food plants were found within this ditch deposit, with a single whole hazel nut (with shell) and a single bramble seed. However, these could also have just come from the surrounding vegetation and woodland and are not strong evidence for food consumption in the fortlet.

Insect remains in the form of caddis larval cases and water flea eggs indicate that the ditch contained standing water for at least some of the time that the deposits (007) were building up in the base of the ditch.

Ditch fill (012) lay below a layer of wood (011) (not identified for this report) and also produced a large quantity of wood remains, although very fragmentary in nature. Wood of willow and birch was identified as well as numerous seeds and catkin scales of silver birch and downy birch, suggesting a very local presence of birch trees. Water-flea eggs were identified from this deposit and so indicate a period of standing water when this ditch fill formed.

The botanical remains from the Roman ditch deposits do not provide any strong evidence for the occupation of the fortlet. It is more likely that they represent the natural vegetation that grew around and within the ditch once the fortlet had been abandoned.

Wood Dating Assessment

By Coralie Mills

Introduction

Two timbers from the BR/C site were submitted for dating assessment, following a waterlogged wood assessment report by Michael Bamforth (see *Waterlogged Wood* below). The two timbers had both been identified as *Salix/Populus* (willow/poplar) which makes them unsuitable for dendrochronological dating. Instead, this assessment focusses on their suitability for radiocarbon dating, in particular 'wiggle-matching' which is sometimes possible with multiple known-interval sub-samples of the annual rings from a timber to improve radiocarbon dating precision. The timbers are unworked and are probably from local natural vegetation growing in or near the ditch.

Assessment results

The form and condition of the two timbers (Samples 11 and 13) have been described in detail by Bamforth (see below). Further examination confirmed their very decayed condition, and the smaller of the two timbers, Sample 11 appears to have rotted on both inner and outer faces, leaving a quite slim piece of wood, crescent shaped in cross-section, which is unlikely to preserve its outer sub-bark surface. The ring pattern is unclear, but is estimated to have only about 15 rings which would further rule out any wiggle-matching potential, being too short to allow meaningful multi-interval subsamples. The assessment therefore concentrated on the larger timber, Sample 13. This was chain-sawn through the centre, where it appeared to be best preserved and most intact; a thin slice was taken at this central position to allow better preparation of the transverse surface for examination of the ring pattern. Due to the soft, crumbly, condition of the wood, the slice was first frozen and then one face entirely pared by razor blade to reveal the wood structure. This revealed just how very decayed the wood was, with fungal spalting effects evident and many large black spots of rot. While some of the rot may have occurred in antiquity, it seems likely that recent changes in the depositional environment have contributed to its poor condition. The ring pattern was very

difficult to discern, in part due to the diffuse-porous ring structure of the species, but also due to the great degree of rot in the sample. There is more than one centre present and this stem appears to be a fused multi-stem, a form which could occur naturally, without management intervention, in willow (*Salix*) especially. The ring count is not high, and estimated to be in the order of 20 rings. The indistinct character of the rings and the low ring counts make this timber also unsuitable for wiggle-matching. However, in places, the sub-bark surface does appear to be intact which would make orthodox radiocarbon dating of a sub-sample from the outer edge meaningful.

Conclusion

Unfortunately, neither timber is suitable for wiggle matching. The ring sequences are too short, their condition too poor and the ring boundaries too indistinct to permit meaningful sub-sampling of annual ring segments for wiggle-matching. Instead, it is recommended that an orthodox radiocarbon date is undertaken on a sub-sample of the outer wood of Sample 13 at a position where the sub-bark surface is intact. This would provide a date for the felling or death of this stem, before it became incorporated into the ditch context. In anticipation of this approach being adopted, a small subsample of the outer ring has been taken and placed in cold storage, ready for any radiocarbon dating submission.

Hair Moss from BR/C

By Nysa Noelle Loudon

Bronze Age and Iron Age use of hair moss for fabric, basketry, and cordage is still not proven in Scotland. The samples from the ditch fill (009) were not noteworthy as they were not worked or used in any way that could be observed (Figure 10). In some medieval Perth examples of plaiting with hair moss, (Fraser and Smith 211, 79; Loudon forthcoming PhD thesis), many of the stems have had the leaves rubbed off, presumably through wear, which may be an indication of use for this plant when found in the record, besides other evidence of working such as twisting, bundling or weaving.

Objects confirmed or yet to be confirmed made from hair moss in Scottish archaeology include:

- A hat made from basketry techniques, Romano British (80 – 180 AD), held at the National Museums Scotland (NMS) (X. FRA 1183) (Curle 1911), identified by Kew with NMS.
- Several fragments of thick plaited ropes from excavations of the Perth High Street, held at Perth Museum collections, identified by specialists (Holdworth *et al.* 1987).
- (Still to be confirmed) a 4-strand plait and several fragments of fringe, Lochlea Crannog, multi-period site (likely 1st – 2nd century AD) excavated by Munro in the 1880s (Henshall 1950; Munro 1882, 88, 95).
- (Still to be confirmed) compressed organic material, originally described as a moss fibre garment from Mann’s excavation of a Bronze age cist at Greenoakhill, Mount Vernon, Glasgow (Henshall 1950, 153) Identification as hair moss is doubtful and Harris and Gleba’s (2015) investigation of the object in Glasgow Museums did not find any evidence of a weave structure.

Hair moss objects across the British Isles:

- Hair moss rope from Boat No. 3 from the early Bronze Age, North Ferriby, with other types of moss (*Neckera complanata* and *Eurhynchium striata*) used as chaulking for the boat (Wright and Churchill 1965, 5, pl. I upper, pl. VIII lower; Wright *et al.* 2001, 732).
- A Roman hair moss cap and fringe from Romano British Vindolanda, Northern England (Wild 1994, 97-103).

Traditional uses of hair moss and other mosses can be found in the *Flora Celtica* (Milliken and Bridgewater 2004), *Flora Britannica* (Mabey 1998), and *The Scots Herbal* (Darwin 2008).

Waterlogged Wood

By Michael Bamforth

Introduction

Four pieces of wood were recovered from deposit (011) in the base of ditch (009) during archaeological works at BR/C (Kilpatrick and Rennie 2017). The ditch may be associated with a previously unknown fortlet along the Antonine wall.

This analysis aims to assess the potential of the waterlogged wood assemblage in terms of woodworking technology, woodland reconstruction, decay analysis, species identification, dendrochronology and conservation and retention. The wood was recorded off site in February 2020. The wood was situated in waterlogged deposits which created the anaerobic conditions necessary for organic preservation.

Methodology

This analysis was produced in accordance with Historic England guidelines for the treatment of waterlogged wood (Brunning and Watson 2010) and recommendations made by the Society of Museum Archaeologists (1993) for the retention of waterlogged wood. The system of categorisation and interrogation developed by Taylor (1998; 2001) and the condition scale developed by the Humber Wetlands project (Van de Noort *et al.* 1995: Table 15.1.) have been adopted within this report. The wood was identified microscopically by the author. Sub-samples were thin-sectioned to produce slides of the transverse, radial longitudinal and transverse longitudinal sections (cf. Gale and Cutler 2000) which were viewed under a transmitted light microscope at x40-x100 magnification. Identifications follow anatomical guides (Schoch *et al.* 2004; Wheeler *et al.* 1989) and modern reference material.

Condition

The condition scale developed by the Humber Wetlands Project (Van de Noort *et al.* 1995: Table 15.1) will be used throughout this analysis (Table 4). The condition scale is based primarily on the clarity of surface data. Material is allocated a score dependent on the types of analyses that can be carried out, given the state of preservation. The condition score reflects the possibility of a given type of analysis but does not consider the suitability of the item for a given process. If preservation varies within a discrete item, the section that is best preserved is considered when assigning the item a score.

All the ends which extended into the narrow foundation trench are degraded and the timbers were sawn where they extended out of the footing trench. The wood is in poor condition, sitting below the boundary for meaningful technological analysis, and it is likely that any traces of tooling that may have been extant will have been obliterated by surface degradation.

Range and Variation

Two of the items are classed as timber – larger material derived from logs in excess of 150 mm generally derived from the trunks of medium to large trees. Two are classed as roundwood – material derived from stems less than 150 mm in diameter, consisting of the trunks of small trees, understorey growth and side branches. A full catalogue is provided in Table 5.

Wood 1.1 is a willow/poplar (*Salix/Populus*) timber, perhaps originating as a half split, the pith/centre has rotted away, probably in

antiquity (Figure 20). The hollow, rotted surface was towards the base of the ditch and the outer surface of the timber towards the top, and all the surfaces are degraded.

The adjacent wood 1.2 is a medium diameter piece of willow/poplar (*Salix/Populus*) unconverted roundwood/brushwood.

Wood 2 is a willow/poplar (*Salix/Populus*) timber is the largest piece of wood and is formed of a substantial timber, probably the trunk of a medium sized tree, terminating in a 'Y' shaped crux, the two stems of which have degraded away. In keeping with the remainder of the assemblage, the surfaces are all degraded with the upper surface showing deep, longitudinal radial troughs suggestive of wet rot, presumed to have occurred in antiquity.

Wood 3 is alder buckthorn (cf. *Frangula alnus*), has a tangentially aligned cross section and is derived from large diameter roundwood (Figure 20). All the surfaces are heavily degraded suggesting this item may well have rotted into this shape, probably in antiquity.

Discussion

There is no evidence for cultural modification/woodworking in terms of either split surfaces or tool marks. Although two of the timbers are not in the round, their conversion seems to be a result of degradation and decay. The morphology of the decay, which has the appearance of wet rot (Coggins 1980) suggests it occurred in antiquity, prior to the material becoming enclosed in a secure burial environment.

Condition score		Woodworking Technology	Woodland management	Dendro-chronology	Taxonomic identification
5	excellent	yes	yes	yes	yes
4	good	yes	yes	yes	yes
3	moderate	yes / no	yes	yes	yes
2	poor	yes / no	yes / no	yes / no	yes
1	very poor	no	no	no	yes / no
0	non-viable	no	no	no	no

Table 4: Condition scoring system (After Van de Noort *et al.* 1995: Table 15.1).

No.	Sample	Context	Category	ID	Bark / sapwood / heartwood	Condition	Conversion	Ends	Notes	Length (mm)	Breadth (mm)	Thickness (mm)	Original diameter (mm)
1.1	11	011	Timber	Salix/ Populus	SH	2	Radial 1/2 with centre rotted out	Both sawn	3 refitting and 2 non refitting fragments. Outer surface up, rotted hollow surface down. All surfaces degraded, unclear if outer surface has sapwood present / represents bark edge. Growth rings c.2-3mm where visible	605	180	50	c.200
1.2	11	011	Round wood	Salix/ Populus	SH	3	Whole	Both broken	Slow grown, growth rings c.1mm	330	50	45	
2	13	011	Timber	Salix/ Populus	SH	2	Whole	1 degraded, 1 sawn	1 main piece and 9 non-refitting small fragments. One end sawn, degraded end is a 'Y' shaped crux. All surfaces degraded, upper surface has deep, radial troughs suggestive of wet rot in antiquity. Growth rings c.3mm	690	300	240	main stem diameter 220
3	12	011	Round wood	cf.Frangula alnus	SH	2	Tangential	1 degraded, 1 sawn	All surfaces heavily degraded. Growth rings 1-3mm where visible	540	135	65	>120

Table 5: Waterlogged wood catalogue.

Although it is theoretically possible that the material was either placed in the ditch for a purpose (such as underpinning a structure) or was dumped in the ditch as waste, it may well represent naturally accumulated detritus. This would suggest that the wood had been growing in the immediate vicinity. This is to some extent supported by the species identifications.

Three of the samples have been identified as willow/poplar (*Salix/Populus*) which are generally indistinguishable microscopically – both thrive on wetter soils although willow is the most damp tolerant and is often found growing beside open water or on marshy ground (Gale and Cutler 2000).

The other sample is alder buckthorn (cf. *Frangula alnus*) - a shrub or small tree that grows on damp soils as part of scrub or marginal woodland (Gale and Cutler 2000). These are all wet tolerant species that are not generally used in a structural context. The material represents moderate to poor quality timber – it is not the straight grained, knot free, side branch free timber that a wood worker would choose to work with.

Timber framed buildings are known to have been present at the Antonine Wall fort of Bar Hill (Anderson *et al.* 1985). Structural timber at the Hadrian's Wall fort of Vindolanda is generally formed of oak, much of which is straight grained, knot free and good quality material (Birley 2009).

Fossil Beetle (Coleoptera) Fauna and Bayesian Analysis

By Nicki J. Whitehouse

Introduction

Nine sediment samples were processed and picked for their fossil beetle fauna from BR/C (Kilpatrick and Rennie 2017) and this report summarizes the results from the analyses of fossil insects and highlights the significance of the insect remains analysed, alongside a suite of new radiocarbon dates. Samples came from a ditch of waterlogged peat deposits, wood and other waterlogged plant material that may be associated with the remains of a previously unknown Roman fortlet related to the line of the Antonine Wall. The main aims of the work were to establish environmental conditions inferred from the samples and establish their archaeological significance.

Fossil beetles can be very useful indicators for reconstructing past environments and details of living conditions on archaeological sites, being sensitive to environmental change and occupying almost every possible ecological niche and type of habitat on land and freshwater. Archaeological sites of Roman age frequently yield copious insect material; some of the best-known examples of this type of work have been undertaken in urban

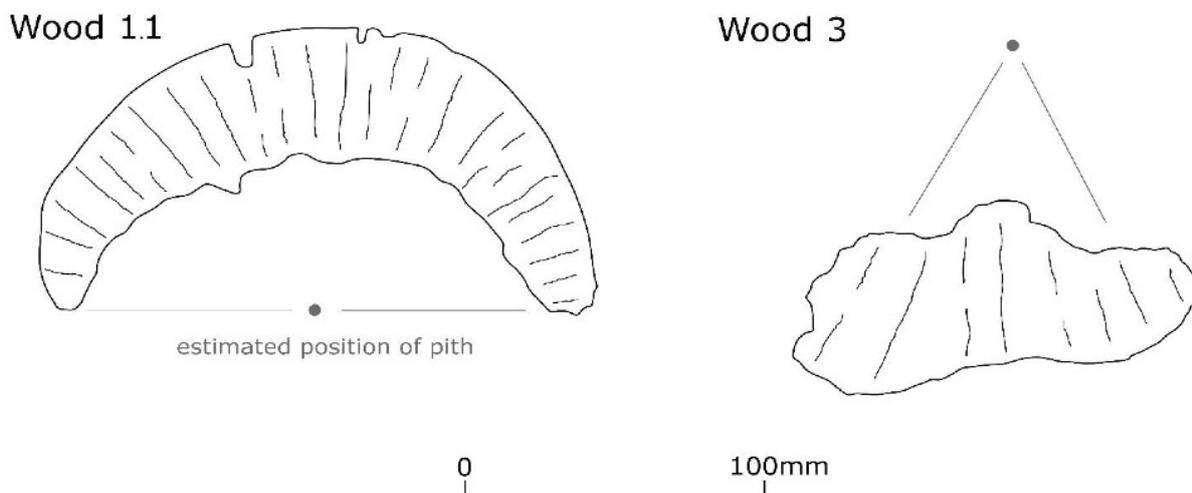


Figure 20: Cross sections of Wood 1 and Wood 3, as orientated in ground.

centres such as York (cf. Kenward and Hall 1995), London, Carlisle and Lincoln (e.g. Coope and Osborne 1968; Dobney *et al.* 1998; Smith 2012). These works have established the importance of understanding the taphonomic pathways through which insect fossils become part of the archaeological record, which can often be complex. It is thus important to appreciate that interpretations should not be based on single species (cf. Kenward 1975), rather the combinations of different species and groups of related species are critical to the interpretation of archaeological materials (cf. Smith 2013).

There have been relatively few investigations of Roman date from Scotland for their fossil beetles, which makes this investigation of some importance. Useful comparators include those excavated at the large Antonine fort at Bearsden (Locke 2016), close to this sampled location. Another example comes from the insect remains from the well at the Roman Civil Settlement at Inveresk, West Lothian (Smith 2004).

Material and Methods

A total of nine samples were analysed. Seven bulk soil/sediment samples were subjected to paraffin flotation and processed for fossil insect remains (Table 6); a further five flots from some of the same samples associated macro-botanical analyses were also sorted and added to the seven bulk samples. Two macro-botanical samples which had no associated bulk soil samples were also sorted (Samples 3 and 6, both context 010). Very little material was recovered from these samples as the sieve sizes used for macro-botanical analyses is considerably larger than used for insect analysis, which means that anything that might have been preserved would not have been retained. Nevertheless, the addition of this material across all samples was useful to augment recovered material.

Details of all soil/sediment descriptions and samples sizes can be found in Table 6. The latter varied in size, between 1 to 3 litres of material, which is lower than optimum for the extraction of insect remains. However, this did not have a major impact on the abundance of materials recovered, as seen from the species list. It may be beneficial, however, to increase standard sample sizes to 3 litres for fossil insect analysis,

to ensure sample sizes are always adequate for future analyses.

Each samples' sediment was described using the Troels-Smith system for the description of Quaternary deposits (Troels Smith 1955; Aaby and Berglund 1986). This is based on a semi-objective classification of unconsolidated sediments - the scheme is descriptive and independent of any knowledge of depositional processes, and the logical, structured approach enables direct comparison of results collected by different investigators.

Samples were initially disaggregated in water over a 300 µm sieve to remove any fine fraction from the samples. Samples were then subjected to the paraffin flotation method devised by Coope and Osborne (1968) to concentrate the insect remains. Flots from macrobotanical samples were either scanned in water and any remains added to samples or were subjected to paraffin flotation where the sizes of flots warranted this. Flots were sorted under a binocular microscope at x10-x40 magnification. One sample (sample 17, context 010) was very fibrous and here flots expanded to 3 or 4 times their original size. Due to this, only one paraffined flots was removed and sorted for this sample, still creating a very large flots for sorting. Consequently, an additional step was introduced for processing context 012, sample 16, which had similar issues. Here, the sample was separated into a courser and finer fraction and paraffined separately; this created more manageable flots (see Table 6). Identification of materials occurred at the Hope Collection, University of Oxford Museum, and the Gorham and Girling Collection, University of Birmingham, when fossil materials were compared against named specimens.

Coleoptera nomenclature follows Lucht (1987); plant nomenclature follows Stace (1991). Habitat information was obtained from the Coleopteran database BUGSCEP (Buckland and Buckland 2006). Species were categorized using Kenward's ecological grouping and classification system (1978; 1995) to identify overall patterns in community compositions and any anthropogenic materials and synanthropic indicators (see *Inferred Environmental History*, below). Some issues of preservation were noted; these are commented upon within samples accounts.

Sample No.	Context No.	Description of deposit	Volume processed	Volume of flot	Main characteristics of flots
4	007 fill of ditch (009)	Dark brown/black peaty-rich deposit with visible plant remains, some sand and silt. Wood and hazel nuts noted in processing, alongside Polytricum. Some larger stone inclusions ? hardcore/modern contaminant? Sh2, Ag2, Dh+, Ga+	3 litres	200 ml	Clean flot dominated by plant materials, with frequent seeds, including Betula. Diptera: rare; Chironomids: rare; Formicidae: rare; Acarina: occasional. Coleoptera: frequent. Rich assemblage of materials.
5	007 fill of ditch (009)	Dark brown/black organic deposit, some silt, with abundant wood. Visible plant remains ?Polytrichum spp. Th1, Dl2, Sh1, Ag+ Wood removed and placed to one side – at least two different taxa	1 litre	60 ml	Clean flot dominated by plant materials, with frequent seeds. Diptera: rare; Chironomids: rare; Formicidae: rare; Acarina: occasional. Coleoptera: occasional
7	007 fill of ditch (009)	Dark brown, organic-rich silty-wood peat with fine sand (noted in processing) Ag2, Sh2, Ga+, Dl+	1.5 litres	60 ml; also sorted 500 mm and 1 mm flots from plant remains analyses	Processing revealed Betula and ?Pinus remains. Clean flot dominated by plant materials, frequent seeds. Diptera: rare; Chironomids: rare; Formicidae: rare; Acarina: occasional. Coleoptera: frequent
8	007 fill of ditch (009)	Dark brown, silty peat; some stratified material, with wood inclusions (?Birch) Ag1, Dg1, Ld2, Ga+	2 litres	200 ml; also sorted 500 mm and 1 mm flots from plant remains analyses	Plant dominated flot with many waterlogged seeds such as Alnus; Diptera: occasional; Chironomids: rare; Formicidae: rare; Acarinae: frequent; Coleoptera: Abundant
9	007 fill of ditch (009)	Dark brown, almost black organic-rich peat deposit with some silt Sh2, Dh1, Ag1	1 litre (sub-sample)	50 ml; also sorted > 500 mm and 1 mm flots from plant remains analyses	Plant dominated, clean flot. Seeds are frequent, with some wood; Diptera: rare; Formicidae: rare; Acarinae: frequent; Coleoptera: frequent.
3	010 lower fill ditch (009)	Paraffined > 500 mm plant fraction and 1 mm plant fraction	N/A	20ml	Plant dominated; rare Coleoptera
6	010 lower fill ditch (009)	Paraffined > 500 mm plant fraction and 1 mm plant fraction rinsed over the sieve and added – the latter was tangled Polytricum.	N/A	20ml	Plant dominated flot. Rather little remaining, very rare Coleoptera.
17	010 over fill ditch (009)	Dark brown, very fibrous peat including a considerable volume of stems and leaves of Polytricum moss. Also leaves of deciduous trees Th3, Dg1	2 litres	1 litre	Very matted, fibrous peat flot, extremely challenging to sort. Copious herbaceous remains, with frequent seeds. Occasional Acarinae (mites) and Dipterous remains. Coleoptera: rare, very few remains
16	012 fill of ditch (009)	Dark brown, fibrous peat with stems and leaves of Polytricum moss. Highly matted. Some wood remains Sh2, Dh2	1 litre	180 ml; also sorted >500 mm and 1 mm flots from plant remains analyses	Matted, fibrous plant-dominated flot, similar to above. Herbaceous remains, Occasional Acarinae (mites) and Dipterous remains. Coleoptera: occasional

Table 6: Description of samples processed.

Chronology was established via four radiocarbon dates from the ditch fills, which were submitted by GUARD Archaeology to SUERC Radiocarbon Laboratory to support investigations (see Table 1 above and Table 7 below). Dates have been calibrated and analysed using a Bayesian approach, using OxCal (<https://c14.arch.ox.ac.uk/oxcal.html>).

Results

Inferred stratigraphic history

Most of the samples follow a broad stratigraphic sequence, starting with basal samples 016, context 012, through to sample 004, context 007 at the top of the sequence.

As noted above, most of the samples analysed come from the ditch fill deposits (context 007), described as a mid-brown silty peat, which was very waterlogged. The amount of silt varied somewhat through the profile (see Table 6), with wood periodically either falling into or being added to the deposit. The lower-most samples analysed, in contrast, consist of very fibrous peat deposits dominated by *Polytricum*, clearly contrasting with the upper deposits which are typical of standing water ditch deposits. These deposits are very unusual within the context of a ditch sequence and in some ways back to front to what one might expect. As ditches infill with materials and become territorialised it's not unusual for them to be colonised by aquatic plants such as *Polytricum*; however, here, *Polytricum* and mosses form the base. One

possible interpretation is that the *Polytricum* has been used to 'line' the ditch, perhaps to keep waters above clear; another interpretation is that the ditch was initially quite shallow and started to infill with *Polytricum*; the ditch was then subsequently re-cut and kept open/clear, allowing the silty/peat deposits to form above. The latter of these two interpretations seems the most likely, given the differences in aquatic water beetle abundances noted through the profile (see below), especially the transition into sample 009, context 007, which contrasts with previous samples, suggesting deeper, more open water conditions about half-way up the sequence. This is most likely achieved either by an abrupt change in the water table, or due to a clearing/re-cut of the feature to create more open water habitats.

Radiocarbon dates and chronology

Four samples from the ditch were submitted for radiocarbon dating (Table 1).

The calibrated dates cover the period between the 2nd and 5th century AD. A Bayesian model was attempted on the data, using an OxCal Sequence Model, which treated context 010 as separate from context 007. SUERC 127792 was identified as an outlier by OxCal during the initial scoping runs and marked as such in the final run. The A-scores were significantly above the minimum recommended for a reliable model (>100); the model outputs are shown below (Table 7; Figure 21). Following the usual conventions, modelled dates are shown in italics.

Name	Unmodelled (BC/AD)		Modelled (BC/AD)		Indices				
	from 95.4	to 95.4	from 95.4	to 95.4	A_{comb}	A	L	P	C
Sequence Bocalair Road									
Boundary start context 010			-10	311					98.5
R Date GU51927	125	245	127	247		104.3			99.8
Boundary end context 010			145	305					99.9
Boundary start context 007			205	335					99.8
R Date SUERC 127792	220	346	234	340		101.9			99.8
R Date SUERC 127791	261	531	262	531					99.7
R Date GU51928	248	401	241	367		102.7			99.7
R Date SUERC 127879			0	115					99.9
Boundary end context 007			240	444					99.1

Table 7: OxCal results table for BR/C.

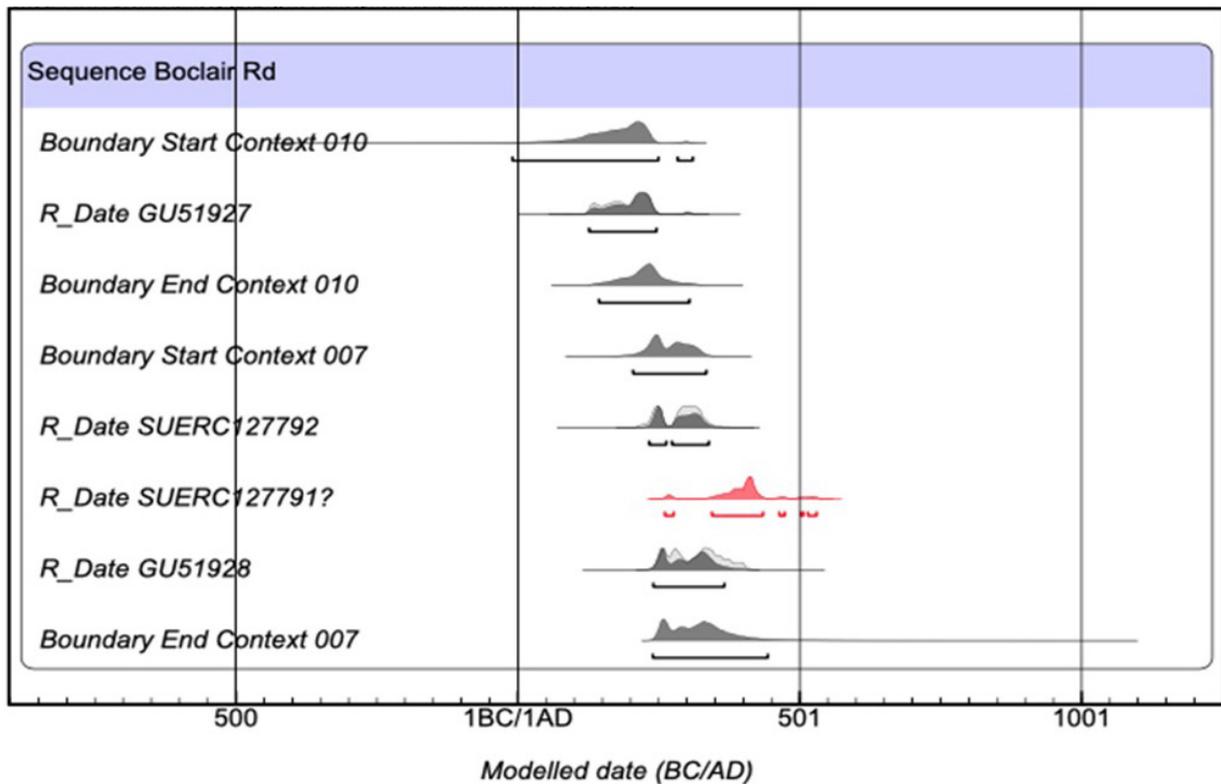


Figure 21: Bayesian OxCal Sequence model plot for BR/C.

The model indicates that context 010 (at the base) is dated to cal AD 127 – 247 (95% probability), whilst context 007 started cal AD 205 – 335 and ended sometime around cal AD 240 – 444 (95% probability), lasting about 115 years.

Inferred environmental history

A total of 699 MNI were recovered from nine samples (Table 8). Certain portions of the sequence yielded much greater numbers of fossils than others. Appendix - Table 9 shows the breakdown of the samples by communities.

The communities were dominated by families associated with open habitats, especially aquatic and hygrophilous communities, plant and pasture habitats, tree and wood habitats. Insects associated with decaying organic matter, but not belonging to either the rd or rf groups (rd-species primarily associated with drier organic matter; rf - species primarily associated with foul organic matter often dung), formed an important community through the samples, especially those judged to belong to more recent periods, and there were a few members of rf groups (foul organic material, often dung), mostly in the form of dung beetles. These generally increased in

abundance through the sequence but remained modest components of the assemblage. There were also some members of the Diptera (flies) community, especially in samples from context 007 (samples 007, 008 and 009). The abundance of synanthropic beetles was very modest and consisted exclusively of facultative synanthropes (sf) – those that are common in ‘natural’ habitats but clearly favoured by artificial ones. Modest abundances through the sequence suggests anthropogenic habitats were increasing and this is supported by the other communities in the samples. However, the absence of other synanthropes, such as typical synanthropes (st) – those particularly favoured by artificial habitats but believed to be able to survive in nature in the long term, strong synanthropes (ss) that are dependent on human activity for survival and those species thought to be particularly associated with human occupation (category h taxa) (Kenward and Hall 1995) suggests none of these habitats were in the vicinity of the material sampled.

Consequently, whilst the assemblage tells us quite a lot about the immediate environment represented by the samples, they do not appear

Category	016, context 012	017, context 010	006, context 010	003, context 010	009, context 007	008, context 007	007, context 007	005, context 007	004, context 007
SUM oa	11	0	0	2	10	6	12	1	11
% oa	13%	0	0	4%	8%	4%	7%	2%	11%
SUM oa-w	26	2	2	0	34	37	67	7	40
% oa-w	30%	18%	3%	0	29%	26%	41%	17%	40%
SUM oa-d	26	4	2	3	34	61	48	15	25
% oa-d	30%	36%	3%	5%	29%	42%	29%	36%	25%
SUM oa-p	4	0	0	0	14	7	11	2	3
% oa-p	5%	0	0	0	12%	4%	7%	4%	3%
SUM oa-rf	2	0	1	1	1	1	1	0	2
% oa-rf	2%	0	1%	1%	1%	1%	1%	0	2%
SUM oa-d	1	1	0	0	1	3	2	1	4
% oa-d	1%	9%	0	0	1%	2%	1%	2%	4%
SUM oa-l	1	1	0	0	4	6	8	4	3
% oa-l	1%	9%	0	0	3%	4%	4%	10%	3%
SUM I-h	0	0	0	0	1	0	0	0	0
% I-h	0	0	0	0	1%	0	0	0	0
SUM rt	14	2	2	0	17	18	8	9	11
% rt	16%	18%	3%	0	14%	12%	4%	22%	11%
SUM u	2	1	0	0	3	7	7	2	0
% u	2%	9%	0	0	2%	5%	4%	3%	0
SUM ws	0	0	0	0	0	0	0	0	1
%	0	0	0	0	0	0	0	0	1%
Totals MNI	87	11	7	6	122	146	164	41	100
(Sf MNI)	2	0	1	0	2	4	0	3	1

Key

Totals based entirely on Coleoptera and exclude Hemiptera and Diptera; Sf MNI data shown at the end, as secondary classification on already included count data

Ecological coding (Kenward and Hall 1995)

oa (& ob) species which will not breed in human housing.

w aquatic species.

c species associated with salt water and coastal areas

d species associated with damp watersides and river banks.

rd species primarily associated with drier organic matter.

rf species primarily associated with foul organic matter often dung.

rt insects associated with decaying organic matter, but not belonging to either the rd or rf groups.

g species associated with grain.

l species associated with timber.

p phytophage species often associated with waste areas or grassland and pasture.

pu species associated with pulses (peas and beans).

h members of the 'house fauna' this is a very arbitrary group based on archaeological associations (Hall and Kenward 1990).

Synanthropic coding (Kenward 1997)

sf facultative synanthropes - common in 'natural' habitats but clearly favoured by artificial ones.

st typically synanthropes - particularly favoured by artificial habitats but believed to be able to survive in nature in the long term.

ss strong synanthropes - essentially dependant on human activity for survival.

h species thought to be particularly associated with human occupation (Kenward and Hall 1995).

Table 8: Categorized data, Boclair Road, Coleoptera assemblage.

to be associated with any meaningful human occupation layers or strongly artificial habitats that might be associated directly with an archaeological site or settlement, but rather more likely represents elements of human activities occurring within the wider landscape, but within close proximity to archaeological activities.

Below is an account of each sample, starting from the oldest, basal materials upwards.

Context 012, Sample 16

This sub-sample lay below a layer of wood (011) (*Archaeobotany*, above). The material was reasonably abundant with 92 MNI, across 51 taxa. The material originated from the fill of ditch 009. The sample is dominated by the following communities: open communities (13%); aquatic communities (30%); waterside and banks (30%) – in this context, most likely hygrophilous taxa associated with the ditch/water feature. Decaying organic matter communities also form an important component of the assemblage (16%) within the rt category, but which do not belong to either dry or foul communities. There are also small plant and woodland communities; there are two facultative synanthropes.

The aquatic communities include species that typify standing or slowly moving water bodies, including *Hydraena britteni* and *Limnebius aluta*, which are indicative of aquatic mesotrophic conditions (Friday 1988) whilst *Hydroporus gyllenhali*, is typical of acid bog pools (Friday 1988). *Hydroporus angustatus* is found in leaf-rich woodland waters (Koch 1989). The absence of larger Dytiscid water beetles suggests there were no extensive or deep areas of open waters, but rather a modest and vegetation-rich aquatic environment. The abundance of Scirtidae, Hydraenidae and Hydrophilidae are typical of small detritus pools, abundant with leaves and amphibious plants. Hygrophilous species are abundant and include those that live in plant detritus in wet situations (e.g. *Cyphon* spp., *Megasternum obscurum*, *Stenus* spp; *Stenus kiesenwetteri*; *Paederus ripariu*; *Lesteva heeri*, *Lathrobium brunripes*). *Lesteva heeri* is usually found in debris of *Carex* and *Phragmites* (Koch 1989). Pools with detritus would have been a favourable habitat to the hydrophilids *Hydrobius fuscipes* and *Anacaena globosus* (Hansen 1987).

Species associated with fens and alder carr, such as *Pterostichus nigrita*, were found, as well as *P. diligens*, which is found on peaty substrates (Eyre and Luff 1990). *Trechus obtusus* is typical of swampy deciduous woods (Lindroth 1954). The staphylinid *Olophrum fuscum* is found in detritus of *Phragmites*, *Carex* and *Juncus*, under damp leaves and moss, often in marshes and alder carr (Koch 1989), a habitat also favoured by *Oxytelus fulvipes*. *Plateumaris sericea* is typical of fen conditions (Stainforth 1944; Bullock 1993). These species suggest that wetland habitats extended well beyond the actual feature itself, but were part of the wider landscape, that might have included areas of alder carr and marshland.

There are several species that are indicative of the drier, wider landscape; *Acidota cruentata* is found in open grassland and sometimes arable fields (Hyman 1994), whilst *Agriotes* spp. is largely found in grasslands.

Members of the genera *Apion*, *Sitona* are found on grasses and herbs in open areas. The presence of grazing animals is indicated by the presence of the large scarab dung beetle, *Geotrupes* sp. and *Aphodius merdarius*, a species associated with horse and cow dung in open settings (Jessop 1986). *Metopsia clypeata* is typically associated with grassland in ancient grassland and downland, preferring minerogenic sediments and warm niches (Whitehead 2005), suggesting exposed sandy areas amongst the grassland areas.

Tachinus sp, a facultative synanthrope, would also have found suitable habitats here, in a variety of biotopes.

There are a few taxa representative of nearby trees, including those associated with oak woodland, such as the *Quercus* leaf miner, *Rhynchaenus quercus*. Willow is also suggested by the presence of *Crepidodera* sp. An indication of the quality of the nearby woodland is suggested by the staphylinid *Quedius truncicola*, which is found in very wet, rotten timber and often associated with ancient broad-leaved woodland and pasture woodland in damp, decaying mould in hollow trees and dead wood (Hyman 1994), a habitat that would also suit many *Polydrusus* spp. The presence of woodland nearby is also confirmed by the weevil,

Strophosoma melanogrammum, which feeds on various deciduous and coniferous trees in drier areas (Koch 1989); it is found frequently within the archaeological record from sites dating from the Neolithic to post-medieval periods.

Overall, the assemblage provides an insight into the conditions immediately associated with the ditch fill, which is likely to have been in a largely open landscape of open woodlands and grasslands, with some grazing animals and alder carr habitats nearby. Nearby woodland was deciduous in nature and there are hints that there are ancient woodland habitats represented. There are very few anthropogenic indicators, apart from the clear indication of open habitats and grazing animals.

Context 010, Sample 017

This material came from *Polytricum*-dominated peat, representing a bulk sample of material from context (010). It is a very sparse insect assemblage (Figure 22), represented by 11 MNI, across 10 taxa. The material is well preserved but is very sparse, despite having been subjected to paraffin flotation. It is likely this reflects the sampled material, dominated by *Polytricum*, which is quite a sterile habitat.



Figure 22: Insect assemblage in Sample 17, context 010.

The sample is dominated by communities of water and wetlands and includes hygrophilous species that live in plant detritus in wet

situations (e.g. *Cyphon* spp., *Stenus* sp., *Bryaxis* sp.). Mesotrophic conditions are indicated by *Hydraena britteni*, which is found in fens (Friday 1988), whilst *Lesteva heeri* is usually found in debris of *Carex* and *Phragmites* (Koch 1989). Small aquatic taxa *Hydroporus* spp. suggest the context had small areas of open water, but these must have been very limited given the absence of larger water beetles which require more permanent water pools. Waterside plants are indicated by the reed beetle, *Plateumaris* sp. The presence of the rove beetle *Oxytelus sculptus* hints at grazing land nearby, where it can be found in cattle pastures, fields and manure heaps (Koch 1989), whilst *Rhamphus pulicarius*, suggests the nearby presence of overhanging *Betula* and *Salix* trees (Morris 1993). The fauna is rather small to provide much meaningful information, beyond the fact that this is an almost exclusively wetland community, with almost no anthropogenic indicators present, representing a community living within the ditch at the time of deposition of the basal deposits, and a small community of species that lived within drier adjacent habitats.

Context 10, Sample 006

This material was obtained from the plant remains residue provided. Only 6 MNI were recovered from this sample, from across seven taxa; material was all in a good condition. Those recovered suggest that conditions on the site remained wet, with areas of open water, as indicated by the presence of *Cyphon* spp., and *Helophorus* sp., whilst the presence of *Hydroporus angustatus* suggests leaf-rich standing waters and eutrophic or mesotrophic conditions (Bilton 1988; Koch 1989). The presence of *Aphodius contaminatus* (Figure 23) suggests nearby grazing animals; this dung beetle is a eurytopic species which likes sandy places and is found in all kinds of dung, very often in horse, as well as cattle manure (Landin 1961). *Rhizophagus dispar* is found under fungoid bark, under both deciduous and coniferous bark in woods, woodland margins, heaths and pasture (Koch 1989). The presence of these species suggests a landscape of largely open conditions with grazing animals, with perhaps scattered trees nearby, akin to woodland pasture.



Figure 23: *Aphodius contaminatus*; Photo: © D. Mann, Oxford University Museum.

Context 10, Sample 003

This material was sorted from the plant remains residue provided and was in good condition. Very few fossils were recovered from this sample, just 4 individuals, *Cyphon* spp and *Geotrupes stercorosus*. The hygrophilous genus *Cyphon* has been ubiquitous through all the samples at this site and indicates that the context associated with this sample remained waterlogged. *Geotrupes stercorosus* is associated with herbivore dung, especially cattle and horse (Duff 1993); it is found commonly in archaeological assemblages of Iron Age, Roman and Medieval periods. It suggests that animal grazing was occurring within the vicinity of the feature.

Context 007, Sample 009

This sub-sample, from the fill of ditch (009), contained an abundance of remains, 117 MNI across 63 taxa (Figure 24) of aquatic water beetles (30%) and species associated with waterside and hygrophilous conditions (30%), as well as a good community of species associated with open situations and plants (12%), organic rotting habitats (13%), trees (3%) as well as some rotting/foul and dung communities. There are two facultative synanthropes.

Aquatic habitats are well represented and for the first time in the sequence we see the presence of large water diving beetles, represented by *Agabus bipustulatus* and *Colymbetes fuscus*, which suggest sizeable pools of water, with some

areas of open water. *A. bipustulatus* appear to favour deeper pools (>30 cm deep) (Foster 1995). *Colymbetes fuscus* is found in vegetation-rich, shaded standing waters (Koch 1989); both are rather generalist species. Smaller water beetles *Hydroporus gyllenhali*, *H.? neglectus* and *Hydroporus* spp. continue to remain abundant, suggesting aquatic habitats are important in this phase and open water more extensive than previously. The presence of hydrophilids such as *Hydrobius fuscipes*, *Anacaena globosus*, *Hydraena britteni* suggest extensive detrital habitats within the ditch (Hansen 1987), alongside the ubiquitous *Cyphon* spp., *Olophrum fuscum*, *Lesteva heeri*, and *Lathrobium brunnipes*. There are a few waterside plants indicated by the presence of reed beetles *Donacia/Plautemaris* sp, but this does not seem to have been a significant habitat. The surrounding area supported several hygrophilous species common in fen woodland, such as the Carabidae *Agonum fuliginosum*, *Trechus obtusus*, *Pterostichus* spp. (Lindroth 1954), habitats also suitable for *Oxytelus fulvipes*.



Figure 24: Sample 009, Context 007; *Hydrobius fuscipes* may be seen in the centre (large elytra).

There are also several drier habitats nearby, including grasslands, represented by members of *Apion*, *Sitona* and *Ceutorhynchus* spp, *Agriotes* spp., *Tychius* sp. which are found on grasses and herbs in open areas. Drier habitats are suggested by *Micropeplus staphylinoides*, which is found in fungoid decaying vegetation, including in rotting straw (Koch 1989), whilst *Cidnopus aeruginosus* is associated with sandy, grassy places (*ibid*).

There are also tree habitats; *Strophosoma melanogrammum* continues to indicate the presence of deciduous trees. Oak is represented by *Rhynchaenus quercus* and willow by *Crepidodera* sp. and, *Rhynchaenus rusci* is found on birch (Koch 1989) with *Rhamphus pulicarius* being found on birch and willow. There are likely to have been some dead and dying wood in the vicinity. For example, the alder bark beetle, *Dryocoetinus alni*, attacks standing trees which are beginning to dry out or which are weakened (Palm 1951; Koch 1989), whilst *Rhizophagus ? principis* is found under bark of various dead trees (Hyman 1992). The presence of the furniture beetle, *Anobium punctatum*, is most likely to be associated with trees in their natural habitat, rather than indicative of archaeological materials, as it is associated with both living and dead deciduous trees, though this possibility cannot be excluded. The continued presence of *Quedius truncicola*, suggests ancient broad-leaved woodland continues to be present in the wider landscape.

There are several indicators of dung and rotting foul matter becoming incorporated into the ditch. These include *Aphodius niger* (Figure 25) which feeds on decaying matter in damp soil at the sides of ditches and ponds rich in decomposing leaves or frequented by cattle and horses (Jessop 1986), whilst the yellow dung fly ?*Scathophaga* fly is typically found on fresh cow pats. There are also several 'foul' staphylinidae beetles and other fly puparia, including *Megasternum obscurum* lives in all sorts of decaying organic matter, including rotting vegetation, compost, old dung (Koch 1989), but in this context may well have been associated with herbivore dung and decaying vegetation matter. It seems likely that animals are grazing nearby or using the ditch for water. It is important to stress that the numbers of dung beetles are comparatively small and probably more in line with occasional usage of the feature.

It seems likely that this sample is anthropogenic in origin, re-enforced by the high MNI abundances and range of taxa within the sample, demonstrating a range of pastoral habitats, meadowland alongside ancient broad-leaved woodland, perhaps akin to pasture woodland. The range of aquatic beetles might suggest the feature was being kept clean or regularly cleaned out to allow more open water habitats to develop.



Figure 25: Sample 009, Context 007; *Aphodius niger* close-up.

Context 007, Sample 008

This is a very abundant sample, with 155 MNI represented, across 60 taxa, many in common with the previous sample, with many ecological overlaps. Preservation is generally good (Figure 26), but there are some specimens with a more mottled appearance, suggesting erosion of these materials. The community of species represented include aquatic habitats (26%) and waterside/hygrophilous species (42%), alongside insects associated with decaying organic matter (12%). Other groups represented include those associated with plants (7%), foul organic matter (1%) and communities associated with wood and trees (4%). There are 4 facultative synanthropes.



Figure 26: Sample 008, context 007; note large *Geotrupes stercorarius* elytra top left and leg below.

There is an important aquatic community, dominated by several very large water beetles, suggesting open aquatic habitats, including *Agabus melanarius* – a species that can be found in shallow spring-fed pools and streams, sometimes plant-free pools, but can also be found in woodland pools with decaying leaves (Friday 1988; Koch 1989). A range of smaller water beetles of the *Hydroporus* family are also present, including *H. gyllenhali* and *H. scalesianus*, which is found in boggy, woodland pools, in clear water (Friday 1988). Well vegetated waters are indicated by *Hydraena britteni*, but there is a sense of waters that have more open water habitats than previously. A range of hydrophilids indicate detrital habitats on the margins of the ditch, represented by *Olophrum fuscum*, *Lesteva heeri*, *Lathrobium brunnipes*, *Ptenidium* sp., *Anacaena globosus*, *Cyphon* spp. Some waterside vegetation is suggested by beetles of the reed beetle family (*Plateumaris* spp.), alongside the weevil *Limnobaris dolorosa*, which is usually found on Juncaceae and Cyperaceae, *Carex* spp., *Scirpus* spp. and *Cladium mariscum* (Koch 1992). *Notaris acridulus* can be found associated with similar marsh plants, often Cyperaceae, and reed sweet-grass, *Glyceria maxima* (Koch 1992). A range of ground beetles associated with marshy, wet conditions are also present, including *Pterostichus diligens*, *Agonum fuliginosum*, *Pterostichus* spp.

Dryland, grassland habitats are represented by *Apion* spp., *Cantharis* spp, *Cidnopus aeruginosus*, whilst *Bradycellus ruficollis* suggests some open, sandy, gravelly ground, perhaps associated with cultivated land (Luff 1988). *Dascillus cervinus* can be found on flowering herbs in grassland on rather dry, stony soils (Duff 1993).

There are nearby tree/wood habitats in the form of Scolytids and weevils. These indicate the presence of oak (*Rhynchaenus quercus*), willow and birch (*Rhamphus pulicarius*; *Crepidodera* sp.), alder (*Dryocoetinus alni*) and more broadly deciduous trees (*Strophosoma melanogrammum*). *Rhynchites cupreus* indicates rowan (*Sorbus aucuparia*) (Bollock 1993). Quite open habitats may be implied, with species such as *Agriotes acuminatus*, which is found in light woodland and woodland margins (Koch 1989), alongside the presence of dead trees (*Rhizophagus ?principes* is found under bark of various dead trees (Hyman 1992).

Alongside these taxa, the presence of *Geotrupes stercorarius*, indicates grazing animals. This large scarab beetle is found in horse and cow dung, preferring the former (Jessop 1993), whilst *Megasternum obscurum* is also likely to have been attracted to animal dung. The absence of dry rotting indicators suggests the dung is not stable manure being deposited within the ditch, but more likely indicative of animals within close vicinity of the ditch, either grazing within the landscape or using the ditch for water. There is a sense the aquatic habitats are quite 'clean'. There is no doubt this sample is also anthropogenic in origin, re-enforced by the high MNI abundances for the sample.

Context 007, Sample 007

This sample yielded abundant insect fossils – 167 MNI, across 55 taxa, largely of the Coleoptera family, but also some Dipterous fly puparia remains (Figure 27). Again, there are many similarities with the previous two samples. Aquatic and semi-aquatic taxa are clearly one of the main categories represented, representing 41% of the assemblage, followed by waterside, marsh and hygrophilous taxa (29%). The community associated with decaying debris, in contrast, is represented by 4% of the fauna. Also present are species associated with plants and trees.



Figure 27: Insect assemblage in Sample 007, context 007.

There are taxa associated with vegetation-rich aquatic and semi-aquatic habitats and living in detritus rich waters or drier detritus-rich habitats (e.g. *Hydroporus gyllehalli*, *Hydroporus* spp.; *Hydraena riparia/britteni*, *Hydrobius fuscipes*, *Anacaena globosus*, *Lesteva heeri*, *Olophrum fiscum*, *Stenus kiesenwetteri*, *Cyphon* spp.) but also includes several generalist aquatic taxa associated with more open water conditions, such as *Agabus bipustulatus*, *Helophorus* spp., *Hydrobius fuscipes*, *Colymbetes fuscus*. It is clear that open water habitats remain important. Alongside these, are taxa associated with waterside vegetation such as *Limnobaris dolorosa*, which is usually found on Juncaceae and Cyperaceae, *Carex* spp., *Scirpus* spp. and *Cladium mariscum* (Koch 1992), whilst members of the chrysomelid genus reed beetle *Plateumaris* spp are found in a range of vegetation communities alongside the margins of waters.

There is a small terrestrial community of ground beetles including *Pterostichus diligens*, and *Agonum fuliginosum* sp., which are attracted to hygrophilous substrates. A range of weevils, chrysomelids and ground beetles provide information on the wider community of plants and drier vegetation within close vicinity, such as *Ceutorhynchus* spp, *Apion* spp. *Bradycellus ruficollis* indicates that open, sandy, gravelly ground, remains important. *Pseudostyphilus pilumnus* is also associated with sandy places associated with mayweed, *Matricaria recutita* (Hyman 1992). A similar range of taxa to previously are associated with trees and woodland communities, indicating oak, willow and birch (*Rhynchaenus quercus*; *Rhynchaenus rusci*; *Rhamphus pulicarius*; *Crepidodera* sp; *Strophosoma melanogrammum*).

Finally, there are some components that are associated with human activities, including *Megasternum obscurum* which is often associated with rotting vegetation and dung, alongside *Aphodius* spp. and flies associated with dung, including the yellow dung fly ?*Scathophaga*, which is typically found on fresh cow pats (Figure 28). These are typically associated with the presence of mammals as the adult flies require a blood meal and their larvae feed on animal or human waste. This material looks likely to have become incorporated into the deposit through human activities, most likely from nearby grazing

animals or due to animals coming to the feature to seek water. It's unlikely this material is stable manure as typically such assemblages contain a mixture of foul/manure indicators, alongside beetles typical of dry conditions associated with straw, which are noticeably absent within this material.



Figure 28: *Scathophaga* yellow dung flies on cow pat (Photo: David Smith).

It is noticeable (Figure 29) that some specimens in this sample appear to have suffered from varying levels of erosion – giving a mottled appearance to quite a lot of specimens. This is not across all specimens, but just some and across certainly families more than others. It is likely the product of differential taphonomic issues with the material, most likely drying and re-wetting *in situ* or perhaps less likely due to drying in storage. It is noticeable this has impacted samples further up the sequence, which would suggest drying has happened *in situ*. This type of erosion is commonly found in deposits that are subjected to water table fluctuations. It suggests that similar deposits should be sampled as they are encountered as they suggest that aspects of the archaeological record are being lost progressively over time due to drainage.

Context 007, Sample 005

The material in this sample is not very abundant (44 MNI), across 29 taxa, but what is present is well preserved, with no signs of degradation or mottling. Even very delicate, flimsy, elytra are well preserved (Figure 30). This sample has a noticeable reduction of aquatic and semi-aquatic species compared with previously (17%) and an abundance of waterside and hygrophilous species (36%), alongside small numbers of plant and tree associated species and decaying organic matter (22%).



Figure 29: Showing mottling and erosion of materials in Sample 007, context 007.



Figure 30: Sample 005, context 007; close-up of insect sub-fossils.

Species indicative of aquatic and semi-aquatic habitats include *Hydraena brittteni*, *Hydroporus* spp., *Anacaena globosus*, all of which are associated with well-vegetated aquatic habitats, but there is a distinctive lack of species associated with clear open water that was present in preceding samples. The abundance of waterside and hygrophilous species would suggest that the ditch was becoming increasingly

full of detrital material, which attracted species such as *Microcara testacea*, *Cyphon* spp. *Lesteva heeri*, *Lathrobium brunripes*. It is noticeable that the previous range of species is not present, suggesting a shrinking range of habitats. *Limnobaris dolorosa* indicates the continued presence of waterside plant species such as Juncaceae and Cyperaceae, *Carex* spp., *Scirpus* spp. and *Cladium mariscum* (Koch 1992) at the time of deposition. Mildly basic environmental conditions are indicated by *Plateumaris sericea*, whose larvae spin cocoons in rhizomes and roots of *Typha latifolia*, *Iris pseudacorus*, *Schoenoplectus lacustris*, *Bolboschoenus maritimus* and *Sparganium erectum* (Stainforth 1944), as well as on *Carex* and *Nuphar* species (Bullock 1993). Finally, the presence of *Agonum fuliginosum* is indicative of nearby terrestrial marshy environments. There are very few species indicative of open grassland, apart from a couple of Elaterid click beetles. The former diversity of beetles associated with grassland and herbs is absent in this sample; there are also no indicators of grazing animals within this assemblage.

There were copious amounts of wood within this deposit and some of the following taxa may have fallen in either associated with wood or from overhanging trees, including *Rhynchaenus rusci* (*Betula* sp.) and *R. quercus* (oak). The presence of leaf beetles of the *Rhynchaenus* family likely became incorporated from nearby hanging trees over the deposit; their elytra are very delicate and so unlikely to have become incorporated in wood materials. *Deporaus betulae* is typically found in birch and hazel (Bullock 1993). *Cryphalus picea* is a Scolytid that develops in the dead branches of *Picea* (spruce) but may have also developed in other coniferous wood. Spruce is not a native species to Scotland, so either this deposit belongs to a substantially later period, or this taxon was associated with an alternative conifer such as *Pinus sylvestris*, although it is worth noting that there have been no indicators of this species through the sequence, suggesting that the natural woodland in this area is mostly deciduous in nature. Overall, this assemblage is likely to be of natural origin and does not appear to contain any synanthropic or anthropogenic indicators. It is noticeable that diversity had declined dramatically, and the range of taxa seen previously had largely disappeared.

Context 007, Sample 004

This material is mostly well preserved (with a few minor exceptions) and abundant, with 101 MNI recovered, across 52 taxa. Aquatic and semi-aquatic habitants are once again important, representing 40% of the assemblage, alongside waterside and hygrophilous taxa (25%) and decaying organic materials (11%).

There are many Dytiscid water beetles, including the large water beetles (e.g. *Agabus bipustulatus*, *Colymbetes fuscus*, *Ilybius/Agabus spp.*, *Hydroporus spp.*) and *Helophorus brevipalpis*, found in vegetation rich, standing waters (Koch 1989). A wide variety of species associated with well-vegetative waters (e.g. *Hydraena brittnei*, *Cyphon spp.*, *Olophrum fuscum*, *Anaceana globosus*, *Hydrobius fuscipes*) indicate this is an important habitat. Ground beetles *Pterostichus diligens* and *Agonum fuliginosum* and a range of staphylinidae indicate marshy habitats, with waterside plants indicated by *Plateumaris sericea* (e.g. *Typha latifolia*, *Iris pseudacorus*, *Schoenoplectus lacustris*, *Bolboschoenus maritimus* and *Sparganium erectum*. *Altica lythri* is usually associated with a range of willow herbs in fens and damp habitats (Duff 1993).

A few species are indicative of grassland and open habitats, such as the Coccinellid *Scymnus spp.*, *Sitona sp.*, *Cantharis sp.*, whilst *Dascillus cervinus* can be found on flowering herbs in grassland on rather dry, stony soils (Duff 1993). A few species are associated with over-hanging trees, including *Rhynchaenus rusci* (on birch), and *Rhamphus pulicarius*, also on birch and willow trees (Morris 1993). *Strophosoma melanogrammum* continues to be present and indicates the presence of deciduous trees. Fragments of *Geotrupes sp.* and *Aphodius sp.* indicate the dung from nearby grazing animals, whilst *Corticarina/Corticaria sp.* may be associated with drier decomposing vegetation.

The assemblage appears to be largely of natural origin, despite the presence of some dung beetles; many of the other indicators of grassland, disturbed soils seem largely absent and even the tree associated taxa seem limited compared with previously.

Discussion: inferred archaeological significance and chronology

It is clear that the samples represent conditions associated with a ditch as it underwent a life-cycle of change. Some elements of the beetle communities are largely natural in origin and reflect the environmental conditions associated with a water-filled feature as it began to infill. In addition to providing information on the conditions associated with the feature itself, they also tell us something about the nature of the wider landscape in this area. Wetland habitants were important within the immediate vicinity but also beyond, as suggested by the range of beetles associated with peatland substrates and alder carr in the basal samples. Beyond these areas, however, the landscape appears to have been akin to pasture woodland, with rich grasslands and mixed woodland within the vicinity of the sampled feature, especially in the early stages. Large grazing animals (cattle, horses) were important components within this context, suggesting a largely pastoral landscape, substantially but not entirely cleared of trees. The presence of a wide variety of taxa associated with trees (alder, oak, willow and birch are all indicated) and woodlands and ancient woodland habitats suggest that some of this was quite ancient, albeit within a largely pastoral landscape, though over time the importance of these habitats seems to have declined and become less varied. Over this period, the ditch appears to have started to terrestrialise and become increasingly clogged up with plant materials, with diminished open water habitats.

The communities associated with the bottom-most samples of ditch (context 012, sample 016) are reasonably abundant and dominated by open and aquatic communities, watersides and decaying communities, though not foul. Aquatic communities suggest standing or slowly moving water bodies, typical of small detritus pools, alongside other species characteristic of wetland habitats, perhaps set within a wider area of alder carr and marshland. Perhaps the ditch took advantage of existing lower ground and marshy areas as part of its construction. Drier habitats are also represented, indicating grasses and herbs in open areas and the survival of ancient

grassland and sun-exposed sandy areas amongst the grassland areas, together with the presence of large grazing animals such as horse and cow. The presence of several species typical of trees and woodland, and taxa indicative of ancient broad-leaved woodland and pasture woodland suggests the landscape retained an important woodland element of some antiquity, within the context of an open landscape of open woodlands and grasslands, with some grazing animals and alder carr habitats nearby. Apart from the grazing animal indicators, there is limited sense of human activity in this landscape, where patches of ancient woodland remained. These conditions must have been those associated with construction of the ditch, representing either the conditions immediately before-hand or contemporary with the very early stages of creation of the feature.

Successive samples, whilst also within the basal elements of the ditch (context 010; samples 017, 006 and 003) returned rather few remains, largely because two of the samples were picked from plant residues and one returned sparse remains although paraffined in full. It is likely that some of material that may have survived was lost in the sieving process as sieve sizes for plant macrofossil analyses are larger than those used for the retrieval of insect remains, as well as perhaps smaller sample sizes. Material was in good condition and indicates open water conditions within the feature, waterside plants of *Carex* and *Phragmites*, in a landscape of largely open conditions and scattered over-hanging trees of birch and willow nearby, together with the presence of grazing animals nearby (horse and cattle) and other species associated with grazing land. *Polytricum*-dominated peat represented the bulk of material in one sample (017) and probably reflects the waterlogged, boggy nature of the ditch at this time, where it clearly formed mats of vegetation across it – conditions that may have been deliberately encouraged. Aside from the species associated with grazing animals, this is largely a ‘clean’ deposit, with few anthropogenic indicators, suggesting the ditch was kept in a good, clean condition at this stage. The low numbers of fossils make it hard to be sure due to low abundances, but the impression provided is of a more open landscape compared with previously.

Samples 009, 008 and 007 (context 007) signal changes in landscape and in usage of the ditch; firstly, it seems likely that the ditch was cleared out to create more open water habitats, or was subject to hydrological changes. Whatever the mechanism associated with this, open waters characterize the ditch, perhaps deliberately so, for either watering grazing animals, or associated with a maintained open ditch system and although detrital material continued to remain a major aspect of the communities, the ditch was largely kept clear of vegetation. Riparian plants fringe the feature at times. There are hints that large herbivores – either cows and/or horses – were kept in vicinity of the ditch, as suggested by some of the dung fauna and fly remains. Disturbed soils and exposed sand and gravel indicators suggest areas nearby may occasionally have been trampled by grazing animals, but activities are not intensive. A species-rich grassland continued to be present within the vicinity of the site, alongside a wide range of woodland and tree taxa, akin to wood pasture or open grassland with scattered trees.

By the time sample 005 (context 007) was deposited, the ditch was once again starting to infill with decaying debris and open water habitats declined. Over the course of this sample and the next one there seems to have been much less archaeological activity within the vicinity and wider landscape and there is a noticeable decline in the range of species associated with grassland and woodland, suggesting a decline of niches and of archaeological activities. Whilst sample 004 appears to indicate that the ditch became wetter once again, a lot of the former diversity of insect remains are no longer present and although grazing animals appear to continue to use the landscape it is perhaps not at the same intensity.

Overall, the material does not represent the type of assemblage one might expect from a settlement, fort or a farmstead site and largely reflects low level activities within a pastoral landscape but is in line with one might expect of a maintained ditch with open water, perhaps either constructed as part of the Antonine Wall or associated with activities within proximity of the Wall. The Antonine Wall was constructed c. 142 AD, taking about 6 years to construct,

but was eventually abandoned sometime in the AD 160s (Hanson and Breeze 2020). The Bayesian chronology for the samples (Figure 21) suggests that the basal materials are broadly contemporary with the Antonine Wall archaeological period. The model indicates that context 010 (at the base) is dated to cal AD 127 – 247 (95% probability), overlapping the period when the Wall was constructed and abandoned; a deep ditch system was associated with construction of the Wall and it is possible the feature represents elements of this. It also stands to reason that the very basal sample below this (context 012) pre-dates this period and relates to the environmental conditions during the very early stages of construction of the ditch or immediately before construction. Consequently, this material provides a good insight into the landscape that the Romans arrived within, or during early stages of occupation - an area of marshy alder carr with areas of rich grassland and ancient woodland, grazed by cattle and horse, within which the ditch was constructed.

Although it is conceivable context 010 represents material after abandonment, faunal changes between contexts 012 and 010 may lend weight to the notion that assemblages are contemporary or partially contemporary with the Antonine Wall period. Distinct changes in the communities imply increased activity in the landscape, including the maintenance of the ditch as an open water feature (perhaps via regular clearing), the increased importance of large grazing animals such as horse and cattle, the disappearance of alder carr and marshy areas (perhaps via drainage) and reduction of some aspects of woodland areas, and the disappearance of ancient grassland areas, perhaps due to increased grazing. It is striking that the basal samples (context 012 and 010) are not entomologically very significant, in contrast to context 007, mostly representing low-level activities occurring within a pastoral, grazed landscape. If the samples are contemporary with Roman activities on the Wall, then the feature might either represent activities at some distance away from major archaeological activities, perhaps representing occasional use or low-level usage, or that the feature was regularly cleaned out and kept clear of archaeological materials that occasionally get deposited in ditches of this

period - which might explain the limited recovery of materials at this level - though sample size is definitely an issue for context 010.

The Bayesian model indicates that context 007 (samples 009 to 004) started cal AD 205 – 335 and ended sometime around cal AD 240 – 444 (95% probability), lasting about 115 years and thus definitely post-dates the construction and abandonment Antonine Wall period, by about a century or more. These assemblages are much more abundant than previously and most likely post-date the abandonment of the site. They represent infill material that was either deposited during the retreat of the Roman army or perhaps, most likely, which slowly infilled the ditch with abandonment of the legions and the feature no longer being maintained. The fact that open water remained important through several samples of context 007 suggests the infill was gradual and/or the feature continued to be cleared out for a while after the end of the Antonine Wall period, or that the feature was sufficiently deep to retain open waters for some time. It is worth noting that there are several similarities between context 007 assemblages and those from Layers B and C associated with the ditch at Bearsden Roman Fort (Locke 2016), which also represent the slow infilling of the ditch after the fort had been abandoned.

It is a little hard to reconcile the clearly anthropogenic origin samples within context 007, with the earlier materials that are much more closely dated to the Antonine Wall period. Perhaps the best interpretation for this disparity is that during the main life-time of the feature the ditch was regularly cleared out and so rather less material was deposited, whilst during the post-abandonment phase material was either deliberately dumped into the feature as part of post-Wall activities or that the location remained a focus of ongoing activities despite the abandonment of the site by the legions. This did not remain the case for too long, as by the time the upper-most samples were deposited (005 and 004, context 007) extremely limited activity occurred around the site, within a largely clear pastoral landscape with scattered trees. Grazing of animals continued within this landscape and any disturbance attributed to the Roman period subsides.

This story of fluctuating land use accords well with other palaeoecological evidence, which highlights that deforestation occurred well before the Roman invasion and then with woodland regeneration occurring in the post-Roman period (Davies 2020). It is quite clear from the evidence that the basal samples are associated with a largely cleared landscape, but where there was existing survival of areas of ancient woodland, within a predominantly pastoral landscape, and where some land was also left in an unmanaged state, including areas of wetland and peatland, such as observed here. The construction of the ditch was undertaken through a largely open landscape, perhaps taking advantage of existing open areas as part of the construction process and areas of marshy land to create an open-water ditch system. There are hints that levels of woodland habitats declined through the life-time of the ditch, although there is no sense this was in any way dramatic, rather following existing trends of increasing clearance. Towards the end of the period of deposition of the deposit it is quite clear that anthropogenic activities subside, with the landscape returning to a more obviously pastoral landscape, with over-hanging trees. Whatever impacts the Roman legions and post-Roman activities had in this area were modest and there is little sense that there are any dramatic changes in land-use during the period of construction and use of the ditch (cf Davies 2020).

General Discussion

By Maureen Kilpatrick

Over the last 20 years numerous archaeological fieldwork projects have taken place in and around Bearsden. Much of this work, although not exclusively, has been the result of residential development within private individuals' gardens during the construction of garages, extensions and garden structures undertaken as part of the planning process. However, the importance of this area has been known for many years, mainly due to the Antonine Wall and its associated structures including forts. Little of these structures survive above ground today: casualties of the growth and expansion of Bearsden town in the nineteenth century. Figure 31 shows that as late as the nineteenth century the area of this most recent work was agricultural land. An exception to this being Bearsden Roman Fort bathhouse Scheduled Monument which, following its excavation in the latter half of the twentieth century (Breeze 2016), was left exposed. Its location is now surrounded by a modern housing development.

Groundwork monitoring during the development process is therefore an important aspect of archaeological works to investigate the survival of any below ground archaeological remains along the World Heritage Site or its Buffer Zone. In the case of the works at BR/A and BR/C Boclair Road, HES played a key role in ensuring that adequate resources were devoted to investigating the area more thoroughly, despite the planning condition being technically satisfied for each development. This highlights the importance of consultation between local authority archaeologists, commercial archaeologists, academics, researchers, and key historic environment organisations, such as HES, in order to ensure that adequate opportunities are available to investigate potentially significant archaeology where it cannot be preserved *in situ*.

Excavations by Breeze (2016) between 1973 and 1982 at Bearsden Roman Fort Scheduled Monument (SM 3662) revealed that remnants

of the fort still survived below ground despite the development and continuing urbanisation and expansion of Bearsden. Granary buildings, roads, the bathhouse, annexe and the defences including the ditches were all investigated during the work. Breeze (2016) concluded that its survival was probably due to the low-lying nature of the ground with the ground level being raised during the development of Bearsden, rather than reduced in height. This, and the recent work at BR/A and BR/C Boclair Road, demonstrates the potential for Roman, and indeed other archaeology to survive even within an urban environment.

The archaeological investigations at Boclair Road revealed the inner kerb of the stone base of a turf rampart and a parallel ditch 11 metres to the east of it, likely an outer perimeter ditch, both perpendicular to the course of the Antonine Wall to the immediate north. Altogether these features appear to comprise fragments of a Roman Fortlet attached to the southern side of the Antonine Wall. This interpretation is supported by the

radiocarbon dating evidence recovered from the base of the ditch and the apparent recovery of Roman pottery sherds from the stone base itself. The geophysics results to the immediate north, revealing stone structures, likely relate to surviving fragments of the Antonine Wall itself.

Topography and Landscape

The location of this investigation was on a ridge of higher ground at around the 60-70 m contour line (Figure 32). A further area of high ground is located to the north-west, which reaches a height of up to 80 m. In-between these areas is an area of low lying ground where the Manse Burn flows towards the Allander Water. The siting of the possible fortlet on this higher ground afforded it commanding views of the surrounding landscape particularly that to the north which was not in Roman control. Unimpeded views were also provided to the west towards Bearsden Roman Fort (SM 7479), which was positioned on the lower lying ground, at around the 50 m contour line.

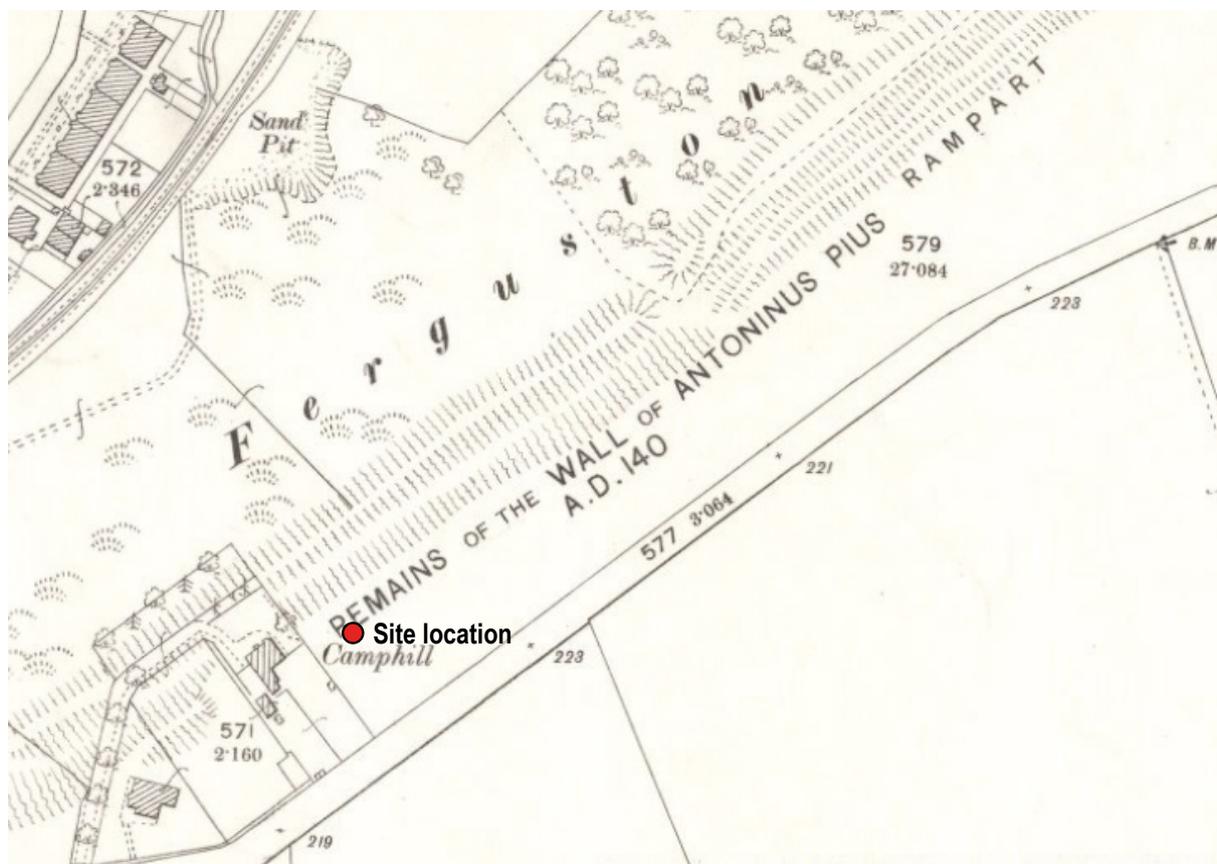


Figure 31: Excerpt from 1898 Ordnance Survey 25" ed. (Reproduced by permission of Ordnance Survey on behalf of the Controller of His Majesty's Stationery Office. All rights reserved. Licence number 100050699).

The siting of the fortlet on the ridge would not only have provided good strategic sense with regards to its observational position, but also filled in a ‘gap’ along the wall where no defensive structures are presently known (Gillam 1976; Hanson and Breeze 2020). Between Bearsden Roman fort and Summerston fortlet to its east there is a gap of just under 3 km; from Bearsden Fort to Balmuildy Fort to the east of Summerston fortlet the gap measures approximately 3.5 km.

Environment

Although the present investigative work was limited, both the botanical and fossil beetle analysis provided evidence of the environment during and after the Roman occupation of the area, and also provided information on the likely environmental conditions before the Roman occupation. Analysis of fossil beetle remains is particularly useful at reconstructing past environments as beetles are indicator species

adapting quickly to environmental change and requiring optimal and often very different environmental conditions, and in some cases host fauna and flora to thrive.

The analysis describes open areas with deciduous woodland comprising tree species including oak, alder, willow and hazel and areas of open water/marsh including grassland areas used as pasture for large ungulates such as cow and horse. It describes a relatively ‘cleared’ landscape with areas of ancient woodland remaining. This present research confirms the pollen analysis from the 10-year long excavations and post-excavation analysis at the nearby Bearsden Roman fort (Breeze 2016). Pollen analysis suggested that when the fort was built the surrounding landscape was open pasture with areas of partially cleared woodland with species including alder, hazel and willow, lesser amounts of oak and birch. Grasses were present within the cleared areas.

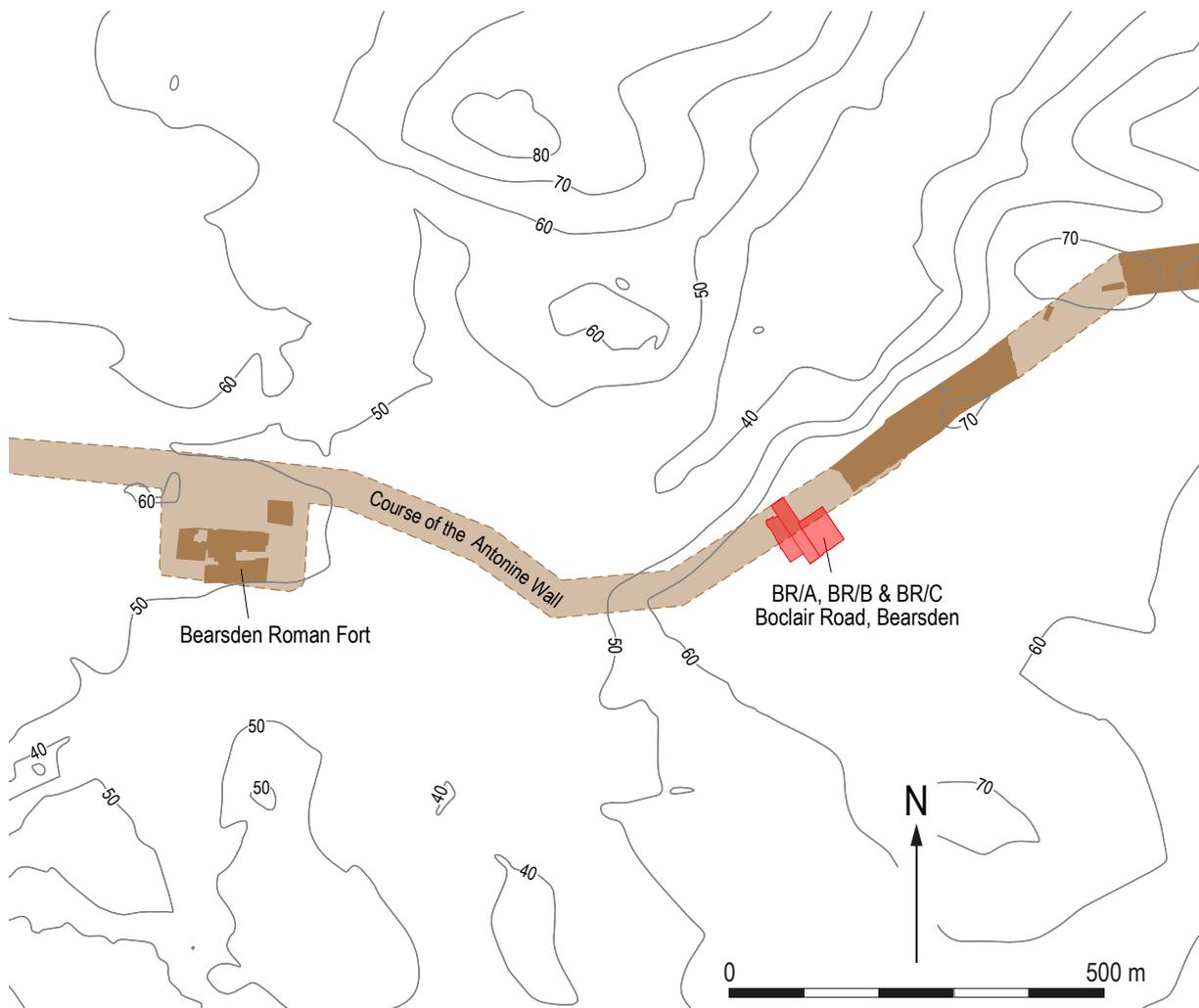


Figure 32: Contour map with location of present work and Bearsden Roman fort.

Whitehouse (above) also suggests that the 'sterile' nature of the lower ditch deposits (010) could be evidence of the ditch being cleaned out periodically while it was in use, with the upper ditch deposits (007) providing evidence of its abandonment, it being left to gradually and naturally fill up with vegetation. It is also suggested that while the material might not be what is expected from a settlement site, it also indicates low level activity and what could be expected from a maintained ditch such as that associated with the Antonine Wall.

Ramsay and Loudon (above) made comment on the hair and bog mosses and their uses within the archaeological context including the use of hair mosses use in items of clothing such as caps. Loudon analysed the hair moss and confirmed Ramsay's findings that there was no evidence of the plant being used at this site, although the analysis was limited.

Roman Fortlets

There are presently at least 17 known fortlets along the Antonine Wall. These include Bar Hill (Canmore ID: 45920), Boclair (Canmore ID: 44485), Cleddans (Canmore ID: 44555), Croy Hill (Canmore ID: 45875), Duntocher (Canmore ID: 43265), Glasgow Bridge (Canmore ID: 45253), Kinneil (Canmore ID: 48135), Laurieston (Canmore ID: 47892), Seabegs (Canmore: 46788), Summerston (Canmore ID: 4448), Watling Lodge (Canmore ID: 46783), Wilderness Plantation (Bailey 2021) and the recently re-discovered Carleith fortlet (Canmore ID: 43309) in West Dunbartonshire towards the western end of the Wall. They acted as outposts or watch towers along the wall and could house between 20 and 50 soldiers at a time. According to Bailey (2021, 55) they were usually placed in areas of tactical requirement, such as in gaps between the forts or areas requiring additional monitoring such as blind spots. They also used the topography to enhance their positions, such as at Kinneil fortlet which is located on a small knoll and Watling Lodge fortlet which occupies the apex of a ridge (Breeze in Bailey 2021, 55). The present fortlet at Boclair Road is similarly placed on a ridge with views of the surrounding area and potentially fills a 'gap' along the Wall that could have provided additional support to the nearby Bearsden fort.

Those fortlets that have been investigated by archaeological excavation suggests that they

were either contemporary or preceded the Wall's construction suggesting they were part of its original design (Hanson and Breeze 2020). Most of the known fortlets are attached to the Wall itself, except Bar Hill which lies adjacent, while the fortlet at Duntocher fort predates the Wall itself and has a perimeter ditch on all four sides, the only one known to do so (Bailey 2021, 97). Meanwhile, Laurieston fortlet was constructed after the Wall was built (*ibid*, 56).

Unfortunately, due to the limitations of the present work this could not be ascertained for the Boclair structure. Gillam in his 1975 paper suggested that the design of the Antonine Wall was generally based on that of Hadrian's Wall and that the fortlets were regularly spaced along its length at intervals of 1 mile, although only four were known at this time (Duntocher, Wilderness Plantation, Glasgow Bridge and Watling Lodge). Following the publication of his work, further fortlets have been discovered including Cleddans, Summerston, Croy Hill and Carleith fortlets, although do not 'fit' into his spacing model of 1 mile. He also suggested that forts were similarly either built before the Wall's construction or following it, Kilpatrick fort an example of one built before the wall but was designed to allow for its integration as was Balmuildy fort (Hanson 2020). These later forts also included Bearsden fort, which could suggest that the Boclair Road fortlet might have been built before the Wall's construction and although it 'filled a gap' in the defences at this location, it was an integral component in the original design affording views of the area during the building of Bearsden fort. Alternatively, it may have been built later, a response to deteriorating local conditions and increases in border security (Hanson and Breeze 2020, 30).

Fortlets were small sub-rectangular enclosures that measured on average 21 m by 18 m (Breeze 2008) with an outer perimeter ditch on all sides except the north where it met the Wall. They also contained a turf rampart set on a stone base which measured on average 3 m in width and was of similar construction to the stone base found at the base of the Antonine Wall itself (Figure 33). Wilderness Plantation fortlet (Canmore ID: 44475) differed slightly in having a double ditch perimeter and it also contained evidence of postholes indicating internal timber structures.



Figure 33: Antonine Wall base in Old Kilpatrick Cemetery, Bearsden.

During the additional excavation work at BR/A Boclair Road, Geoff Bailey confirmed the similarities of the stone wall base within the garden with that of the Antonine Wall and thereby a similar date for the stonework. As with the Antonine wall, this linear stone base could have supported an upper structure such as a defensive turf rampart and together with its close relationship to a ditch section of similar

orientation, could suggest that what has been discovered is evidence for a new fortlet: the ditch being a section of the perimeter ditch beyond the turf wall. The Bayesian analysis (see *Fossil Beetle (Coleoptera) Fauna*, above) also confirms the earliest phase of the ditch dated to cal AD 127 – 247 and therefore within the period of use and immediate aftermath of the Antonine Wall.

Conclusion

The work within the three gardens at Boclair Road, Bearsden although limited has revealed how important the planning process is to archaeological investigation and the discovery of new sites. Given their location and date, the archaeological remains discovered in the back gardens of Boclair Road are related to the Antonine Wall and it would therefore seem that the stone base supported a turf wall and the ditch was a section of the perimeter ditch around a hitherto unknown Roman fortlet.



Figure 34: The Boclair Road Roman Fortlet as it may once have been, by Eduardo Pérez-Fernández.

Acknowledgments

GUARD Archaeology would like to thank the three property owners for allowing us access to their gardens to carry out all the phases of work. Thank you also to Historic Environment Scotland for funding the geophysical survey, watching brief and excavation at BR/C, the post-excavation analysis and dating, and this publication. Thanks go also to Tom Rees and Geoff Bailey for their input and on-site assessment of the archaeology during the works. The fieldwork was carried out by Iraia Arabaolaza, Maureen Kilpatrick, Dave McNicol, Beth Spence and Christine Rennie with assistance from Genoveva Dimova, Ivelina Kondova and Clark Innes. Illustrations were produced by Jordan Barbour, Eddie Perez Fernandez, Jennifer Simonson and Gillian Sneddon. The project was managed for GUARD Archaeology by Warren Bailie.

Professor Nicki Whitehouse, University of Glasgow, would like to thank Dr David Smith for access to the Gorham and Girling Collection, University of Birmingham, and for assistance with some of the trickier Diptera remains and for his convivial company.

Project Archive

The site archives will be lodged with the NRHE at Historic Environment Scotland, Edinburgh.

Cartographic Sources

Gordon R and Gordon R c. 1636-52 Map Stirlingshire and Lennox. Stirlingshire with part of Lennox and some of Clydesdale. Available from <https://maps.nls.uk/rec/38>

Roy, W. c.1755 *The Military Survey of Scotland 1747-1755*. London: British Library. Shelfmark: Cartographic Items Maps CC.5.a.441 sheet 26.

Bibliography

All links were active at the time of publication.

Aaby, B and Berglund, B E 1986 Characterization of peat and lake deposits, 231-246, in Berglund, B E *Handbook of Holocene Palaeoecology and Palaeohydrology*. Chichester: Wiley.

Anderson, A C, Bateson, J D, Boyd, W E, Hartley, K F, Hodgson, G W I, Mearns, J, Robertson, A S, Smith, S and Webster, P V 1985. Excavations at the Roman Fort of Bar Hill, 1978-82, *Glasgow Archaeological Journal* 12, 49-81.

Bailey, G 2021 *The Antonine Wall in Falkirk District*. Glasgow: Bell and Bain Ltd.

Bilton, D 1988 A survey of aquatic Coleoptera in central Ireland and the Burren, *Bulletin of the Irish Biogeographical Society* 11, 77-94.

Birley, R 2009 *Vindolanda: A Roman Frontier Fort on Hadrian's Wall*. Stroud: Amberley.

Breeze, D J 2016 *Bearsden: A Fort on the Antonine Wall*. Edinburgh: Society of Antiquaries of Scotland. Available from: <https://doi.org/10.9750/9781908332189>

Breeze, D J and Jilek, S 2008 *Frontiers of the Roman Empire: The European dimension of a World Heritage Site*. Edinburgh: Historic Scotland.

British Geological Survey Online viewer 2025. Available from: <https://geologyviewer.bgs.ac.uk>

Brunning, R and Watson, J 2010 *Waterlogged wood: guidelines on the recording, sampling, conservation and curation of waterlogged wood*. London: English Heritage.

Buckland P I, Buckland P C 2006 *Bugs Coleopteran Ecology Package* (Versions: BugsCEP v7.63; Bugsdata v7.11; BugsMCR v2.02; BugStats v1.22). Available from: www.bugscep.com

Bullock, J A 1993 Host Plants of British Beetles: A List of Recorded Associations, *Amateur Entomologist* 11a, 1-24.

Canmore. Available from: <https://www.trove.scot/>

Cappers, R T J, Bekker, R M and Jans, J E A 2006 *Digital Seed Atlas of the Netherlands*. Groningen Archaeological Studies 4. Eelde, The Netherlands: Barkhuis Publishing.

- Coggins, C R 1980 *Decay of Timber Buildings: Dry rot, wet rot and other fungi*. East Grinstead: Rentokill Limited,
- Coope, G R and Osborne, P J 1968 Report on the Coleopterous fauna of the Roman well at Barsley Park, Gloucestershire, *Transactions of the Bristol and Gloucestershire Archaeological Society* 86, 84 - 87.
- Curle, J 1911 *A Roman frontier post and its people: The fort of Newstead*. Glasgow: MacLehose. P. 108, Pl. XV.
- Darwin, T 2008 *The Scots herbal: the plant lore of Scotland*. 5th edition. Edinburgh: Birlinn. Available from: <https://go.exlibris.link/SKH1rLTc>.
- Davies, M H 2020 The landscape at the time of construction of the Antonine Wall, 37-46, in Breeze, D and Hanson, W (eds.) *The Antonine Wall; Papers in Honour of Professor Lawrence Keppie*. Oxford: Archaeopress Roman Archaeology 64.
- Dobney, K, Kenward, H K, Ottaway, P and Donel, L 1998 Down, but not out: biological evidence for complex economic organization in Lincoln in the late 4th century, *Antiquity* 72, 417-424.
- Duff, A 1993 *Beetles of Somerset: their status and distribution*. Taunton: Somerset Archaeological and Natural History Society.
- Eyre, M D and Luff, M L 1990 The Ground Beetle (Coleoptera: Carabidae) Assemblages of British Grasslands, *Entomologist's Gazette* 41, 197-208.
- Foster, G N 1995 Evidence for pH sensitivity in some insects inhabiting peat pools in the Loch Fleet catchment, *Chemistry and Ecology* 9, 207-215.
- Fraser, M and Smith C 2011 The botanical remains, 67-79, in *Perth High Street Archaeological Excavation 1975-1977*. Fascicule 4. Perth: Tayside and Fife Archaeological Committee.
- Friday, L E 1988 A Key to the Adults of British Water Beetles, *Field Studies* 7, 1-151.
- Gale, R and Cutler, D 2000 *Plants in Archaeology*. Otley: Westbury Publishing.
- Gillam, J P 1975 Possible changes in plan in the course of the construction of the Antonine Wall, *Scottish Archaeological Forum* 7, 51-6.
- Hansen, M 1987 The Hydrophiloidea (Coleoptera) of Fennoscandia and Denmark. *Fauna Entomologica Scandinavica* 18. Leiden: Scandinavian Science Press.
- Hanson, WS 2020 The Design of the Antonine Wall, *Britannia* 2020, 1-21. Available from: doi:10.1017/S0068113X20000112.
- Hanson, W and Breeze, D 2020 The Antonine Wall: the current state of knowledge, 9-36, in Breeze, D and Hanson, W (eds.) *The Antonine Wall; Papers in Honour of Professor Lawrence Keppie*. Oxford: Archeopress Roman Archaeology 64.
- Harris, S and Gleba, M 2015 Bronze Age moss fibre garments from Scotland - The Jury's out, *Archaeological Textiles Review* 57, 3-11.
- Henshall, A 1950 Textile and Weaving Appliances in Prehistoric Britain, *Proceedings of the Prehistoric Society* 10, 130-162.
- Holdsworth, P (ed.) 1987 *Excavations in the Medieval Burgh of Perth 1979-1981*. Edinburgh: Society of Antiquaries of Scotland monograph 5.
- Hyman, P S 1992 *A review of the scarce and threatened Coleoptera of Great Britain; Part 1*. Revised and updated by M S Parsons. Peterborough: UK Joint Nature Conservation Committee.
- Hyman, P S 1994 *A review of the scarce and threatened Coleoptera of Great Britain. Part 2*. Revised and updated by M S Parsons. Peterborough: UK Joint Nature Conservation Committee.
- Jessop, L 1986 *Coleoptera: Scarabaeidae. Handbooks for the Identification of British Insects* 5, 11. Royal Entomological Society of London.
- Kenward, H K 1975 Pitfalls in the environmental interpretation of insect death assemblages, *Journal of Archaeological Science* 2, 85-94.
- Kenward, H K 1978 The analysis of archaeological Insect Assemblages: a new approach, 1-68, *The Archaeology of York* 19 (1). London: Council for British Archaeology.
- Kenward, H K, Hall, A R 1995 Biological Evidence from Anglo-Scandinavian Deposits at 16-22 Coppergate. *The Archaeology of York* 14/7. London: Council for British Archaeology.

- Kilpatrick, M C and Rennie, C 2017 Report 4740: BR/C Boclair Road, Bearsden: Archaeological Watching Brief, Excavation and Geophysical Survey. Unpublished Data Structure Report, GUARD Archaeology Ltd.
- Koch, K 1989 *Die Käfer Mitteleuropas. Ökologie, 1 and 2*. Krefeld: Goecke and Evers.
- Koch, K 1992 *Die Käfer Mitteleuropas. Ökologie 3*. Krefeld: Goecke and Evers.
- Landin, B O 1961 Ecological studies on dung-beetles, *Entomologica Supplement*, 19.
- Lindroth, C H 1945 *Die Fennoskandischen Carabidae I-III*. Goteborg: Goteborgs K. Vetensk. o VitterhSamh. Handl (6) B 4.
- Locke, J 2016 Insect remains, 289-299, in Breeze, D *Bearsden: a fort on the Antonine Wall*. Edinburgh: Society of Antiquaries of Scotland.
- Lucht, W H 1987 *Die Käfer Mitteleuropas, Katalog*. Krefeld: Goecke and Evers.
- Luff, M L 1998 *Provisional Atlas of the ground beetles (Coleoptera; Carabidae) of Britain*. Peterborough: NERC.
- Mabey, R 1998 *Flora Britannica: The concise edition*. London: Chatto and Windus (Random House).
- McCardel, J 1949 *The Parish of New Kilpatrick Scotland*. Glasgow: Robert Maclehose and Company.
- Milliken, W and Bridgewater, S 2004 *Flora Celtica*. Edinburgh: Birlinn and Royal Botanic Garden Edinburgh.
- Morris, M G 1993 A review of the British species of Rhynchaeninae (Col., Curculionidae), *Entomologist's Monthly Magazine* 129, 177-197.
- Munro, R 1882 *Ancient Scottish lake-dwellings or Crannogs: with a supplementary chapter on remains of lake-dwellings in England*. Edinburgh: David Douglas.
- Palm, T 1951 *Die Holz und Rindenkäfer der nordschwedischen Laubbaume*. Meddelelser Statens Skögsfors. Instituteten 40, 2.
- Rennie, C 2017 Report 4792: BR/A, BR/B and BR/C Boclair Road, Bearsden: Geophysical Survey. Unpublished GUARD Archaeology Ltd Data Structure Report.
- Romankiewicz, T, Milek, K, Beckett, C, Russell, B and Riley Snyder, R 2020 New Perspectives in the Structure of the Antonine ;Wall in Breeze, D and Hanson, W (eds.) *The Antonine Wall; Papers in Honour of Professor Lawrence Keppie*. Oxford: Archaeopress Roman Archaeology 64.
- Schoch, W, Heller, I, Schweingruber, F H and Kienast, F 2004 *Wood anatomy of central European Species*. Online version. Available from: www.woodanatomy.ch.
- Schweingruber, F H 1990 *Anatomy of European Woods*. Berne and Stuttgart: Haupt.
- Smith, D 2004 The Insect remains from the well, 81-88, in Bishop, M C (ed.) *Invereskgate: Excavations in the Roman Civil Settlement at Inveresk, West Lothian 1996-2000*. Edinburgh: STAR (Scottish Trust for Archaeological Research) Monograph Series 7.
- Smith, D N 2012 *Insects in the City: an Archaeoentomological Perspective of London's Past*. Oxford: Archaeopress.
- Smith, D N 2013 Defining an indicator package to allow identification of 'cesspits' in the archaeological record, *Journal of Archaeological Science* 40, 526-543.
- Society of Museum Archaeologists 1993 *Selection, retention and dispersal of archaeological collections: guidelines for use in England, Wales and Northern Ireland*. (1st edition). London: Society of Museum Archaeologists.
- Spence, B 2017a Report 4409: BR/A Boclair Road, Bearsden. Unpublished Data Structure Report, GUARD Archaeology Ltd.
- Spence, B 2017b Report 4736: BR/C Boclair Road, Bearsden. Unpublished Data Structure Report, GUARD Archaeology Ltd.
- Stace, C 1997 *New Flora of the British Isles*. (2nd Edition). Cambridge: Cambridge University Press.
- Stainforth, T 1944 Reed-beetles of the genus *Donacia* and its allies in Yorkshire (Col. Chrysomelidae), *Naturalist* 81-91; 127-139.
- Taylor, M 1998 Wood and bark from the enclosure ditch, 115-159, in Pryor, F M M (ed.). *Etton: excavations at a Neolithic causewayed*

- enclosure near Maxey, Cambridgeshire, 1982-87. London: English Heritage Archaeological Reports 18.
- Taylor, M 2001 The wood, 167-228, in Pryor, F M M (ed.) *The Flag Fen basin: archaeology and environment of a fenland landscape*. London: English Heritage Archaeological Reports.
- Troels-Smith, J 1955 Karakterisering af løse jordarter (Characterization of Unconsolidated Sediments), *Danmarks Geologiske Undersøgelse IV Series*, Vol. 3, No. 10, 1-73.
- Van de Noort, R, Ellis, S, Taylor, M and Weir, D 1995 Preservation of Archaeological sites, in Van de Noort, R and Ellis, S (eds.) *Wetland Heritage of Holderness - an archaeological survey* (1st edition). Humber Wetlands Project.
- Watson, E V 1968 *British Mosses and Liverworts*. (2nd Edition). Cambridge: Cambridge University Press.
- Wells, C E, Huckerby, E and Hall, V 1997 Mid- and late-Holocene vegetation history and tephra studies at Fenton Cottage, Lancashire, UK, *Vegetation History and Archaeobotany* 6, 153-66.
- Wheeler, E, Baas, P and Gasson, P 1989 IAWA list of Microscopic features for hardwood identification, *International Association of Wood Anatomists Bulletin* 10 (3), 219-332.
- Wild, J P 1994 A hairmoss cap from Vindolanda, 61-68, in Tidow, K and Jaacks, G (eds.) *Textilsymposium Neumünster, 4-7.5.1993 (North European Symposium for Archaeological Textiles - NESAT V)*. Neumünster: Textilmuseum Neumünster (Archäologische Textilfunde).
- Whitehead, P F 2005 Pollination of the Dragon Arum (*Dracunculus vulgaris Schott*) in England and Kriti, *Entomologist's Monthly Magazine* 141, 254.
- Wright, E V, Churchill, D M 1965 The Boats from North Ferriby, Yorkshire, England, with a review of the origins of the sewn boats of the Bronze Age, *Proceedings of the Prehistoric Society* 31, 1-24. Available from: doi:10.1017/S0079497X0014687
- Wright, E V, Hedges, R E M, Bayliss, A, Van de Noort, R 2001 New AMS radiocarbon dates for the North Ferriby boats—a contribution to dating prehistoric seafaring in northwestern Europe, *Antiquity* 75 (290), 726-734. Available from: doi:10.1017/S0003598X00089237

Appendix

Table 9: List of insect remains recovered from BR/C.

Sample no.	Ecological codes	Synanthropic codes	016, context 012	017, context 010	006, context 010	003, context 010	009, context 007	008, context 007	007, context 007	005, context 007	004, context 007
Context description			Fill of ditch 009	Lower fill of ditch 009	Lower fill ditch 009	Lower fill ditch 009	Fill of ditch 009				
HEMIPTERA											
Family, genus and spp. Indet.			4				3	3			
COLEOPTERA											
Carabidae											
<i>Loricera pilicornis</i> (F.)	oa					2					
<i>T. quadristriatus</i> (Schrk)/ <i>T. obtusus</i> Er.	oa		1				2		1		
<i>Bembidion</i> sp.	oa		1								
<i>Bradycellus ruficollis</i> (Steph.)	oa							1	1		
<i>Bradycellus</i> spp.	oa						1		3		1
<i>Pterostichus diligens</i> (Sturm)	oa		1					1	2		1
<i>Pterostichus nigrita</i> (Payk.)	oa-d		3				1				
<i>Pterostichus</i> spp.	oa						1	2	1		
<i>Abax parallelepipedus</i> (Pill.Mitt.)	oa								2		
<i>Agonum fuliginosum</i> (Panz.)	oa-ws						2	3	1	1	3
<i>Agonum</i> sp.	oa						1				
<i>Amara</i> spp.	oa						1				
Halididae											
<i>Haliphus</i> spp.	oa-w						1				
Dytiscidae											
<i>Hydroporus scalesianus</i> (Steph.)	oa-w							1			
<i>Hydroporus angustatus</i> (Strum)	oa-w		1		1						
<i>Hydroporus gyllenhali</i> (Schodte)	oa-w		4				2	5	2		
<i>Hydroporus melanarius</i> (Sturm)	oa-w							6			1
<i>Hydroporus</i> ? <i>neglectus</i> (Schaum)	oa-w						1				
<i>Hydroporus</i> spp.	oa-w		1	1			5	6	4	2	7
<i>Colymbetes fuscus</i> (L.)	oa-w						1		1		1

Sample no.	Ecological codes	Synanthropic codes	016, context 012	017, context 010	006, context 010	003, context 010	009, context 007	008, context 007	007, context 007	005, context 007	004, context 007
Context description			Fill of ditch 009	Lower fill of ditch 009	Lower fill ditch 009	Lower fill ditch 009	Fill of ditch 009				
Aganus melanarius (Aube)	oa-w							4			
Agabus bipustulatus (L.)	oa-w						2		1		3
Agabus spp	oa-w						1	1	2		1
Ilybius sp.											2
Hydraenidae											
Hydraena britteni (Joy)	oa-w		10				1		6	1	3
Hydraena riparia (Kug.)	oa-wff						1				
H. britteni/riparia	oa-w			1			10	7	41		9
Limnebius aluta (Leich)	oa-w		1								
Helophorus brevipalpis grp (Bedel)	oa-w										2
Helophorus spp.	oa-w		1		1				2		2
Hydrophilidae											
Megasternum boletophagum (Marsh.)	rt						1	1	1		
Hydrobius fuscipes (L.)	oa-w		1				2		1		1
Anacaena globulus (Payk.)	oa-w		7				5	4	6	3	5
Silphidae											
Phosphuga atrata (L.)	rf		1								1
Silpha spp.	rt						1	1			
Catopidae											
Catops spp.	oa		1							1	
Scydmaenidae											
Stenichnus sp.	rt			1							
Ptiliidae											
Ptilidae Genus & spp. indet.	rt		2								
Ptenidium sp.	rt						2	1			1
Staphylinidae											
Micropeplus staphylinoides (Marsh.)	rt						1				
Metopsia clypeata	rt		1								
Megarthritis sp.	rt	sf								1	
Omalium spp.	rt										1
Olophrum fuscum (Grav.)	oa-d		1				2	2	4		2
Acidota cruentata (Mann.)	oa-d		1						2		

Sample no.	Ecological codes	Synanthropic codes	016, context 012	017, context 010	006, context 010	003, context 010	009, context 007	008, context 007	007, context 007	005, context 007	004, context 007
Context description			Fill of ditch 009	Lower fill of ditch 009	Lower fill ditch 009	Lower fill ditch 009	Fill of ditch 009				
Lesteva heeri Fauv.	oa-d		6	1			5	2	7	1	1
Oxytelus sculptus (Grav).	rt			1							
Oxytelus fulvipes (Er.)	rt		1				1		1		
Oxytelus sculpturatus (Grav.)	rt	sf									
Stenus kiesenwetteri (Rosen.)	oa-d		1						1		
Stenus spp.	u		1	1			3	7	7	2	
Paederus spp.	u		1								
Lathrobium brunnipes (F.)	oa-d		2				2	2	1	1	4
Othius subfiliformis (Steph.)	rt								1	1	2
Philonthus spp.	rf		2					2	1	1	
Quedius truncicola (Fairm. & Lab.)	rt		1				1				
Quedius spp.	rf				1		1	1			1
Bolitobius spp.	rt						1	1		2	
Tachinus spp.	rf	sf	2				1	3		2	
Aleocharinidae Genus & spp. Indet.	rt		4				6	6	4	2	4
Pselaphidae											
Bryaxis bulbifer	oa-d		2				1	1			
Bryaxis spp.	oa-d			1						1	1
Cantharidae											
Cantharis sp.	oa-p							1			1
Elateridae											
Agriotes acuminatus (Steph.)	oa-p							1			
Agriotes spp.	oa-p		1				4		1		1
Cidnopus aeruginosus (Ol.)	oa-p						1	1			
Athous haemorrhoidalis (F.)	oa-p										
Athous spp.	oa-p									2	
Scirtidae											
Cyphon spp.	oa-d		10	2	2	3	23	48	30	10	16
Microcara testacea (L.)	oa-d									1	
Dascillidae											

Sample no.	Ecological codes	Synanthropic codes	016, context 012	017, context 010	006, context 010	003, context 010	009, context 007	008, context 007	007, context 007	005, context 007	004, context 007
Context description			Fill of ditch 009	Lower fill of ditch 009	Lower fill ditch 009	Lower fill ditch 009	Fill of ditch 009				
<i>Dascillus cervinus</i> (L.)	oa							1			1
Rhizophagidae											
<i>Rhizophagus</i> ? <i>principes</i> (Ol.)							1	1			
<i>Rhizophagus</i> ? <i>dispar</i> (Paykull).	rt	sf			1						
<i>Rhizophagus</i> spp.	rt	sf						1			
Phalacridae											
<i>Phalacrus</i> spp.	ws										1
Lathridiidae											
<i>Corticaria</i> / <i>corticarina</i> spp.	rt	sf									1
Coccinellidae											
<i>Scymus</i> spp.	oa										2
<i>Stethorus punctillum</i> (Weise)	oa										1
Anobiidae											
<i>Anobium punctatum</i> (Geer)	l-h	sf					1				
Scarabaeidae											
<i>Geotrupes stercorarius</i> (L.)	oa-rf					1		1			
<i>Geotrupes</i> spp.	oa-rf		1								1
<i>Aphodius contaminatus</i> (Hbst.)	oa-rf				1						
<i>Aphodius merdarius</i> (F.)	oa-rf		1								
<i>Aphodius niger</i> (Panz.)	oa-rf						1				
<i>Aphodius</i> spp.	oa-rf								1		1
Chrysomelidae											
<i>Plateumaris sericea</i> (L.)	oa-d		1						2	1	1
<i>Donacia</i> / <i>Plateumaris</i> spp.	oa-d			1			1	2			3
<i>Chrysolina</i> sp.	oa										1
<i>Altica lythri</i> (Aube)	oa-d										1
<i>Crepidodera</i> sp.	oa		2				2	1	1		1
Chrysomelidae indet.	oa		1				1		1		
Scolytidae											
<i>Dryocoetes alni</i> (Georg)	oa-l						1	1			
? <i>Cryphalus piceae</i> (Ratz.)	oa-l									1	

Sample no.	Ecological codes	Synanthropic codes	016, context 012	017, context 010	006, context 010	003, context 010	009, context 007	008, context 007	007, context 007	005, context 007	004, context 007
Context description			Fill of ditch 009	Lower fill of ditch 009	Lower fill ditch 009	Lower fill ditch 009	Fill of ditch 009				
Curculionidae											
Rhynchites cupreus (L.)	oa-l							1			
Deporaus betulae (L.)	oa-l									1	
Apion spp.	oa-p		1				2	3	2		
Phyllobius sp.	oa-p						2		3		
Strophosoma melanogrammum (Forst.)	oa-p		1				3	1	2		1
Sitona spp.	oa		1				1				1
Polydrusus sp.	oa		3								2
Notaris acridulus (L.)	oa-d							1			
Pseudostyphilous pillumnus (Gyll.)	oa-p								1		
Tychius sp.	oa-p						1				
Baris sp.	oa-p		1								
Limnobaris pilistriata (Steph.)	oa-d							6	3	1	
Ceutorhynchus spp.	oa-p						1		2		
Rhynchaenus quercus (L.)	oa-l		1				1	2	2	1	
Rhynchaenus ? rusci (Hbst.)	oa-l						1		2	1	2
Rhynchaenus sp.	oa-l							1	3		
Rhamphus pulicarius (Hbst.)	oa-l			1			1	1	1		1
DIPTERA											
Family, genus & spp. indet.			1		1			5		3	1
Sphaeroceridae									1		
Scathophagidae											
?Scathophaga sp.							1	1	2		
RAPHIDIOPTERA indet.			1								
Insect MNI			93	11	8	6	123	155	167	44	101
Numbers of species			51	10	7	3	63	60	55	29	52

*Archaeology***Reports**Online 

Archaeology Reports Online

52 Elderpark Workspace

100 Elderpark Street

Glasgow

G51 3TR

Tel: 0141 445 8800

Fax: 0141 445 3222

editor@archaeologyreportsonline.com

archaeologyreportsonline.com